Gothic Architecture

and the

Liturgy in Construction

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Abstract

Medieval Christian action, which is sometimes venerational, provides the embodiment of Christian narrative within relics. Abbot Suger saw masonry stones as if they were relics, and there must therefore be a corresponding Christian veneration and collective Christian working, i.e. liturgy, specifically to do with construction. Though the articulation of this collective Christian action in construction has not been attempted because masons left no written record of their work, it is certain manual construction was seen as a spiritual process of edification. This "liturgy in construction" is here explored through the idea of sacred geometry as an aspect of "uncreated being", applied geometry, and stone masonry craftsmanship.

The cosmological presuppositions accepted by the medieval mind allowed for religious answers to questions of building and construction in the medieval cathedral, but contemporary literature often provides an insufficient narrative of the role of religion for the daily tasks required in stone masonry. While past scholarship has asserted the cathedral was built by theologians, such notions are now seen as suspect. To what extent did religion influence these lay builders? Although it is certainly reasonable for thinkers of the 21st century to assume a secular and technological workforce, it remains somewhat of an oversight, given the weight of the religious and written tradition in medieval culture, to assume religion played no role in design and construction. The removal of key philosophical and theological notions, such as virtue, charity, the idea of uncreated being, and miracles from debates dealing with medieval architecture result in an insufficient and inauthentic account of the Gothic cathedral.

To explore the question of religious building methods in the medieval cathedral, an interpretation of the cosmology of the period is here articulated, and the work of the mason is discussed within this "cosmological" approach. Despite the absence of written documents which might reveal the presuppositions and motivations of the masons, the task of stone masonry is undertaken experimentally within this thesis in order to demonstrate how cutting stone with hand tools fits within the medieval cosmology. Thus, the processes of medieval stone masonry and of organizing a workforce without construction documents, lent themselves to easy assimilation by the medieval mind.

Contents

1.1 Acknowledgments

I wish to say thank you and express gratitude to my first and second supervisor, Prof. Fontana-Giusti and Dr. Timothy Brittain-Catlin, respectively. Their support, advocacy, patience, and skill during my time as a graduate allowed for a focus that would not have been possible otherwise. The knowledge base and encyclopaedic grasp of architectural theory and history were a never-ending resource.

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1.2 Introduction

The importance of renewed scholarly interest in Gothic[1] architecture is best understood by first establishing why a new study is necessary. A considerable time separates today from the year 1144, when the first Gothic basilica was completed.[2] During the almost nine-hundred-year interim, many developments and historical episodes have shaped the world in different ways.

The disconnect with the past is evident in current studies of Gothic architecture. Authors and scholars of today look out at the world very differently than the authors and scholars of the past, and sometimes motivations are misattributed to thinkers from long ago. One such misattribution can be found in the writings of the well-known architectural historian Eugène Emmanuel Viollet-le-Duc (1814-1879), where he sought to describe French nationalism as a motivational consideration in the construction of Notre Dame Cathedral.[3] Many of today's thinkers, like Viollet-le-Duc, haven't articulated what the medieval builders were asked to do.

Three recent developments have created a need for looking at Gothic architecture again. The first development took place over hundreds of years. The habits of "modernity", by which I mean many of the habits of thought which are taken for granted today, need to be addressed because these habits of thoughts are, in some ways, inverted from Gothic habits of thought. The second development is the ubiquitous technological invention that is the Internet. While not itself the subject of the current study, it needs addressing because of its ubiquity. The third development is the modern way of building and working. Standardization has had great influence on how things are built, and a mindful sense of what is unique and appropriate is no longer a significant concern of the construction industry.

It follows that apart from these habits and circumstances of modernity, we can articulate what the medieval builders were asked to do by entering into the medieval mind. Insofar as possible, and as will be described in the coming section on method, a medieval system of thought will be

[1] The term Gothic was first used by Renaissance authors to describe ecclesiastical buildings erected during the Middle Ages; 5th century to 15th century. Gothic was thought to be synonymous with barbaric, and therefore pejorative, by these classicising Renaissance authors. The disparaging treatment of Gothic architecture continued until the 19th century, when a Neo-Gothic revival began to emerge. In the context of this thesis, Gothic architecture of the period between 1100-1250 is looked at adjacent to the theological cosmology, which will be shown to have a significant bearing on the architectural and construction practice of the period.

[2] Basilica of St-Denis, completed 1144 AD.

[3] Van Santvoort, L., Maeyer, J. D., & Verschaffel, T. (2008). *Sources of regionalism in the nineteenth century: architecture, art and literature*. Leuven, Leuven University Press, p. 61. Not only was the notion of "nation-state" nebulous when Notre-Dame cathedral was completed in 1345, but Violet-Le-Duc was removed from the cosmology of the Middle Ages. For Violet-Le-Duc, the epistemological argument was between rationalism and empiricism, which presupposed a thinking man in a material and causal universe. The argument Violet-Le-Duc presented was that a French proto-nationalism caused the iconography and architectural forms.

adopted with which to look at Gothic architecture. In short, the methodology applied in the course of this thesis shall not presume to test a hypothesis, but instead shall adopt "medieval thinking" in order to understand medieval architecture

1.2.1 Contemporary Habits of Thought and Ancient Knowledge

One of the significant changes in "habits of thoughts" that separates the contemporary situation from the medieval world is a perception and philosophical understanding of the locus of *ideas*. Contemporary thinkers assume ideas are mental objects, created by the human brain, while for ancient thinkers, ideas were part of the universe.[4] This fundamental distinction, briefly discussed here, is a significant philosophical and theological notion upon which this thesis is based.[5]

Today it is understood that personal thoughts are the source of knowledge. Mind exists within the organic material network of brain cells. The thinking individual looks out upon the material of the universe, and theorizes about material phenomena by using his personal material network of brain cells. Theory is a re-presentation of material phenomena, and ideas are mere models of reality, but material reality itself keeps some distance from thought. This premise, often unstated, can be found in many contemporary arguments and modern essays.[6] The characterization of religion as a "belief system", is one example of this premise, and the modern scientific method of hypothesizing, testing, and theorizing, is another example.

In the ancient world, and during the Gothic episode, this premise was not yet developed. In fact, the opposite premise was taken to be true. Mind exists within what modern thinkers would call the "objective universe". In the well-known "Forms" of Plato, the essence of the cosmos "always

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[4] Dupré, L. (1993). *Passage to modernity: an essay in the hermeneutics of nature and culture*. New Haven, Yale University Press, p. 176. "I trace the problematic features of modern thought to a more recent epoch than Nietzsche's followers usually do [the epoch of Socrates]. Its seeds lie buried not in the sands of ancient or early medieval rationalism but in a set of assumptions newly formulated at the closing of the Middle Ages." These seeds of modern thought are found in the theological speculations of nominalist thought where formal ideas held nominal status only, but did not exist in reality. These nominal ideas would later influence René Descartes and the subsequent "Cartesianism", which is important for modern thinking.

[5] A brief entry on mental representation in medieval philosophy can be found at the Stanford Encyclopaedia of Philosophy. Lagerlund, Henrik, "Mental Representation in Medieval Philosophy", *The Stanford Encyclopedia of Philosophy* (Spring 2011 Edition), Edward N. Zalta (ed.), URL = <http://plato.stanford.edu/archives/spr2011/entries/representation-medieval/>.

[6] Dupré, L. (1993). *Passage to modernity: an essay in the hermeneutics of nature and culture*. New Haven, Yale University Press, p. 5. Louis Dupré describes the "border stones marking the beginning of the [modern] epoch", where the seeds of rational Enlightenment thought are to be found in 13th century theological speculation. Dupre also remarks how Freud and Marx "remained within the modern premises: the physical world appears as an independent, often antagonistic reality, and religion as an illusion, temporarily useful but eventually to be overcome." Furthermore, "Marx denounced the distorted relation of the person to the natural world, which has resulted in alienation from both the natural and the social environment. Freud focused on the predicament of the modern self. Nietzsche both denounced the Platonic-Christian idea of transcendence and feared its departure. All three described our condition as having now become problematic, yet none identified the problem with modern culture as such.

is", "has no becoming", and "does not change".[7] No generation or corruption in the heavenly realm is possible because it is eternal. The material of the cosmos is in-formed, and the "Forms" exist outside of human intelligence, yet inform intelligence insofar as they make all things intelligible. In this way, the "Forms" exist apart from material, and "Forms" exist outside of personal thoughts. The ancient cosmos was seen as alive and mindful, and the ancient thinker was not at the self-creating centre of epistemology.[8] Ideas as described by Plato, or as "Forms" when translated in Latin, were part of the universe, and it could be said ideas were universal forms.

Aristotle refined Platonic thought, and described God's ideas as creating the cosmos. God's pure ideas are pure being, and God's being helps to create the cosmos, even if the natural world was seen as inherently divine, (for a divine cosmos is in no need of an external God). [9] In this way the cosmos demonstrates God's presence because his likeness is observable, and it is possible for the cosmos to share some semblance of the eternal and divine realm. It follows that human thinkers, as part of the cosmos, display some semblance to the creator God insofar as thinkers were seen to participate in universal reason. Because of this likeness between mind, cosmos and creator, the mind was seen as able to access higher sources of pure thought and being. The human mind was seen to have a unique capacity to understand the cosmos. Insofar as humans resembled the creator God of pure being, through training or learning, thinkers could intuitively grasp the reasonable or intelligible nature of things. Aristotle demonstrates here that Platonic thought requires discipline, learning, and training to reach the more-real reality.[10]

Because the eternal realm of Platonic ideas exists independently of individual thinkers, the ancient cosmology required thinkers, so to speak, to "travel out" to the ideas. Thus, the source of

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[7] Plato, & Kalkavage, P. (2016). *Timaeus*, p. 58. Plato's Timaeus c. 360 BC. Plato established the philosophical language that framed philosophy for almost two thousand years. He did this by writing a cosmology that did not resort to allegory, myth, or sexual imagery common at the time. Plato's demiurge, ideas, and receptacle influenced not only antique Roman thinkers, but second century Christian church fathers and their successors. The Pagan religious order can also be seen in political structures of the Western Church, where Roman legal buildings known as basilicas were appropriated, as was Roman legal code which eventually became absorbed into Western Christian canon. For example, "Diocese" and "vicar" find their origin in Emperor Diocletian's reforms. (284-305 AD).

[8] Epistemology is the study of knowledge.

[9] Dupré, L. (1993). *Passage to modernity: an essay in the hermeneutics of nature and culture*. New Haven, Yale University Press, p. 27. "On what ground does Aristotle base his confidence [that phenomena as they present themselves may essentially be trusted]? I have no doubt that it was an ontotheological vision of the real. No less than Plato, he supports his metaphysics by the assumption that beings owe their intrinsic meaningfulness to the divine quality of the *kosmos*. It would be incorrect to understand this divine quality as a foundation since that assumes a distance between nature and its divine ground, whereas Aristotle's natural world, unlike that of modern philosophy, is itself divine." Furthermore, "Aristotle thereby rejects a major trend in Greek thought, one initiated by Parmenides and completed in Plato's theory of the forms, that sharply opposes truth to appearance."

[10] Note that even human personality was understood to originate in the unchanging eternal realm as determined by natal horoscopes.

knowledge was ultimately seen to be outside of humans yet, because of a kinship between mind and intelligible cosmos, accessible by those willing to reach the eternal realm. Hence the emphasis of ancient society on accessing divinity directly through ascetic religious practices, monasticism, traveling to oracles, or secret mystical rites, where earthly concerns could be escaped and eternity accessed. While pre-modern knowledge was not created by a private human mind "divorced" from the cosmos, it could be known to those pre-modern and medieval "spiritual athletes" that were willing to strive for knowledge through monasticism, asceticism, or pilgrimage.[11]

It follows that in the ancient cosmology, it was possible to encounter, to some extent, the eternal and divine realm. All knowledge flowed from this perfect place, and final knowledge was possible by encountering the intelligible divine ideas.[12] This encountering of divinity was an explicit goal, and thus, in a very real way, guaranteed God's presence through ritual and traditions. It is here that many modern thinkers stumble when explaining Gothic architecture, insofar as the concerns of modern academic scholarship in Gothic architecture seem concerned only with establishing material causal relationships.[13] It is too easy for modern thinkers to dismiss the descriptions left to us by medieval theologians, such as Abbot Suger who explicitly records that divinity is literally encounter-able in the medieval church building.[14] Thus, rather than limiting a study of Gothic architecture to a dialogue with contextual scholarship restricted to describing the economic or power motivations behind medieval cathedral building, this thesis offers an exploration of the religious insights of medieval builders as of fundamental importance to a proper understanding of the construction of Gothic cathedrals.

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[11] The link between Greek philosophy and medieval society has its roots in the education of St. Peter. He was a Roman citizen and well educated in the Classical tradition. From its inception, Christianity maintained a position for Greek philosophy, and would later translate and preserve Classical literature for posterity.

[12] The English word Cosmology is made of the Greek roots, "kosmos" and "logia", which mean "universal" and "discourse". This thesis treats cosmology as discourse about the order of the cosmos, or in modern terms, the order of the universe. Cosmology is important because it underpins traditional societies' institutions; i.e. its practices and customs.

[13] Addis, B. (2015). *Building: 3000 years of design engineering and construction*. London, Phaidon. While it is easy to appreciate an extensive survey of historical engineering, Addis provides an example of material causation explaining Gothic architecture.

[14] Suger, Panofsky, E., and Panofsky-Soergel, G., (1979). *Abbot Suger on the Abbey Church of St.-Denis and its Art Treasures*. Princeton, N.J.: Princeton University Press, p. 47. "Whoever thou art, if thou seekest to extol the glory of these doors, Marvel not at the gold and the expense but at the craftsmanship of the work. Bright is the noble work; but, being nobly bright, the work Should brighten the minds, so that they may travel, through the true lights, To the True Light where Christ is the true door. In what manner it be inherent in this world the golden door defines: The dull mind rises to truth through that which is material And, in seeing this light, is resurrected from its former submersion. Portarum quisquis attollere quæris honorem, / Aurum nec sumptus, operis mirare laborem, / Nobile claret opus, sed opus quod nobile clarete / Clarificet mentes ut eant per lumina vera / Ad verum lumen, ubi Christus janua vera. / Quale sit intus in his determinat aurea porta. / Mens hebes ad verum per materialia surgit, / Et demersa prius, hac visa luce resurgit."

For medieval society, pilgrimage becomes very important because all classes of society could undertake a pilgrimage, and by doing so access divine knowledge.[15] Every Christian was on a spiritual journey, and each was at a different point in the journey, even if social class was assumed to correlate with a natural presence of divinity. The noble class, for instance, was thought to have more access to divinity, or more of a divine spark, than the peasant class. Some thinkers were further along than others, but everyone in society was thought to be striving towards the eternal realm where God remained.

The idea of the Gothic cathedral, therefore, could be described as a kind of "pilgrimage in stone". In fact, the building of the medieval religious edifice *itself* was seen as a spiritual journey, and working with material was seen as a kind of religious endeavour. The ongoing construction process sometimes lasted for a generation or longer, and would occupy the lives of the masons and other construction crafts. These builders would have been on a pilgrimage in stone towards the eternal realm, the mind of God in which the ideas were situated. The medieval mason provides an example of how medieval thought reinforced the notion of accessing divinity and eternity through humanity itself. Human-ness allowed for an encounter with divinity.

Abbot Suger, who is recognized by contemporary scholars as overseeing the construction of the first Gothic cathedral, the Basilica of Saint Denis, relied upon Christian Platonism,[16] as Plato and

[15] McGaughey, D. R. (1997), p. 197. *Strangers and pilgrims on the role of Aporiai in theology*. Berlin, Walter de Gruyter. "We are not strangers and pilgrims not because we possess (or are) a soul that connects us with an eternal and unchanging realm of Platonic ideas (at the core of Augustine's logic for distinguishing between the earthly and heavenly cities). We are strangers and pilgrims not because, then, we are the hidden few eagerly awaiting full citizenship in the heavenly city (as well as awaiting retribution on our enemies, the wicked of the world). Rather, we are strangers and pilgrims because our very condition in this world (involving both what is manifest and what is concealed) is one of aporiai." Aporiai is an ancient Greek word describing a rhetorically useful pause to express uncertainty or doubt as to how to proceed. See also Sorabella, J. (2010). *Pilgrimage in Medieval Europe*. Timeline of Art History. http://www.metmuseum.org/toah/hd/pilg/hd_pilg.htm. "Throughout the Middle Ages, however, Christians sought to close the distance between themselves and God by engaging in physical travel toward a spiritual goal."

[16] Harl, K. W. (2011). *The fall of the pagans and the origins of medieval Christianity*. Chantilly, VA, Teaching Co. (Chapter 11). In fact, Platonism has always been an important philosophy for Christian thought, even if the primary Platonic and Aristotelian texts were lost to Western medieval thinkers. Christianity began as a Jewish sect, then developed into an independent religion, all under Roman Imperial rule. To argue against pagans, Jews, and other thinkers during the first and second centuries, the earliest Christians did so using Platonic doctrine. To be a respected thinker in ancient Rome, one had to read and write in Greek, and know important texts such as Plato's Timaeus and Homer's Odyssey. The earliest Christian apologists such as Justin Martyr (100-165AD) would denounce paganism while finding exception for pagan literature, and Origen Adamantius (184-253AD) would articulate the Christian religion in Platonic terms. Christianity had appropriated and re-defined Roman social and political institutions, and became the organization which continued the Roman project of society building after the fall of Rome in the fifth century. Christianity maintained the legitimacy of Rome long after its fall, which included the art, architecture, literature, and Papal political structures.

Aristotle were regarded as philosophical authorities, and deserved to be studied carefully.[17] The problem for medieval thinkers was the absence of primary Classical texts. Plato and Aristotle were known because Christian Fathers wrote about them hundreds of years before the Middle Ages. Aristotle was reintroduced in the middle of the twelfth century, around the same time as Abbot Suger was finishing the Basilica of Saint Denis, and the translation of Aristotle's approximately 42 books would occupy almost 100 years. Stepping back into late Roman antiquity, we can see that the Christian Fathers in a quest for legitimacy in Pagan Rome, had appropriated Classical literature while simultaneously denouncing Pagan gods.[18] Therefore medieval Christians like Abbot Suger knew of Aristotle, even if the original texts were inaccessible. As Medieval Christian cosmology was essentially Platonic, Abbot Suger accepted the existence of things as in-formed by the eternal forms that exist within God, and there would be no things without the creation of God, which was understood to be a continual event. The source of material creation was understood to be metaphysical, and material reality was therefore a kind of facsimile of the truer ideal, intelligible and eternally existing reality. From this point of view creation could be understood to be a metaphysical rather than physical and temporal concept, and an eternal yet created universe is, on this view, perfectly possible.

By contrast, the modern epistemology no longer emphasizes God, or the eternal ideas that existed within God's mind, nor does it emphasize a divine material cosmos. Instead the modern cosmology removes divinity, and relies upon man's logical personal thoughts to understand the "inert" material of the cosmos. While an exhaustive storyline describing the transition over hundreds of years from the ancient and antique cosmology to the contemporary-modern cosmology is not the purpose of this thesis, the hint of how that transition began can be included here.[19] According to Dupré, the shift from an ancient cosmology, with its formal premise, to a

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[17] Grant, L. (1998). *Abbot Suger of St.-Denis: church and state in early twelfth-century France*. The medieval world. London, Longman, p. 5. "Many scholars have accepted and elaborated upon the image of Suger as neo-platonic theologian and by implication, founder of both a new Gothic imagery and a new Gothic architecture, and have pointed to evidence for this in the complicated religious iconography with which the Abbey of St-Denis was encrusted, and the architectural sophistications of its new choir. Others have been unable to see Suger as a credible new-platonic intellectual."

[18] Harl, K. W. (2011). *The fall of the pagans and the origins of medieval Christianity*. Chantilly, VA, Teaching Co. (Chapter 5, 2:48 min). Plato wrote a thoroughly religious text despite later Christian efforts to minimize the religious content. These Christian efforts can also be seen in reinterpreting Pagan cult idols as Classical sculpture. Platonic teaching is fundamental for Greek and Roman Pagan religious tradition.

[19] Dupré, L. (2004). *A dubious heritage: studies in the philosophy of religion after Kant*. Eugene, Ore, Wipf & Stock Publishers. There are several alternative accounts of cultural modernity currently available. Accounts of cultural modernity include those written by (1) MacIntyre (1981), *After Virtue: A Study in Moral Theory*, (2) Voegelin (1956) *Order and History*, (3) Gauchet (1997) *The Disenchantment of the World*, (4) Olberman (2001) *The Harvest of Medieval Theology*. These examples of alternative approaches are not as appropriate as Dupré (2004) because the former are philosophical analyses. For understanding Gothic architecture, it is necessary to rely upon a theological understanding of historical cosmology, for the master masons of the time would have taken for granted God's presence.

modern “epistemology”, with its psychological premise, began in the thirteenth century when medieval thinkers explored “nominal” thought. The Franciscan notions of will in the thirteenth century later led to major developments in Renaissance and Enlightenment thought. Nominalism holds that ideas, though still understood as universal concepts, are held to be so in name only. While they fulfilled a function in logical or philosophical discourse they were no longer seen as having a reality of their own. Thus, the Franciscan nominalists, such as John Duns Scotus and William of Ockham, held that the formal ideas held nominal status only but did not exist in reality, in contradiction to Plato. The seeds of modernity were sown by rendering ideas as names only, because over time the idea of “in name only” was applied to all areas of human thinking.[20] Eventually ideas became the exclusive domain of thinking humans. The novelty of the scientific method in the year 1621[21], as philosophically described in that year by Francis Bacon, was based on the new status of ideas, as were the voluntarist philosophical presuppositions of the Protestant reformation where religion was rendered as “faith” based understood to be a personal idea to hold in conviction. Translation of the Bible into vernacular language instead of traditional Latin made sense to protestant Christians because of the changing cosmology.

This thesis claims that it is possible to understand the Gothic cathedral as firmly situated within the ancient cosmology. An authentic rendering of the Gothic cathedral is possible because Platonic cosmology which drove Christian thought is thoroughly intellectual, and through a common humanity can modern thinkers access ancient and medieval thought. Traditional thought relied upon traditional cosmologies, epistemologies, and metaphysics. Insofar as contemporary accounts of medieval building are rooted in traditional-medieval thought, can contemporary scholars understand the past accurately. For instance, Plato held that ideas existed objectively, and were (re)-discovered by thinkers. So too can contemporary thinkers discover these ideas if traditional metaphysics is relied upon. Furthermore, it is possible to see ancient cosmology in action in the Gothic cathedral, and demonstrate not only a science based upon religious ideas, but a material science which actualizes Christian Platonic ideas. Before continuing on though, it is important to see examples of how contemporary thinkers treat the understanding and accessing of the eternal realm.

[20] Dupré, L. K. (2004). *A dubious heritage: studies in the philosophy of religion after Kant*. Eugene, Ore: Wipf & Stock Publishers., p. 176.

[21] Francis Bacon *Novum Organum Scientiarum,* published 1620. The work of Nicolaus Copernicus (1473-1543) and Galileo Galilei (1564-1642) influenced Bacon tremendously. Here can be seen the willingness to discard ideas. This willingness is possible when ideas exist only in the human mind, and human thoughts do not necessarily reflect material reality.

The first example comes from Evelyn Underhill whose work established the study of mysticism as an academic subject.[22] Her essay in 1911 titled, *Mysticism: A Study in the Nature and Development of Man's Spiritual Consciousness*, described the medieval Christian preoccupation with encountering divinity, and established direct knowledge of God as possible and necessary. Underhill did this through emphasizing the psychological religious experience, and describing mysticism as practical rather than theoretical. While mysticism is often associated with the occult, magic, or superstition, Underhill carefully articulated how the medieval monastics throughout history could be described as mystics.[23]

As a modern thinker, Evelyn Underhill begins with the modern assumption that ideas exist within the human mind only. Such presuppositions are evident in the use of words such as "mystical experience". The term was never used by medieval monks, and describing "experience" is to imply a personal experience.[24] The use by Underhill of contemporaneous psychological concepts of ego, subconscious, and self-consciousness takes for granted much that the medieval "mystics" never would have.[25] Nevertheless, her essay suggests it is possible to transcend the ego, or other psychological concepts, in order to access the eternal realm. Evelyn Underhill makes the point that meeting divinity is a unique occurrence unlike any other, and that human activity that accesses divinity holds a unique character.[26] Underhill's explorations of medieval monastics point

[22]Underhill, E. (1911). *Mysticism: a study in nature and development of spiritual consciousness*. Woodland, California, Andras M. Nagy Publ. This example was chosen because it is a popular and accessible book. The popularity can be attributed to modern presuppositions used unwittingly by Underhill to explain medieval religious thought, whereby many readers are introduced to arcane and inaccessible thinking. These modern presuppositions, (i.e., positivism), have found their way into the study of religion, as evidenced throughout Underhill's thesis.

[23] Evelyn Underhill underscores how knowing about religious awareness is different than being it.

[24] Turner, D. (2002). *The darkness of god: negativity in Christian mysticism*. Cambridge, Univ. Press, p. 262. "For, as I have suggested, there is in the contemporary preoccupation with mysticism as 'experience' an implied theological positivism, not without its parallels in the philosophical positivisms of our own century. For just as the philosophical positivists made a sharp division between the first-order experiential bedrock of 'sense-experience' and the second order theoretical reflection upon the language of experience, so there are those for whom there is, as it were, a 'mystical' equivalent to sense experience – equivalent in its 'immediacy' and subjectivity, equivalent in its foundational character, equivalent in its freedom from theoretical presupposition – in terms of which theological truth is capable of being verified or falsified. Such parallels are not, by any means, always made out explicitly. But in so far as the question can be raised as to whether "mysticism' is in that way 'experientially immediate' that it can serve in the role of confirming or disconfirming religious belief-claims, the same general epistemic status is implied for the mystical in the theological as for sense experience in the scientific. Therefore, rather than defining 'mystical' as consisting in any 'immediate experience of God', he [McGinn] prefers an account of the mystical element in Christianity as 'that part of its belief and practices that concerns the preparation, the consciousness [awareness] of, and the reaction to what can be described as the immediate or direct presence of God'."

[25] Ego, subconscious, and self-consciousness were notably articulated in Sigmund Freud's model of the mind, circa 1896, long after the Gothic episode.

[26] Underhill, E. (1911). *Mysticism: a study in nature and development of spiritual consciousness*. Woodland, California, Andras M. Nagy Publ, p. 43. "As the ordinary man is the meeting-place between two stages of reality – the sense-world and the world of spiritual life – so the mystic, standing head and shoulders above ordinary men, is again the meeting-place between the two orders. Or, if you like it better, he is able to perceive and react to reality under two modes."

to something modern science has struggled with, and has been mostly ignored, with a few exceptions.

The second example provided here demonstrates just how modern science addresses the highest of religious ideas. In 1990, Rick Strassman began studying the effects of a chemical present in every mammal that has been studied, and in hundreds of plants. This chemical is known as N,N-dimethyltryptamine, or DMT. Strassman describes the controlled and scientific experiment whereby the effects of DMT include visions, disembodied consciousness, voices, feelings of overwhelming significance, powerful emotions, and new insights. 400 doses of DMT were administered to 60 human volunteers over the course of five years.[27] Furthermore Strassman has found that DMT can be endogenously created by the pineal gland in mice.[28] From his scientific studies, Strassman hypothesizes that the pineal gland in humans can also create DMT endogenously, possibly while sleeping or in near death circumstances, or under stress or stimulation like religious ritual and meditation. For Strassman, his study provides a modern scientific description of union with God.

It should be noted that Strassman has no way of testing for the presence of DMT in the altered states of consciousness of historical figures. We will never know for sure if religious visions of the past were examples of endogenously created DMT within the pineal glands of the ancients. In a similar manner to Evelyn Underhill, the presuppositions of Strassman's scientific study of religious understanding are dissimilar from the presuppositions of ancient thinkers. To begin, Strassman reduces the mind to brain function which can be reduced to chemical and material processes, which in turn can be studied using scientific methodology. The legitimacy of religious insight is brought into question when inducing states using illegal drugs because of the association with other illegal drugs that have no association with religious insight. It is too easy to repudiate the alteration of brain chemistry via DMT as trivial recreational drug use. Moreover, Strassman's study could be dismissed as recalling the reputation-damaging episode modern psychology suffered during the 1960s, where advocacy of psychedelic substances in conjunction with psychotherapy was condemned in the court of public opinion.

Furthermore, the scientific study does not serve the same purpose as the rites, rituals, and meditations of the ancient thinkers, if we assume the use of DMT in 1990 caused similar effects to

[27] Strassman RJ, & Qualls CR. (1994). Dose-response study of N,N-dimethyltryptamine in humans. I. Neuroendocrine, autonomic, and cardiovascular effects. Archives of General Psychiatry. 51, 85-97.
[28] Barker, S. A., Borjigin, J., Lomnicka, I., & Strassman, R. (2013). LC/MS/MS analysis of the endogenous dimethyltryptamine hallucinogens, their precursors, and major metabolites in rat pineal gland microdialysate. *Biomedical Chromatography.* 27, 1690-1700.

the religious Pagan Mysteries.[29] Scientific study is undertaken to experiment under controlled circumstances, and subjectively observe the objective phenomenon. The suspension of agency by modern science is antithetical to ancient Christian assumptions of agency, as God is seen to be the ultimate source of agency, and He even generates human agency. In other words, science has very little, if anything, to say about the content of chemically induced mental states, nor the 'mental states' of ancient religious thinkers. The situation where material can be observed 'objectively', and objective material causation can be established, is not possible in the ancient cosmology, for the ancient account of things cannot be reduced to material causation at the expense of other kinds of causes. It follows that the ancient religious rites make no such assumptions of subjectivity or objectivity. While the ancient rites varied considerably over time and place, the goal was to initiate and demonstrate religious truth, through inescapable divine agency. The dissonance between modern science and ancient religion is obvious, even if the presuppositions of modern thinkers compared to ancient thinkers is not obvious.[30]

The distinction between ancient cosmology and contemporary cosmology is characterized by a different understanding of human thought. The ancient Christians held that thoughts and personality descended from above, while contemporary thinkers hold ideas and personality as possessions and convictions of the individual. To understand medieval religious practices, it is important to set aside, as much as possible, the contemporary cosmology. If the varieties of ancient cosmology which underpinned epistemology, society, and religion for thousands of years are to be studied, it is prudent to take into account those propositions which, though alien to modern thought, could prove fruitful to an attentive study of Gothic architecture.

Medieval text and buildings are difficult to interpret because of the chasm of thought between medieval and modern thinking. Often modern history does not account for the medieval cosmology or medieval epistemology. The tool of modern networked computers offers a solution to this scholarly problem. With large databases of medieval information available, it is possible to access and study the ancient way of thinking, or at least access the textual information.

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[29] Taylor, T., Wilder, A., & Rawson, A. L. (1891). *The Eleusinian and Bacchic mysteries. A dissertation*. New York, J.W. Bouton. According to Plato, "the ultimate design of the Mysteries … was to lead us back to the principles from which we descended, … a perfect enjoyment of intellectual [spiritual] good."

[30] Guenon, R., & Osborne, A. (2007). *The crisis of the modern world*, p. 45. "For Aristotle, physics was only 'second' in its relation to metaphysics-in other words, it was dependent on metaphysics and was really only an application to the province of nature of principles that stand above nature and are reflected in its laws; and one can say the same for the Medieval cosmology. The modern conception, on the contrary, claims to make the various sciences independent, denying everything that transcends them, or at least declaring it to be 'unknowable' and refusing to take it into account, which in practice comes to the same thing. This negation existed de facto long before it was erected into a systematic theory under such names as 'positivism' or 'agnosticism', and it may truly be said to be the real starting-point of all modern science."

Furthermore, it is also possible for scholars to network and share academic progress in a way unavailable before networked computing.

1.2.2 Networked Computers and Manuscripts

The previous section established the difference between ancient cosmology and contemporary cosmology. This section will contrast the medieval and modern methods of storing, retrieving, and creating information. It will be shown that the medieval "art of memory" is unlike modern information systems, and is best understood as a meditational aid, whereby the divine ideas can be more easily accessed. It is possible to see through the memory arts a method of creation very similar to the method of creation by the medieval stone masons.

The rise of modern computing has revolutionized human thought and action, and here will be discussed in order to provide a helpful contrast with medieval "information management". Networked computers are known collectively as the Internet. This global system of interconnected computer networks uses a common protocol to connect billions of digital machines.[31] Collaboration is therefore possible across geographic and political distance. There is more data available, research is collaborative, and more results are achieved than otherwise possible without the internet. The networked computers are commonplace in public and private locations, and specialized information is available within seconds.

For instance, digitized image galleries of original medieval manuscripts can be viewed by anyone with a connected computer. Since these manuscripts are written in Latin, the task of translation has been assisted by the use of collaborative research. The translation of Hugh of St. Victor's exegetical works from Latin to English, for example, has recently been made more accurate, lucid, and readable thanks to the help of the Internet.[32] Undoubtedly the influence of the internet as a scholarly tool invites a revisiting of medieval history with new information in hand. It is therefore possible to gather more primary sources and recent translations today in order to better understand the medieval worldview.

Not only have databases of information been established, but communities of scholars can develop around these databases and around topics such as medieval history. Sharing of recently written academic articles can be virtually instantaneous, and discussion of these articles takes place not only online, but at academic conferences which are themselves planned and

[31] National Science Foundation (U.S.). (2001). *The Internet: Changing the Way We Communicate* [online], National Science Foundation. http://www.nsf.gov/about/history/nsf0050/internet/internet.htm [Accessed 28 Feb 2014].

[32] Harkins, F. T., Liere, F. A. V., Hugh, Richard, Andreas, Godefroy, & Robert. (2013). *Interpretation of scripture: theory: a selection of works of Hugh, Andrew, Richard and Godfrey of St Victor, and of Robert Melun*. Hyde Park, NY, New City Press. p. 76.

disseminated through networked computers. The meeting of scholars at conferences is a routine and frequent occurrence in the so-called information age.

Medieval Europe, by contrast, presents a situation in which information is primarily shared orally once recalled from memory. Manuscripts, and archiving of written knowledge was a specialized skill, and the Christian monasteries maintained the relatively small libraries. Literacy among the general populace was very limited, but the knowledge contained within the manuscripts was disseminated as much as possible amongst literate persons.

It should be noted that Medieval thinkers did not necessarily equate literacy with education. Medieval people were educated, even if illiterate, as the Gothic cathedral was dedicated to educating everyone about Christianity. In fact, the Bible was rendered in *material* form: the stories from the Bible could be seen in the stained glass, mosaics, and sculpture, and memorized, for locating information in place is a powerful way to remember that information.[33] Furthermore, in the absence of mechanical tools for recording and recalling information, Gothic society utilized the memory tools inherited from late antiquity to store, recall, and disseminate knowledge.

These outlined differences resulted, likewise, in significantly different ways of sharing information and knowledge. The aforementioned “spiritual athletes” of the Middle Age lived in communal groups away from influences that distracted from seeing the higher order of knowledge. The distractions of material and earthly affairs were subjugated to a life seeking the eternal realm, and this eternal realm was thought to be found, in part at least, in books. Books were known as manuscripts - a word which literally means “hand written” - and God’s presence was found in the ideas contained therein. It follows that copying of religious texts was also *itself* a religious and meditative exercise. Through the written word, the medieval monk could achieve a higher knowledge and religious encounter.[34]

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[33]Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 274-275. “The Gothic cathedral, Mâle argued, was essentially a Bible in stone and glass, its images designed to substitute for the written word in communicating the stories of the Bible to a lay congregation which could not read and therefore, Mâle assumed, had no other access to their content. The notion that the medieval laity as a group could not read at all has now been largely discredited by the accumulation of contrary evidence, from even the earliest medieval centuries. Explanations such as Mâle’s also played down the fact that books and churches restricted to learned groups and clerical use were also profusely pictured. But Mâle was not wrong to say that the cathedral was a non-verbal textual form, only in his understanding of what that statement meant to a culture that did not share the bias ingrained in our notion of representational realism.”

[34] *O'Donnell, James O. (1979). Cassiodorus.* University of California Press, (chapter 5). "[E]ach Psalm would have to be recited at least once a week all through the period of study. In turn, each Psalm studied separately would have to be read slowly and prayerfully, then gone through with the text in one hand (or preferably committed to memory) and the commentary in the other; the process of study would have to continue until virtually everything in the commentary has been absorbed by the student and mnemonically keyed to the individual verses of scripture, so that when the verses are recited again the whole phalanx of

This is not to say that the religious order was not dedicated to educating the population about Christ. The monastic order had historically been the proselytizing force of Christianity[35], and was a unique feature of early Christianity when compared to Pagan and Jewish religion.[36] Instead, books were a tool not readily usable by the laity given the rarity and expense. Books were essentially memory tools, by which the monks and educated laity could commit to memory those texts so important to achieving unity with God.

These manuscripts were understood to be sacred, and were kept in libraries. This repository of information was a long-term project of copying and distributing manuscripts among the various monasteries. Distribution was accomplished by simply walking with manuscript in hand to neighbouring monasteries, which could be hundreds of miles away. If knowledge was sought, then travel across great distances might be in order, so that direct, in person access was possible. For some idea of travel in medieval Europe, a common ratio was used as a heuristic when planning a journey. The ratio is one to seven to twenty-three, as in what takes one day by sea, takes seven days by horse, which takes twenty-eight days by foot.[37] It should be noted the most popular means of transportation in the medieval age was by foot.[38]

The transmission of knowledge was not limited to manuscripts, however. Medieval education emphasized the art of memory, and superhuman feats of recollection were achieved. The entire

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Cassiodorian erudition springs up in support of the content of the sacred text". Also: Armstrong, D. (2015). *The Medieval world*. [Audiobook]. [Chantilly, Va.], Teaching Company, (chapter 1, 16:18 min).

[35] While class division is not the subject of this thesis, the hierarchy of Christian society and the transition from Pagan to Christian over time, and the subsequent importance of popular enfranchisement, needs to be pointed out to describe the role of master masons as common yet participatory. Polytheistic Romans of late antiquity found umbrage with the dissolution of class distinction when before the Christian monotheistic God. For the Christians, God was accessible to all. This rising Jewish sect, sometimes known as the Galileans, offended a number of Roman sensibilities, and would suffer a number of persecutions because of it. Christianity was unique in its proselytizing when compared to Polytheistic religion or Judaism. The Christian church therefore appropriated the Roman basilica in order to house large groups of people indoors, where the Pagan temple was not built for accommodating large groups of people. The Pagan temple housed religious artefacts, and statues of the deity which lived in the temple. While sacrifices would have been made in the temple, large congregations would not have been seen there. Instead ancient Pagans would often congregate in amphitheatres or other more public areas associated with the nearby temple. The proselytizing character of Christianity meant that churches were intended to accommodate large groups of people that were brought into the religion. The Roman basilica, because it was a public bureaucratic building which could provide shelter for crowds, was appropriated for Christian use, and would much later be reformed into what we now consider a Gothic cathedral.

[36] Judaism and Paganism were ancestral faiths that did not seek enfranchisement of other races.

[37] Armstrong, D. (2015). *The Medieval world*. [Audiobook]. [Chantilly, Va.], Teaching Company, (chapter 36, 30:59 min). One to seven to 23: by ship, by horse, by walking.

[38] Armstrong, D. (2015). *The Medieval world*. [Audiobook]. [Chantilly, Va.], Teaching Company, (chapter 7, 11:40 min). Charlemagne (c. 742-814 AD) instituted a so-called renaissance by patronizing Christian arts and literature. He sent couriers throughout Europe to acquire important manuscripts, and he was especially interested in Classical works, like Virgil, Horace, Tacitus. The collection of works was subsequently disseminated after being copied by scribes working in Charlemagne's court. Many current editions of these Classical works are based upon eighth and ninth century copies made at Charlemagne's court. This religious knowledge would trickle down into surrounding society during the subsequent centuries.

Summa Theologica, which consists of five volumes and thousands of pages, was written by using memory arts and summarized all human knowledge at the time.[39] Indeed medieval saints were often described as possessing outstanding recall skills, and the ability to recall was a widespread desire,[40] so much so that medieval European culture itself has been described as a "memorial culture".[41] It follows that the sharing of knowledge was not limited to what could be stored in libraries. Manuscripts could remain scattered amongst the medieval monasteries, but the knowledge therein was spread by artful monks and laity who could recite entire works without relying on scribal copying.[42] Indeed religious canon and other controversies were spread quickly throughout the medieval world because information was shared from memory to memory.[43]

The creation of manuscripts was a religious process where the physical labour assisted in imprinting the information into the mind of the writer.[44] Making a manuscript was a laborious undertaking, and the utmost care was devoted to the exercise. There was no paper or movable type, and many steps were required. An animal needed to be slaughtered, for the hide became

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[39] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 6. "The contemporary sources suggest strongly that the *entire Summa Theologica* was composed mentally and dictated from memory, with the aid at most of a few written notes, and there is no reason to disbelieve them."

[40] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 1. "Their greatest geniuses they describe as people of superior memories, they boast unashamedly of their prowess in that faculty, and they regard it as a mark of superior moral character as well as intellect."

[41] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 9. "It is my contention that medieval culture was fundamentally memorial, to the same profound degree that modern culture in the West is documentary.".

[42] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 198. "This was also an early Church custom; Cyril of Alexandria composed many sermons which he sent to all the bishops of Greece, who, in turn, memorized them and preached them to their own congregations."

[43] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 201-202. "Books can stay physically on their shelves in Paris and yet move to the centres of England and Rome, if they have been transmitted by one who imitates the prophet Ezekiel and first consumes (memorizes) their contents. Everything from authoritative canons to the latest controversy is reported directly to him orally, memory to memory – not having to go through the unreliable medium of scribal copying."

[44] Armstrong, D. (2015). *The Medieval world*. [Audiobook]. [Chantilly, Va.], Teaching Company, (chapter 1, 15:02 min). As Armstrong points out, "Several or perhaps dozen people were involved in the creation of a manuscript. The animal hide is tough and durable, and the pages have survived until today. The animal hide was worked in vellum or parchment. The hide needed to be scraped and stretched, and soaked in a concentration of lime for days or weeks. The highest quality manuscripts were made using new-born or foetal animals. The younger the animal, the less hair it had that needed to be scraped from the hide. The pages of a manuscript needed to be arranged so that when the book was laid open, there would be a uniformity of appearance, so that the hair side of vellum would be bound so that it faced another page turned to its hair side. Likewise, skin side pages would face other skin side pages when the book was opened. Sometimes the hair follicles can be discerned on medieval pages. The hair would have made the task of writing more difficult. After the hide was cut into sheets, and the sheets were laid out, the contours were filled out to indicate where text and images should go. For most of the Middle Ages, this labour was performed in a monastic scriptorium. Indeed, monks were the most literate people in the medieval world, and the preservation of knowledge was considered prayer."

the writing surface. The skinned and stretched hide of a cow or goat was cut into sheets, ruled, pricked, and organized with markings in a very deliberate fashion. The markings were not grid like, or homogeneous, and for very good reason: memory retains information more easily when unique features are incorporated into the text. The techniques of recollection relied upon these unique memorization schemes. The animal hide would tend to spring back into the shape of the animal it came from, so a knife was necessary to keep the vellum in place. The knife was also used to scrape ink from the page, and to also sharpen the quill. The quill was plucked from a bird and sharpened, and the ink made from walnut galls. Twelve different strokes could be required to create one letter, and as a meditative tool, this process imprinted the information into the scribe. Indeed, the creation of manuscripts was prayer for those monks labouring in the scriptorium. Sitting at an angled lectern, the scribe would repeatedly dip his quill into the ink numerous times for each letter. The unique character of the medieval page was necessary for its usage as memory art. Different pages with skin or hair patterns would assist the reader in placing the information into the store house of memory. The history and literary tradition of the church was preserved for future generations while simultaneously storing the information in the memory of the scribe, which allowed for sharing and reading aloud to groups of people.[45] Although manuscripts were written in Latin, many writings were translated into old English, and therefore the information was sometimes accessible to laity.[46]

The written page was decorated with elaborate illustrations in the main body of text as well as in the margins. Manuscripts were often bound by jewelled covers, and were displayed on a lectern to be seen, unlike the modern habit of storing books on a shelf with the spine facing outward. These elaborate illustrations were very important because the mind attaches the textual information to the illustration, and because the illustration is easier to recall, the textual information often followed with it: indeed, the whole process could be said to be analogous to fishing, where the line is pulled from the water, and the fish is brought to the surface with it.[47] The elaborate illustrations and jewelled covers become the tool with which to recall memories from the depths. This technique was so successful that ancient and medieval writers recount the

[45] Armstrong, D. (2015). *The Medieval world*. [Audiobook]. [Chantilly, Va.], Teaching Company, (chapter 3, 09:41 min). "For example, manuscripts written by the Venerable Bede were assumed, at the time of writing, that they would be copied, shared, and read aloud to groups of people. Medieval literacy was very low, so gathering to hear texts read aloud was an activity that was quite common."

[46] Armstrong, D. (2015). *The Medieval world*. [Audiobook]. [Chantilly, Va.], Teaching Company, (chapter 3, 09:19 min). "Although Bede wrote in Latin, the language of scholarship at the time, he was translated into old English, making him accessible to a larger audience. Bede's hope was that the account of events from history, would inspire his readers to closer union with God."

[47] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 18. "Rather books are themselves memorial cues and aids, and memory is most like a book, a written page or a wax tablet upon which something is written."

ability of thinkers to recite entire texts backwards, forwards, or in different orders without forgetting, losing one's way, or being confused.[48]

The medieval memory arts were founded on the cosmological assumptions of where ideas are located. Since ideas are near God, and exist "outside" of the subjective minds, it was assumed that the human mind was like a wax tablet where the ideas could imprint themselves.[49] By memorializing religious ideas, it was thought that the human was being shaped like wax into a better Christian, closer to God.[50] The education of memory was also seen to be a virtuous and ethical endeavour, bringing human beings into contact with divinity.[51] Here it is possible to see the medieval thirst for mystical union with God through Christianity as a revealed religion. Through the meditative memorializing process, religious ideas were not only imprinted in a rote way, but instead appropriated and brought into being in a real manner.[52] It should not be forgotten that medieval society was practical and earthly, and even at these moments of mystical description, the medieval episode should not be dismissed as superstition without merit.

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[48] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 21. "One accomplishment which seems always to have been greatly admired by both ancient and medieval writers was the ability to recite a text backwards as well as forwards, or to skip around in it in a systematic way, without becoming lost or confused."

[49] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 30. "Most pre-modern writers thought of knowledge as a collection of truths awaiting expression in human languages, and fitted, as appropriate, to various occasions." Modern readers might find the words "inside" and "outside" helpful descriptors even if the modern subject-object split did not exist for medieval thinkers.

[50] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 14-15. "The choice to train one's memory or not, for the ancients and medievals, was not a choice dictated by convenience: it was a matter of ethics. A person without a memory, if such a thing could be, would be a person without moral character and, in a basic sense, without humanity. Memoria refers not to how something is communicated, but to what happens once one has received it, to the interactive process of familiarizing – or textualizing – which occurs between oneself and others' words in memory."

[51] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 14-15. "Memory was a virtuous attribute because the ideas which existed close to God would order the human. Recollection was possible because the ideas had imprinted upon the human, like a wax tablet. In this way, humans came closer to God, and it is no surprise that medieval saints were revered for their abilities of recollection. Memory also marked his superior moral character; it should not go unnoticed that the praise heaped on his memory came at canonization trials. In fact, prodigious memory is almost a trope of saints' lives. One thinks of St. Anthony, who learned the whole Bible by heart merely from hearing it read aloud (the fact that he never saw the words written is what astonished his contemporaries); of St. Francis of Assisi, reputed by his followers to have a remarkably exact and copious memory. Tropes cannot be dismissed as "mere" formulas, for they indicate the values of a society and the way in which it conceives of its literature."

[52] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 54. "The arca sapientiae is constructed in the mind of each student. Hugh compares it to the arca of the Church, built in the eternal mind of God. In human minds, time exists, and yet by disciplined thought we can withdraw from it and in some way imitate the eternal present of God. Thus, indeed, in our mind past, present, and future exist in thought at the same time. If therefore by a difficult program of meditation we begin to dwell in our heart, then in a certain way we withdraw from time, and, as though made dead to the world, we live within God."

Monastic memory techniques were practical and teachable, and thus fundamental to medieval education.[53] The basic tactic was to divide the ideas into pieces short enough to be recalled in single units, and to create an organization which allows the single units to be recalled. The learned art of memory was unique to each person, as the organizational system used was created anew by each student.[54] For instance, the colour, shape, position and placement of letters in the page allowed for the stimulation of memory.[55] It is easier to remember a visual image than a series of words, and the visual image was most often an organizational system whereby the text was placed.[56] This visual image sometimes took the shape of a grid, or a pattern of division similar to columns in a colonnade, or at other times figures such as animals, gargoyles, or other shocking hand drawings on the page would provide the visual stimulus to produce the desired memories. It is in this way that students would select the images and organization best suited for attaching to the text, in order to recall later. This method of memory recollection, known as *mnemonic*, was a well-known skill in medieval Europe.[57]

The mnemonic method of memory creation required the composing of adequate mnemonic devices and appropriate words to adapt what already exists in the memory store to the present occasion. For instance, the alphabet could be used as a mnemonic device, whereby each letter

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[53] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 9. "Scholars have always recognized that memory necessarily played a crucial role in pre-modern Western civilization, for in a world of few books, and those mostly in communal libraries, one's education had to be remembered, for one could never depend on having continuing access to specific material."

[54] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 60. "Aristotle's fundamental understanding of soul, which was preserved to a degree by his medieval descendants, was that it is not a "thing" (ghostly or not) but "a kind of organization and functioning that certain pieces of matter have." Prior to Aristotle, even the soul was thought to be a thing, "an interior double, which both pushes and orders the body around."

[55] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 336. "Every medieval diagram is an open-ended one; in the manner of examples, it is an invitation to elaborate and recompose, not a prescriptive schematic."

[56] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 10. "In the early twelfth century, Hugh of St. Victor, instructing some young students on how to remember, explains clearly the mnemonic utility of manuscript page layout and decoration. Repeating traditional advice about always memorizing from the same written source, lest a confusion of images caused by seeing different layouts make it impossible for the brain to impress a single image, he says: it is a great value for fixing a memory-image that when we read books, we strive to impress on our memory…the colour, shape, position, and placement of the letters,…in what location (at the top, the middle or bottom) we saw [something] positioned, in what colour we observed the trace of the letter or the ornamented surface of the parchment. Indeed, I consider nothing so useful for stimulating the memory as this."

[57] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 326. "Indeed, it is a much-remarked-on medieval characteristic to treat the space in a full-page drawing diagrammatically, that is, with images placed in specific locations, often grouped about a large central figure, often in an architectural setting, often with related images enclosed in roundels or other geometric forms, usually with a border, and commonly with inscriptions, like tituli or rubrics, to be associated with the figure and to help associate the figures with one another. The justification for this practice is mnemonic necessity."

was associated with a passage of text, and by recalling each letter could the passage be recalled too. Other mnemonic schemes could be used, such as places like cities, homes, or most relevant to the present study, churches and Gothic cathedrals. Hence the colonnades, flying buttresses, iconography, transept, choir, and every architectural feature could be associated with religious verse or religious stories.[58] It is quite easy to remember and visualize what a physical location such as a cathedral looks like, and each unique physical character of the architecture could be associated with heavenly ideas, which could then be recalled at a later time when away from the cathedral.[59] By fixing into the mind the religious ideas, the medieval thinker is composing his memories, and like the diagrams in medieval books, the architectural features serve as informational schematic and meditational composition.[60] Not only were the religious stories on display in the iconography and architecture of the Gothic cathedral, but its method of assimilation and recollection were on display as well. The inclusion of gargoyles, a sometimes shocking or puzzling presence to modern visitors to the medieval church, can be explained as a unique memory device which imprints a unique scene onto the mind.

The medieval mind sought to encounter the ideas as they were, on the terms which the ideas themselves prescribed. This means that through memory arts the chorus of voices from history are available promptly on any subject, as if the memorialiser was the author of the text in question.[61] The core of monastic life was attentive recollection and reading of texts during daily office and private meditation.[62] The reader becomes author and helps to create the text in the

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[58] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 20. "Evidently, at least in the context of this metaphor, reading was considered to be essentially a visual act, despite the fact that most ordinary social reading, at least, was done aloud by someone to a group of listeners, throughout antiquity and the Middle Ages, and well into modernity. Nonetheless, as they understood the process, whatever enters the mind changes into a "see-able" form for storing in memory."

[59] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 29. "The task of the re-collector who is composing (and, as we will see, recollection is commonly described as an act of composition, a gathering-up into a place) is to select the most fitting and adequate words to adapt what is in his memory-store to the present occasion." This quote describes the active role medieval Christians played in creating a Christian culture when away from church iconography.

[60] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 332. "For mnemonic purposes, diagrams, like other sorts of images in medieval books, have a combination of two functions: they serve as fixes for memory storage, and as cues to start the recollective process. The one function is pedagogical, in which the diagram serves as an informational schematic; the other is meditational and compositional."

[61] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 9. "Indeed, the very purpose of a book is differently understood in a memorial culture like that of the Middle Ages than it is today."

[62] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 205. "But the medieval scholar's relationship to his texts is quite different from modern objectivity. Reading is to be digested, to be ruminated, like a cow chewing her cud, or like a bee making honey from the nectar of flowers. Reading is memorized with the aid of murmur, mouthing the words sub vocally as one turns the text over in one's memory; both Quintilian and Martianus Capella stress

present.[63] This manner of reading is very different from modern objectivity, and as will be shown later in the thesis, this medieval way of making was applied to the creation of the stone cathedral as well.[64] Modern thinkers might be tempted to understand monastic reading as "attentiveness", but this concept does not acknowledge the search-able store house of knowledge acquired through meditation.[65] Furthermore neither Aristotle, nor Augustine held a modern conception of mental activity.[66] Since, as Dupré has shown, the autonomous individual thinking self was not a medieval idea, we should therefore not reduce ancient medieval memory arts to "memorization"; mindless recitation of information memorized through repetition. [67]

Medieval education relied upon memory, and medieval masons would have memorized geometrical figures as part of their craft education. Through the use of geometry, the practical and earthly task of stone masonry was brought into being in a direct and real way. Furthermore, the term geometry, whose Old English literal meaning is earth-craft, is understood as making from the earth, and thus bears analogical relationship to the eternal creation of God.[68] This medieval

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how murmur accompanies meditation. It is this movement of the mouth that established rumination as a basic metaphor for memorial activities."

[63] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 9-10. "For us, texts only come in books, and so the distinction between the two is blurred and even lost. But, in a memorial culture, a "book" is only one way among several to remember a "text," to provision and cue one's memory with "dicta et facta memorabilia." So, a book is itself a mnemonic, among many other functions it can also have..."

[64] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 211. "I have noted before that the medieval understanding of the complete process of reading does not observe in the same way the basic distinction we make between "what I read in a book" and "my experience." This discussion by Petrarch, I think, makes clear why, for "what I read in a book" is "my experience," and I make it mine by incorporating it (and we should understand the word "incorporate" quite literally) in my memory."

[65] Walsh R, & Shapiro SL. (2006). The meeting of meditative disciplines and Western psychology: a mutually enriching dialogue. *The American Psychologist.* 61, p. 227-39. "[M]editation refers to a family of self-regulation practices that focus on training attention and awareness in order to bring mental processes under greater voluntary control and thereby foster general mental well-being and development and/or specific capacities such as calm, clarity, and concentration".

[66] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 387. "Rorty discusses how the "mind– body problem" was created in the Renaissance: Philosophy and the Mirror of Nature, esp. 39– 69. See also the first chapters of Chalmers, The Conscious Mind. The classic exploration of the problem by Nagel, "What is it Like to be a Bat?", is an exceptionally succinct and well-crafted contribution that deserves more attention from literary historians and critics concerned with issues of subjectivity...". Carruthers is citing these publications: 1.) Rorty, R. (1980). Philosophy and the mirror of nature. Princeton, New Jersey, Princeton University Press. And 2.) Chalmers, D. J. (2007). The conscious mind: in search of a fundamental theory. New York, Oxford University Press. And 3.) Nagel, T. (1974). "What is it like to be a bat?" *The Philosophical Review,* Vol. 83, No. 4, p. 435-450.

[67] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 23. "Rote repetition, since it is not "found out" by any heuristic scheme, is not considered recollection or true memory (memoria)."

[68] Skeat, W. W. (1910). *An etymological dictionary of the English language*. Oxford, Clarendon Press, p. 231. geometry (n.) early 14c., also gemetrie, gemetry, from Old French geometrie (12c., Modern French géométrie), from Latin geometria, from Greek geometria"measurement of earth or land; geometry,"

manner of action is very different from contemporary construction methods, and the latter will be briefly touched upon in order to highlight the differences.

1.2.3 Standardization and Craftsmanship

The previous section acknowledged the Internet, and how medieval monks created and stored knowledge through craftsmanship of the written page, in the absence of modern technology. This section will establish what modern standardization is, and how it is different from medieval craftsmanship. It will be suggested the medieval masons did not need standardization because the craft of building relied upon geometrical archetypes, which were the memorized tools used to author and create a medieval church.

Flash forward to the modern period, and craftsmanship has largely been replaced by standardization. The construction of buildings will provide one example of the absence of craftsmanship in modernity. While cultural modernity has given networked computers, it has also bequeathed standardized building technology. Standardization shouldn't be assumed to exist when looking at medieval building. In fact, standardization as is generally understood today did not exist during the medieval period. This contemporary process of making is defined as using identical parts made by disparate manufacturers, whose decisions are mutually consistent across society. This means, for instance, raw lumber milled thousands of miles away will have identical final dimensions, and six penny nails[69] will share identical length and weight. The basic units of construction are established through consensus, and everyone agrees what the basic building blocks of construction are. For instance, dimensioned lumber is available in nominal two-inch increments, and a "two by four" is readily available, but a "two by three" generally is not.[70]

Furthermore, the occupational positions associated with construction of the built environment are specialized. Generally, an architect, engineer, and general contractor are involved in the task of erecting a building. The first generally outlines the project, and specifies municipal and local codes the building conforms to. The engineer defines the structural components, and their position in the project. The last organizes the workforce and ensures compliance with the plan outlined by the architect and engineer, and compliance with local and national building regulations during the construction process. Each position is standardized as much as possible

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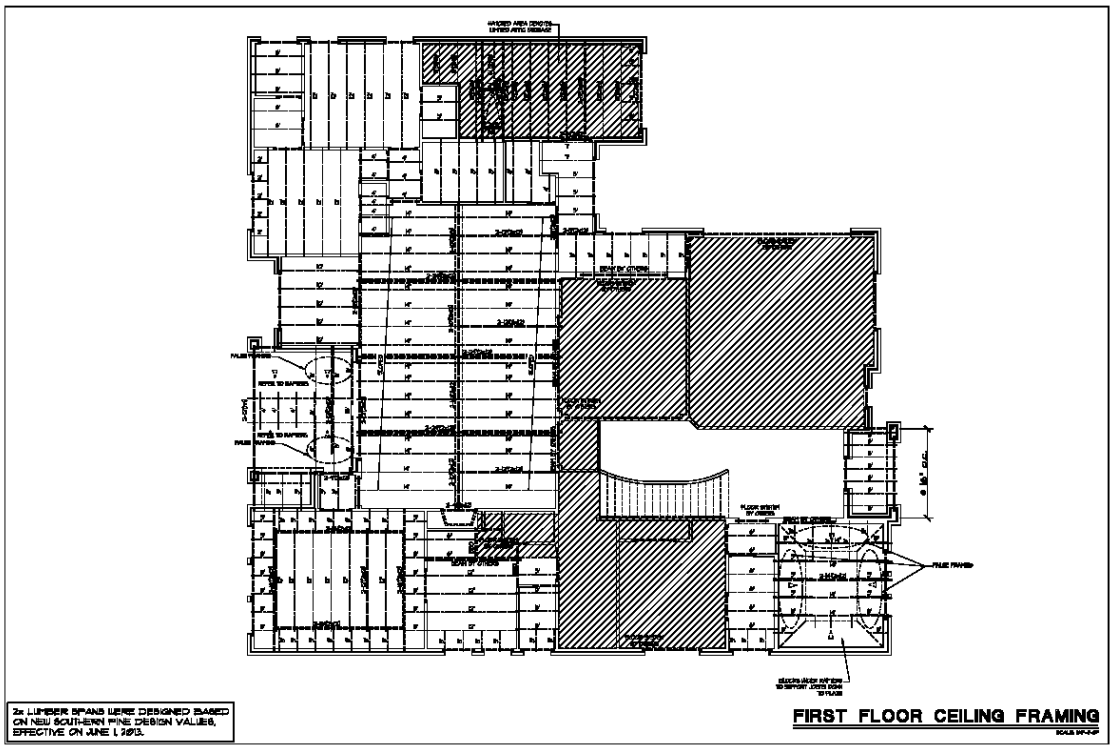
from comb. form of ge "earth, land" (see Gaia) + -metria (see -metry). Rendered in Old English as eorðcræft, "earth-craft."

[69] A six penny nail is 2 in, (5.1 cm), in length. In the United States, nails are designated by penny weight, or how many hundreds of nails one could purchase for a penny at some point in the past, and the penny nail is designated by placing a "d' after the number. For instance, "6d" denotes a six penny nail, where "d" is an abbreviation of "denarius", a Roman penny. The equivalence of a penny to nails changed over time, but the penny measurement system remained in place. This system of measurement is common in the United States today and has not been replaced by the metric system.

[70] The global standard of measurement relies upon the metric system, but the United States has yet to adopt the metric system. The nominal "two by four" example is common in the United States.

through a standardized educational and intern process, where the established consensus is passed onto the next generation of professionals.

Another aspect of modern building that demonstrates an inversion from medieval building is the use of schematic plans which describe a building in its entirety, and are conceived in a top down manner. The medieval mason did not use plans, nor did he trace load paths from the roof to the foundation. While architectural and engineering plans are set to a scale, they are schematic and representational because they are not used to create any specific parts. There are more specialized “shop drawings” that describe the manufacture of specific parts that can’t be created or modified on site, but the architectural and engineering drawings are not used as a template to create a specific building component. Instead the drawings convey a standardized system of measurement applied to each building project. Furthermore, the schematic plan is conceived in a top down fashion, whereby the use of computers is efficient and useful for layering the building heights, and visually confirming the bearing of higher construction components upon lower components of the building system. This means that modern building plans begin with the finished product rendered on a computer screen, and manipulated so as to be consistent throughout the structure, from the roof, through any number of floors, to the foundation.



[Figure 1-1 First floor ceiling framing drawn by the author.]

The division of labour in the modern building industry is a result of both industrialization and standardization. These socio-cultural forces have created a kind of class system within the

contemporary building industry, whereby the “professional” serves a different function to the “tradesman”. While the terms tradesman and craftsman are sometimes conflated in everyday usage, a medieval craftsman performed a very different job to the modern tradesman. The tradesman generally follows the representational construction document in assembling a pre-defined building, by sourcing the units of construction and physically connecting them together. The modern professional is responsible for creating the representational construction document, and making complex decisions where every so often little precedent is available for solving the problem at hand. These two roles today share what was the single task of the medieval master mason.

With regards to medieval construction, the builders of churches and cathedrals were known as master masons, and their most used material was stone, and their craft thereby known as stone masonry. The difference between modern and medieval building is seen not only in the absence of standardized parts in the latter, but the expectation of bespoke parts-making. Like the craftsmanship of the medieval monks in the scriptorium, the medieval master masons created each stone element of the Gothic cathedral by hand, and of a unique shape to fit its purpose. The form of the stone was sought from not only the material, but from the existing stones which set precedent. Here the idea, which once again exists “outside” of the mason’s mind (i.e. have reality primarily in the mind of God) is sought and acquired through the craft of stone masonry.

Not only is standardization absent from medieval building methods, but so is the division of labour. The medieval master mason not only pursued the form of the cathedral, but he ensured its structural stability through his years of trial-and-error experience. The master mason would have been more or less aware of what did or did not work in the past, as well as general craft-heuristics and principles of building. If fulfilling the role of architect and engineer wasn’t enough, the medieval master mason also organized the workforce and lent his hand to physical work. There were no building skills that the master mason couldn’t demonstrate, such as carpentry or glazing, and unlike modern professionals, he was not removed from lifting, chiselling, and generally getting his hands dirty.[71]

The physical manpower required for the construction of the medieval cathedrals, and the delicate artistry that provided the embellishment and finishing touches demonstrate a sophisticated understanding of building. A stone mason might labour for weeks or months on a very small part of the cathedral that would not be seen by human eyes after construction is complete. Workers could possibly not live long enough to see the project completed as the human powered process

[71] Coldstream, N. (1991). *Masons and sculptors*. Medieval craftsmen. Toronto, University of Toronto Press, p. 5.

could take decades to complete. What mattered was the "pilgrimage in stone", not completing as many building projects as possible within a given time.

The extended building campaign involved hundreds, and in some cases, thousands of people over the course of decades and centuries. The master mason oversaw a variety building crafts. These included labourers, roofers, glass makers, smiths, sanders, carpenters, and masons. The quarry, which was often located many miles from the construction site, required supervision as well, for the stone had to be cut from the earth and shaped into the necessary profiles before transport. This work at the quarry lessened the burden of transport, for cut stone is lighter than whole blocks cleaved from the quarry wall. This construction arrangement sometimes required coordination of needed stone forms with the cutting of stone some distance away.

Medieval pilgrimage is analogous to medieval construction insofar as the long-term project of cathedral building was a manual, labour intensive search for form, which ultimately resides in the mind of God, and thus provides a spiritual path for those not committed to living in a monastery. The form of each individual stone had to be given by God, and through proceeding along the extended building process could the form be discovered.[72] This search for spiritual significance through the earthly and material ultimately demonstrated how the stone material created itself in a Divine manner, for God was thought to be present and involved in creation.[73]

The stone material was not only an excellent material for revealing God's presence, but also a material which bound the monastic class to the working class. The religious institutions of medieval Christendom built stone buildings, and therefore needed specialized masonry labour. This specialized labour was rare when compared to other trades such as carpenters, for the average medieval town could provide sufficient employment for carpenters, but not masons. Most medieval floors and ceilings were crafted out of wood, but stone buildings were so rare that only the religious institutions, such as bishoprics or monasteries, could fund the building in stone.[74] It follows that medieval masons travelled often, as stone building sites were relatively few and far between, and that steady employment required obtaining positions at cathedrals or abbeys. It is in this way that stone masons were favourably treated in the labour hierarchy, for the close proximity of mason and monk ensured special attention for the labour at hand.

[72] The current thesis presents the form of the finished work, and the form of the uncut stone as both being given by God.

[73] Understanding the medieval construction process as generating from given-ness is possible when considering the mason is performing Christian duty. Another word for Christian duty is charity. See footnote 262 of the current thesis.

[74] Salzman, L. F. (1979). *Building in England down to 1540: a documentary history*. Millwood, N.Y., Kraus Reprint, p. 34.

Medieval masons didn't rely upon construction documents, or written instructions for building cathedrals and abbeys. While images of the final facade may or may not have been available to the master mason, it was his task to organize the labour force in a manner that created a structure that didn't collapse. He did this by visualizing the final form of the cathedral based upon past examples, and using geometry to proceed from work previously completed. For instance, geometrical figures were used to create new stones which laid upon previously laid stones. A year or more could pass between courses of stone as the lime mortar needed an extended period to cure.[75] Where no documents existed for what needs to be made next, successful solutions were possible through the mason's career of accumulated hands-on-skill as well as knowledge of the stone.

Finding successful solutions that continued the building process, suggests theological connections, for some great importance was to be found in what had been built previously, during past building campaigns. These master masons sought the truth of the stone, and theologically, truth was understood to be residing within God, an aspect of his essence as was intimated above, the cosmology which underpinned the masonry institutions provided an understanding of the role of man in God's created universe, and likewise informed the meditative quality of the craft of stone masonry. Like the medieval monks would memorize important texts, then reproduce these texts from memory as if re-creating the original author's thesis, the master masons would also memorize important geometrical figures and reproduce them from memory in order to craft stone within a divine cosmos, which wouldn't exist without God. Human skill in this example is action in accordance with divine order, and the more skill a mason had, the closer he was to God. Thus, the mason's activity could be described as *pious*, not merely an act of construction but a religious practice. Piety, in this medieval sense, is – as its etymology implies - a word describing dutiful conduct in accordance with natural ties, and this natural sense impresses upon the mason as if he were a wax tablet, and over time the impression becomes deeper.[76]

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[75] James, J., (1990). *The Master Masons of Chartres*. Leura, NSW: West Grinstead Publishing, p. 122-124. "The major alterations which occur [at Chartres cathedral] almost every year show it was the builders who changed, and that between the master mason who led the crews and the Chapter there was no one…It is doubtful whether any of the large builders settled permanently on the construction sites, with the possible exception of some crews of sculptors, or masons working from the quarries. The lack of common detailing and the variety of structural solutions make it clear that builders were mobile, picking up work as they could, bargaining with the client for the best conditions each time, and almost never resident in any one place for long…So when these rare and costly men were employed to build a new church or abbey, they were able to work only for as long as there was money. When it was spent they left, and the stone walls stood there, covered with straw against the frosts, until another donor gave something substantial. The clergy would then scour the land for a new man to continue the work. And thus it would go on until the entire building had been completed. In the smallest churches as well as the largest, the problem and the answer was the same."

[76] Lewis, C. T. (2002). *An elementary Latin dictionary: with brief help for Latin readers*. Oxford, Oxford University Press, p. 615. From Latin *pietatem* (nominative *pietas*) "dutiful conduct, sense of duty;

The novelty and ubiquity of standardization, coupled with the widespread adoption of standardized parts has become part of contemporary construction to an extent that conceptual differences with the past may not be readily apparent. The underlying medieval Christian cosmology established the role of the master mason, and how his work was to be performed. The reliance upon a formal approach, understood to be a revealing in stone – as far as possible – of the intelligible ideas in the mind of God, allowed for the Gothic cathedral to progress without standardized parts, but required a more active participation in, and meditation upon, the building process. Throughout this thesis, we must remember that every medieval diagram is open ended, and an invitation to elaborate.[77] Because of the rise of modernity, the creation of the internet, and the use of standardization, it is necessary and possible to revisit the past, and rediscover how the medieval masons looked at masonry construction.

1.2.4 Contemporary Problems in Gothic Architecture Scholarship

The previous section established some differences between modern and medieval worldviews, technologies, and methods of construction. This section will introduce the theological idea of uncreated being, and identify the scholarly problems of placing Gothic architecture within a religious context. A path forward in order to approach some of the problems prevalent in scholarship is suggested. As was intimated above, the Middle Ages took for granted the presence of God in its religious architecture. Abbot Suger oversaw the rebuilding of the Basilica of St-Denis in 1144 A.D., and also chronicled the nine-year construction process. Abbot Suger instructs his readers to not marvel at the gold and expense, but at the craftsmanship of the work.[78] Abbot Suger was not only an abbot, but also an oblate from an early age, and therefore was recognized as dedicated to God's service and well versed in Christian tradition. It follows that Abbot Suger was describing religious architecture in a uniquely Christian way, which is to say that as the Bible

religiousness, piety; loyalty, patriotism; faithfulness to natural ties," in Late Latin "gentleness, kindness, pity;" from *pius* "kind".

[77] Carruthers, M. J. (2008). *The book of memory: a study of memory in medieval culture*. Cambridge, UK: Cambridge University Press, p. 336. "Every medieval diagram is an open-ended one; in the manner of examples, it is an invitation to elaborate and recompose, not a prescriptive schematic."

[78] Suger, Panofsky, E., and Panofsky-Soergel, G., (1979). *Abbot Suger on the Abbey Church of St.-Denis and its Art Treasures*. Princeton, N.J.: Princeton University Press, p. 47. "Whoever thou art, if thou seekest to extol the glory of these doors, Marvel not at the gold and the expense but at the craftsmanship of the work. Bright is the noble work; but, being nobly bright, the work Should brighten the minds, so that they may travel, through the true lights, To the True Light where Christ is the true door. In what manner it be inherent in this world the golden door defines: The dull mind rises to truth through that which is material And, in seeing this light, is resurrected from its former submersion. Portarum quisquis attollere quæris honorem, / Aurum nec sumptus, operis mirare laborem, / Nobile claret opus, sed opus quod nobile clarete / Clarificet mentes ut eant per lumina vera / Ad verum lumen, ubi Christus janua vera. / Quale sit intus in his determinat aurea porta. / Mens hebes ad verum per materialia surgit, / Et demersa prius, hac visa luce resurgit."

was thought of as an encoded message from God, so too was religious architecture thought of as an encoded message from God.[79]

The encoding of this anagogical message took place during the construction process, through uniquely medieval human action, and the description of this Christian construction process is the subject of the current thesis. It follows that geometry and order are a summarization and condensation of this religious outlook, and that the literal and anagogical foundations of the Gothic cathedrals rely heavily on geometrical formation, should leave no doubt as to the religious character so described. The importance of geometry within Gothic thought is due to one characteristic of God emphasised during the period. Creation from nothing, or *creatio ex nihilo*, is a description of God that theologians of the time used frequently[80], and the theological notion of God as uncreated Being will be the fundamental axiom from which this study springs forth. That geometry exists as a thought of God implies that it too must share something in this creation from nothing. Insofar as geometry "*creates itself as part of Creation"*, does it participate in the thoughts of God.[81] The process of medieval masonry construction participates in this cosmology

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[79] Brown, P. (2014). *Through the eye of a needle: wealth, the fall of Rome, and the making of Christianity in the West, 350-550 AD*. Princeton and Oxford, Princeton University Press, p. 274. "This might seem to us to distance the Bible from mystical endeavors. But this is a modern view, based on a modern preference for what we call and "objective" and "historical" study of the Bible. For Jerome (347 A.D.-420 A.D.) and those whom he taught, it was the exact opposite. The entire Bible was thought of as an encoded message from God. To learn Greek and then Hebrew was to advance yet further in cracking this code. It was to learn how to pierce through secondary layers of imprecise or misleading translations. Once these layers had been removed, it was possible to glimpse the hidden Sun of the Wisdom of God that blazed in very depths of the Scriptures*: I have found what my soul has sought after, I shall hold him and shall not let Him go* (Song of Songs 3:4). Even the crushing ascetic regimes Jerome propounded for his charges were linked to that endeavor. For only a body whose sensuality had fallen silent would thrill with a purified and sharpened sensibility to the mystic joys hinted at in the text of the Bible."

[80] Augustine, & Pusey, E. B. (2006). *The confessions of St. Augustine: spiritual meditations and divine insights*. London, Watkins, (Book XII). "But whence had it this degree of being, but from Thee, from Whom are all things, so far forth as they are? But so much the further from Thee, as the unlike Thee; for it is not farness of place. Thou therefore, Lord, Who art not one in one place, and otherwise in another, but the Self-same, and the Self-same, and the Self-same, Holy, Holy, Holy, Lord God Almighty, didst in the Beginning, which is of Thee, in Thy Wisdom, which was born of Thine own Substance, create something, and that out of nothing. For Thou createdst heaven and earth; not out of Thyself, for so should they have been equal to Thine Only Begotten Son, and thereby to Thee also; whereas no way were it right that aught should be equal to Thee, which was not of Thee. And aught else besides Thee was there not, whereof Thou mightest create them, O God, One Trinity, and Trine Unity; and therefore out of nothing didst Thou create heaven and earth; a great thing, and a small thing; for Thou art Almighty and Good, to make all things good, even the great heaven, and the petty earth. Thou wert, and nothing was there besides, out of which Thou createdst heaven and earth; things of two sorts; one near Thee, the other near to nothing; one to which Thou alone shouldest be superior; the other, to which nothing should be inferior."

[81] Runes, D. D. (2008). *The dictionary of philosophy*. [Whitefish, Mont.], Kessinger Pub., p. 250. "**Immanence**: (late Lat. *Immanere*, to remain in) The state of being immanent, present, or in dwelling. 1. In Medieval Scholasticism a cause is immanent whose effects are exclusively within the agent, as opposed to transient…3. In modern metaphysics and theology immanence signifies presence (of essence, being, power, etc.), as opposed to absence. According to pantheism the essence of God or the Absolute is completely immanent in the world, *i.e.*, is identical with it. According to Deism God is essentially absent or transcendent from the world. According to immanent theism He is both immanent (in presence and activity) and transcendent (in essence) with respect to it. Mysticism in its broadest sense posits mutual

by acknowledging God's uncreated being, then attempts to realize some aspect of God's character in material form. Very few records of the building process exist, and the information available is in fragmentary and anecdotal accounts. Personal accounts of the twelfth century master masons are unavailable, so it is therefore impossible to establish the intentions of the earliest master masons in any one written document. We can however begin to see a clear order and pattern to the construction of the Gothic cathedral through interpreting circumstantial and literary information.

The fundamental axiom of this clear order and pattern is established within the medieval account of the cosmos in Platonic-influenced Christianity, in which it was understood to be the human being's task to realise God's ideas in material form. From this medieval Christian account of the cosmos we can begin to establish how Gothic architecture and construction would have been understood. God's Ideas sit atop an ordered hierarchy that is ordered by those Ideas. The Church as a comprehensive social structure was below God, followed in sequential order by craft guilds and the craft traditions, the pointed arch form, geometry, templates, work or labour, and finally material. The uncreated and self-organizing character of God was seen to be present at every point along the hierarchy.

For instance, the Church would have been seen as a participation in God's ordered cosmos as human beings would have fulfilled their humanness and participated in humanity through the Church: individuals, therefore, would have been seen to be *somehow* more human through participation in the Church. It follows that every aspect of the hierarchy participates in its own ontological self-creation and self-organizing through realising God's presence, for as God was understood to be the source of all being, everything was seen as a multiple of God, including humanity.[82]

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immanence of the human and the divine. –*W.L.* **Immanent Theism**: Doctrine that God is both immanent and transcendent with respect to the World. This view differs from Pantheism (qv) By denying that God's essence is identical with that of the World. —*W.L.*" In the current thesis, the immanence of God is being introduced. Medieval minds would have taken for granted the existence of God, and the cosmos as operating within God inherently. The two, cosmos and God, were inseparable. The immanence of God was celebrated throughout the liturgical calendar. It follows that society and human action were ordered according to divine presence, and this acknowledged divinity over and above all things was also thought to manifest in the material world. Geometry was that bridge that ordered the material world according to divine presence. These themes can be found throughout Christian traditions, and the Pagan traditions which the Christians appropriated.

[82] Cox, M., Dunne, T., & Booth, K. (2002). *Empires, systems and states great transformations in international politics*. Cambridge (GB), Cambridge University Press, p. 122. "In the western Middle Ages, crowned heads were important not primarily as power holders but because of their symbolic and metaphysical role. On the one hand they were the physical representatives of an ordered cosmos, which because of the cultural legacy of late antiquity…meant a tidy hierarchical order encompassing the whole of Christendom. On the other hand they symbolized – much more than they ruled – the communities that they headed. Medieval society was essentially self-organizing, with most of the decision-making and policing taking place at the

Isolating the current study to one period of time and one specific architectural example was necessary to conclude about the fundamentals of Western sacred architecture. While an accurate view of religious thought is pursued, aspects of the Christian tradition, such as the afterlife, are not explicitly included or demonstrated to have influenced architecture. While such studies are worthwhile, the task is to place within the Platonic-influenced Christian worldview prominent in Gothic Europe the written and physical evidences of contemporary medieval scholarship.

Two important words for understanding the religious worldview have fallen from usage when investigating Gothic architecture: God and miracle. Not only are they important and worth consideration because they have been discarded in contemporary discourse, but they are also important because of their ubiquity in medieval literature and everyday life of medieval man. The period can be described in many ways, but these two words encapsulate something unique about the period. A period in time so defined as it is by religious temperament cannot be understood in its artefacts and written evidences without God, and without miracle.

When contemporary scholars do attempt to place Gothic architecture within its religious context, the effort often fails because the religious context is foreign to modern researchers, nor are the religious conclusions of Medieval society held to have explanatory power. Today, invoking God in academic arguments ignores a long history of social and cultural changes. Medieval cosmology has been abandoned in popular thought for perhaps five hundred years, but reconstructing this medieval cosmology and placing the stone structures of the time as co-extensive with the cosmology is necessary for the sake of accuracy.

Today's record of the past is incomplete without addressing the intellectual and temporal chasm that separates thinkers from the archaeological record, even though these archaeological evidences are plainly visible in many modern European cities. Cathedrals and church buildings are numerous, visible, and currently in use throughout Europe. Today, attempts at describing and understanding sacred architecture and sacred geometry does not begin at the same point which medieval thinkers started. Modern studies generally have rightly presented sacred geometry and sacred architecture as synonymous with the nature of the universe[83], but no one study has demonstrated how sacred geometry or sacred architecture exists or existed within a single

level of small, local, relatively autarchic units. In practical terms, the larger became the notional units into which Christian society was divided, and the higher the social rank of the people presiding over those units, the less the decision-making and policing affecting ordinary people."

[83] Pennick, N. (1982). *Sacred geometry: symbolism and purpose in religious structures*. San Francisco, Harper & Row. This book by Pennick is an example of comparative religious studies, which the field of study sometimes has suffered from covering too much time, and too many traditions. Far too often an explicit metaphysic or theology is missing, and instead a potpourri of different notions of Divinity are included from various traditions such as Hindu, Egyptian, Christian, and the connections between them are tenuous.

tradition, or the Christian tradition. The details of medieval Christianity, sacred design, and sacred construction of the most important religious constructs have yet to be brought together in one study, for the modern reader. Though an argument that would accommodate the religious account of architecture should stress that the transcendental nature of sacred geometry overcomes temporality and location, it cannot be consistently shown *that all* sacred constructions utilized sacred geometry. Given the evidence of recent work by scholars such as John James it is possible to describe how the Western medieval Christian tradition understood the world through a religious lens unique to eleventh and twelfth century Christianity, and subsequently understood the design and construction of the Gothic Cathedral through that lens.[84] Thus, transcendental speculations and onto-theological investigations and concrete and practical realities such as raising rib vaults were understood as different aspects of a continuous whole.

There was, however, one significant difference that separated concrete and transcendental realms: whereas God creates from nothing, man creates from within creation. Man re-actualizes pre-existing materials into forms of the higher imagination, which becomes the axiom from which medieval masons organized their craft. Hence, the nature of the material as given is fully realised through forming the stone, and the realisation of the ideas of God render Him present in the Gothic cathedral. The metaphysic brought to the table when investigating historical traditions, whose metaphysic is unique and sometimes incompatible with other metaphysics, presents a myriad of problematic interpretations. While it is necessary to recognize the influence of one tradition or culture upon another, it must be done in a clear way.

The current thesis attempts to not seek relationships and insights that were never sought during the history of the tradition in question, and suppose cross cultural links were never present for the thinkers of the tradition. Cultural and traditional values change over time, and it is important to recognize that ideas we take for granted may not have existed in the past. Isolating when and how ideas changed and were accepted is important to understand the thought of past historical periods while avoiding anachronistic conclusions.[85] Too often contemporary authors assume a division between religion and technology, or downplay the importance of miracles.

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[84] John James (1990), Louis Dupré (1993) and Peter Ellard (2007). James describes how the twelfth century contractors at Chartres cathedral travelled between building locations and utilized a geometric recipe book to build the stone structures. Dupré describes the Medieval cosmology which appropriated a Pagan predecessor, and simultaneously sowed the seeds for a subsequent Modern cosmology. Ellard describes the twelfth century school at Chartres cathedral, and the proto-science of the material realm that was articulated within the transcendent Christian cosmology.

[85] Dupré, L. (1993). Passage to Modernity: An Essay in the Hermeneutics of Nature and Culture, p. 123. Dupré does an excellent job of describing what came before the medieval era, and what followed. For the current thesis, Dupré's description of how "Greek ideas of divine sufficiency were reconciled with the existence of a contingent world order dependent on a divine decision", as described in medieval thought, articulates how the master masons would have understood nature, and therefore stone, to have its

Fortunately for the study of Gothic architecture, a consensus about the original place and time exists. The Abbot of St. Denis chronicled the construction of the first use of pointed arches, flying buttresses, and rib vaults in one location. His written record provides an invaluable resource for understanding how these new architectural elements were viewed, as well as indicating the importance of craftsmanship for Gothic architecture. It is also generally agreed that the Gothic synthesis was first developed at the Abbey of St-Denis, and many studies have given us information about the sequence of its construction. Knowing when stones were placed within the masonry structure is helpful, for it helps to determine how the cathedral was constructed, and what decisions the masons made. This thesis will attempt to place these examples within their appropriate religious cosmology. Fundamentally important is constructive and applied geometry, for it provides the link between the transcendent notions of medieval religion and the immanent actions of the masons. Ultimately this thesis will describe how the medieval mind would have understood the uncreated and transcendent God *as miraculously manifesting in the Gothic cathedral.*

1.2.5 Limits

In this study two limits shall be adhered to; the first is a definite historical cosmology, and the second is a specific architectural episode.

In the first instance, this study is limited to the cosmological developments in time between 1100-1250. The intention is to exclude the *Summa Theologica* by St. Thomas Aquinas because it was written after the development and innovations of Gothic forms, and the *Summa* incorporated Aristotelian philosophy which was unavailable as a ubiquitous primary text in Latin during the period of Gothic architectural development. There were however a number of philosophical treatises available; for instance, portions of Plato's *Timaeus* were known to Western Christianity. Significant aspects of Platonic philosophy were relayed by Plotinus, Augustine, Pseudo-Dionysius, John Scotus Eriugena, and St. Maximus the Confessor. It follows that a more general understanding of the cosmology is necessary, rather than limiting the study to one philosopher, however influential he might have been.

Establishing the nature of the medieval cosmology will be accomplished through utilizing primary texts which, it is reasonably certain to speculate, would have been available during the twelfth

purpose within it. Medieval masons understood nature to have its own purpose and providence, (albeit dependent upon a transcendent God), and hence stone masonry is an acting out of the teleologically determined natural order.

and first half of the thirteenth period.[86] Secondary scholarship will also be consulted concerning the nature of medieval cosmology.

Establishing the use of stone in the construction of the cathedral is the second criterion, and primary archaeological scholarship will be utilized to determine the nature and sequence of cathedral construction. Primary accounts of religious architectural construction, though limited, will also be utilized.

Conclusions concerning the nature of medieval cosmology will serve to contextualise and inform an understanding of construction procedure, and Gothic form. This method differs from contemporary methods in that understanding the medieval cosmology we must forgo the presumption of method as testing a hypothesis. Instead the methodology applied in the course of this thesis shall not presume to test a hypothesis, but instead shall adopt a medieval system in order to understand medieval architecture.[87]

The religious logic prevalent in medieval Christianity will provide the method for understanding medieval cathedrals, and given-ness shall determine interpretation.

Two reasons for forgoing popular methodology; the first is the relatively recent development of methodology as a widespread practice, and the second is the medieval presumption of the given-ness of the cosmos.[88] The medieval position assumed that the cosmos was ordered and everything had its place; the task of humanity was therefore to discover the appropriate place for every given thing. It follows that to understand medieval architecture it is necessary to

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[86] Somfai, A. (2002). 'The Eleventh-Century Shift in The Reception of Plato's Timaeus And Calcidius's Commentary'. *Journal of the Warburg and Courtauld Institutes.* 65, 1. "Two Latin versions, both incomplete, circulated in the period prior to the Renaissance: one by Cicero from the first century BC (Timaeus, 27D-47B, with some passages omitted), the other by Calcidius from around 400 AD (Timaeus, 17A-53C), accompanied by his Latin Commentary."

[87] As will be stated later in the current thesis: The identification of indirect apprehension of sacred architecture as compared to direct apprehension of sacred architecture is synonymous with architecture existing as a stage and context as compared with architecture whose ritual participants engage directly with the architecture. For instance, construction becomes a symbolic ritual event whereby participants, like stone masons or other craftsmen, live the religious event.

[88] Dupré, L. (1993). Passage to Modernity: An Essay in the Hermeneutics of Nature and Culture, p. 22&31. "In sum, for the Greeks, the principle of form contains the definitive justification of the real. The decisive question was not why something existed, but how it could exist meaningfully, that is, in orderly form. Real being begins with intelligible form, with a multiplicity rendered harmonious through unity. In this respect the fundamental question of Greek metaphysics differed from the Christian one. Having deprived the form of its intrinsic necessity, the Christian doctrine of creation evoked the further question: Why does form exist?" Here the current thesis takes up this essentialist position where the Christian doctrine of creation redefined the Greek physical teleology by rendering nature as "intrinsically dependent on a transcendent principle. But it did not reduce nature to a mechanism that was moved from without, as the later theory of creation as efficient causality was to do. Indeed, the idea of God's immanent presence in creation soon drove Christian theologians, especially in the Greek-speaking world, to Neoplatonic philosophy...Nature itself *re-presented* God and this representation laid the basis for a theology of the image and for an original Christian mysticism."

understand architecture's place within the medieval cosmos. It is the argument of this thesis that an appropriate account of medieval architecture must take the medieval cosmological position as its basis. Therefore, the medieval master mason would have understood his task of building a stone structure as a search for divine presence.[89] If we wanted to press the point, we might suggest the medieval method would have the character of patiently allowing the material and cosmos to reveal itself. In other words, *mind* existed in the cosmos and not solely within humans. Through the combination of isolating the study to a historical period of cosmology and interpreting the architectural developments that coincided in time and place through such cosmology, it is hoped a more authentic and essential understanding of Gothic architecture can be approached. With the task of understanding Gothic architecture as authentically as possible, the following section will begin to address academic scholarship.

[89] Boodin, J. E. (1929). Cosmology in Plato's Thought (I.). *Mind.* 38, 489-505, p. 498. "In a mythical way Plato shows that the mind's intuition of structure is due to rapport with the structure of reality. Like Kant, Plato sees that mind must bring structure to experience in order to discover structure. But Plato shows his superior sanity in realizing that the structure of the human mind cannot be conceived in isolation from reality, but must be understood in community with reality. It is ontological structure which the mind intuits; and the discovery of structure, so far as it is true discovery, is the discovery of real structure."

2 Academic Scholarship and the Craft of Masonry

This chapter will initially present recent scholarship by Allan Doig which supports the current thesis of traditional thought, followed by an introduction of the unique way in which liturgy is being presented. The most well-known modern scholars of Gothic architecture, Simson, Panofsky, and Frankl, are presented, as well as pointing out how the current thesis could possibly fit in. The scholarship of Mâle, Jones, and Eliade are sympathetic to tradition, and establish unique contributions to academia, and provide the framework to establish why stone masonry is important, and how masonry is a sacred activity. The stone masonry and traditional religious metaphysic is then discussed, as well as Dupré's exploration of how exactly subjective, individual, and autonomous modern philosophic thought can relate to the transcendent object. The chapter then concludes with a presentation of Guénon, for he describes modernity from a traditional position.

Possibly the most accurate scholar of Gothic architecture would be Alan Doig, whose *Liturgy & Architecture* will serve as instructional for the current thesis.[90] The absence of causal or programmatic form making[91] from Doig's analysis of Gothic architecture immediately establishes a search for meaning that is differentiated from more popular academic sources, such as Simson, Panofsky, & Frankl.[92] The absence of a causal link between liturgy and architectural form does not diminish the importance of liturgy, as Doig reminds us: "The most telling consideration in the interpretation of the architecture is its liturgical function. Liturgy and architecture are inextricably bound up together in a single matrix of meaning, and so interpret one another".[93] It follows that a description of medieval liturgy will provide an appropriate place from which it is possible to understand Gothic architecture.

Alan Doig investigates the relationship between architecture and liturgical ceremony. His conclusion that, "It was by no means changes in the liturgical functions that resulted in the development of the architectural forms of the Gothic from those of the Romanesque", is

[90] Rev'd. Dr. Allan Doig is a Fellow of Lady Margaret Hall at Oxford.

[91] Today, architectural design methodologies often assume a mental construct, then represent said mental construct through sketches and drawings, then modify it according to programmatic or functional considerations. The form of a building is then thought to follow the function where adding or removing functional areas, such as bedrooms or number of floors, subsequently modifies the form. To apply this exotic idea to 12th century Gothic architecture, hypothetically the Christian liturgy would change the form of the basilica, when for example, the Roman Liturgy changed from the time of Justin Martyr (c. 130 A.D.) to the time of Gregory I (c. 604 A.D.), during which time Canon, (i.e. yard stick or standard), was established. We can definitively say, given archaeological evidence, the form of the Christian basilica did not change on a one to one basis with Christian liturgy.

[92] (1) Simson, O. G. V. (1962). *The Gothic cathedral; origins of Gothic architecture and the medieval concept of order*. (2) Panofsky, E. (1957). *Gothic architecture and scholasticism*. (3) Frankl, P. (1962). *Gothic architecture*.

[93] Doig, A. (2008). *Liturgy and architecture from the early church to the Middle Ages*. Aldershot, England, Ashgate, p. 186.

unsurprising given the temporal distance between medieval religious architecture and modern form-causing-function.[94] Given that liturgy requires active participation and engagement, it is inappropriate to attempt a complete crystallization of liturgy within the architecture, (so as to prevent any future flexibility), even though Doig describes a strong relationship between the written descriptions of liturgical functions and the chancel arrangement of church buildings. "This architectural/liturgical arrangement [priestly entrance/exit, reading of texts, presentation of gifts/offertory, communion procession] became strongly established, and continued in Rome (with some modifications, especially limiting the movement of the people, necessitated by pressure of time and numbers) until the ninth century."[95] The purpose of liturgy is to invite elaboration upon established themes and narratives, and any attempt to set in stone, (by using a functional analysis), any single historical liturgy will undoubtedly strip that liturgy of its power. What Doig establishes is the eschatological hope of union, and liturgical tradition as it was inextricably bound to the architecture, can provide the current thesis with the evidence to establish what Christian master masons were looking for, and hoped to achieve. What the current thesis proposes is a liturgy in construction, as human action was understood as liturgical, that served the same purpose and resembled, to some extent, the liturgy proper.

Christian thought has always emphasised the enfranchisement of the disenfranchised, and the liturgical rituals were part of this process. Medieval Christians re-lived scriptural narrative through actively participating in rituals, and through this re-enactment did historical narrative hold power for medieval man. They lived the scriptures through participating in liturgical rituals, and medieval life was organised and understood through these rituals. The attempt to establish a single ritual from which the medieval architecture followed would preclude the embellishment necessary for liturgical ritual. Permanently fixing meaning and ritual for all eternity within a single architecture or ceremony precludes participation and enfranchisement.

Instead, Alan Doig presents archaeological evidence of Christian liturgy and architecture before Constantine's conversion elaborated Christian ritual with princely ceremony, and follows Christian liturgy and architecture until the late Middle Ages. From the initial wealthy converts that allowed their homes to be used for Christian worship, to the Cathedrals of late medieval Europe, the reader is presented with information that paints a broad picture of the state of Christian architecture through the years. Eventually Doig finds importance within the monastic reforms, and the monastic rituals within monasteries. Here is his best opportunity to describe a form following function narrative, if there ever was one to be found. History has not provided us with a

[94] Ibid., p. 169.
[95] Ibid, p. 94.

narrow idea of function before the nineteenth century, and no such narrative can be concretely articulated despite monastic reforms and architectural decisions being decided by a small group of individuals.

Of all the information to come from Doig's work, the strongest would have to be the importance placed upon monasticism for the development of medieval life, and the Gothic form. The trend of enfranchisement was taken up by the monastic orders, and the narratives these orders propagated relied on liturgical and allegorical thinking. While we cannot establish any monastic order as responsible for the development of the form of Gothic architecture, we can know for certain the monastic orders espoused anyone could find their place within the Christian cosmos, and that manual labour was part of the spiritual process of edification. This important connection between work and liturgy allowed for the Christianising of many people who did not have the free time to devote to prayer and daily ritual, like the spiritual athletes within the cloister.

Establishing the link between medieval masons who constructed the cathedral, and the monks who established the importance of liturgical and allegorical thinking, allows a connection between the thinking of the monastic orders, and the working masons. The subsequent Gothic development from Romanesque precedent was possible not from seeing liturgy as function, but instead from the application of liturgical and allegorical thinking. The liturgy in construction, then, allowed for the construction of Gothic cathedrals, without petrifying the liturgical ritual as a function from which the Gothic form was derived.

2.1 A Unique Rendering of Liturgy

A common understanding of liturgy is of a standard order of events that take place within a religious ritual, such as the Common Prayer of the Church of England, or the Roman Rite of the Catholic Church. The emphasis upon liturgy, within the construction process of the medieval cathedrals, is not to be thought of as causing Gothic form, nor as an authoritative order of events with which the masons followed in order to build the great cathedrals. Instead liturgy is thought of as an orientation towards Christ that informed the medieval building process and established the importance of ritual for medieval man.

Gothic architecture was created by human action and work, and more specifically, Christian work. "This public and communal working generated culture, and the word *culture* has linguistic roots in the Latin *cultus,* or worship of deity. The Greek language gives us *leit-ourgia,* which means the work of the people or public worship, and is the root for the contemporary word, *liturgy.* Of all

societies, what is valued or worshipped is embodied in the products of the culture".[96] From these word origins as suggested by Schloeder and Pieper, the nature of Christian work can be said to be a cultivation of what is valued. The planting, nurturing, and harvesting of a Christian religious sense in the act of working can therefore be discerned in the construction process of the Gothic cathedral.

More specifically what will be shown is how the use of liturgy within the construction process refers to a pattern for building that was simultaneously a worship of Christian Divinity. While each master mason had his own procedure for constructing the cathedrals, each master mason understood the building process as a communal response to the sacred. Each worker was responding to God through his work, and each worker established a relationship to divine agency; hence the importance of Abbot Suger's account of the reconstructing of the Abbey of St-Denis.

We can see the stones of the medieval mason participate in a liturgy in construction through Abbot Suger's emphasis upon material, whereby "The dull mind rises to truth through that which is material". It follows that a general liturgy in construction is possible, even if a specific rite was never recorded. It benefits us today to understand the work of the masons as liturgical because we can see that the stone material was recognized as worthy of being treated like a relic prior to construction. Christian masons understood the uncut stone existed within a Divine cosmos. The stones are lightly sleeping, and need the action of man in order to find their rightful place within the cathedral, and within the cosmos. Man, created in the image of God, works like God as well in his creative activity.

Furthermore, it must be remembered that liturgy was an important tool for organizing society. Oral tradition and liturgical ritual were the mechanisms by which society functioned, so it follows that oral tradition and liturgical ritual were an integral part of the everyday tasks of the medieval mason. The reliance upon spoken word and memory was crucial, as written text and instructions were not available.

For instance, manuscripts of the Bible translated into vernacular language were not attempted until the late Middle Ages. The Wycliffe translation in English did not appear until 1384, and the Charles V Bible in French did not appear until 1377. Neither were widely circulated, so it is very unlikely that anyone besides clergy or aristocracy would have access to scripts in any language besides Latin or Greek. Old English and Old French readers were left with only glosses,

[96] Schloeder, S. J. (1998). *Architecture in communion: implementing the Second Vatican Council through liturgy and architecture*. San Francisco: Ignatius Press, p. 35. Here Schloeder is paraphrasing Josef Pieper, (1964). *Leit* means people, and *ourgia* means work.

paraphrases, and limited translations. It was not until long after the early medieval episode that we see a French Bible in 1523, and an English Bible 1611.[97]

It follows that the liturgy in construction is then a tool for organizing society and remembering important Christian narratives, while simultaneously orienting the masons towards Divinity. From this initial description of liturgy and Christian action, it is possible to subsequently describe recent academic scholarship, and how the current thesis contributes something new. Further exploration of Christian liturgy will be undertaken in Chapter 3 of the current thesis, but we must first turn to describing three modern scholars of Gothic architecture; Simson, Panofsky, and Frankl.

2.2 Contemporary Scholars of Gothic Architecture: Simson

Otto von Simson's (1912-1993) essay in 1956 painted a different understanding of Gothic architecture than had previously been established in twentieth century scholarship. [98] The topic of Gothic architecture within a religious context was also explored around the same time by another notable scholar, Erwin Panofsky in 1951. This basic premise of modern academic scholarship, that the coincidence of religious thought and new architectural forms in time and place is evidence of influence, is a common starting point for explorations of Gothic art and architecture.

The central notion put forth by Simson was that Gothic Architecture is the representation of supernatural reality. This formulation of the concerns of the Gothic period is problematic to begin with as the medieval mind never sought to *re-present* the heavenly realm within the earthly realm, but instead saw the transfiguration of the earthly into the heavenly. There was no reliance upon signs for the medieval mind. The summarization of Simson has been stated thusly: "Even more important, and the heart of the Gothic aesthetic according to Otto von Simson, was the belief that all light radiates from some primary source of radiance and glory. This accounts for the glorious windows of Gothic churches. The light of the windows in Chartres, for example, was not just beautiful, but was regarded as a sacrament and analogy for God".[99] The nuance of how Simson got it wrong is as follows.

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[97] Doig, A. (2008). *Liturgy and architecture from the early church to the Middle Ages*. Aldershot, England, Ashgate, p. 92. "It must be remembered first that in late antiquity books were expensive and rare, that memory played a far greater role in all culture than nowadays, that much literature, including large parts of the Bible, was known by heart, and consequently the use of a single word would act as the reminder of whole swathes of scripture and liturgy."

[98] Simson, O. G. V. (1962). *The Gothic cathedral; origins of Gothic architecture and the medieval concept of order*. Bollingen series, 48. New York, Pantheon Books.

[99] Gorringe, T. A Theology of the Built Environment: Justice, Empowerment, Re-demption. New York: Cambridge University Press, 2002, p. 196. Theologians such as Timothy Goringe "are unlikely to subscribe to this metaphysic".

The tangled web is difficult to straighten as history has given us habits of mind that are not conducive to understanding the concerns of medieval thought. At no point does Simson understand the Gothic cathedral as the manifestation of God, but always instead as a representation or symbol beyond immediate reality.[100] The grains of truth that Simson has landed upon, point in a direction that modern assumptions prevent from ultimately arriving. That medieval man was concerned with image, or with re-presentation is completely false. The suggestion that we are to forget the stone and mortar is to ignore the essential function of the Christian mysteries in transfiguring the cosmos in a miraculous way to overcome deficiency and death. What Simson failed to see was how the medieval worldview surpassed *subjective* experience. The stone and mortar are essential to the manifestation of God just as the human nature of Christ is essential to the Trinity.

Furthermore, the link between the importance of metaphysical light, and the light entering the cathedral through stained glass windows led Simson to conclude that St. Denis's choir became a frame for the windows, thereby decreasing the importance of the stone and mortar. Again, we can see the treatment of light entering the cathedral as a metaphor, unlike the treatment of light within medieval thought as literally a miraculous manifestation of God's divine presence.[101] There is a marked distance with which Simson treats the gothic worldview.

Furthermore, Simson does not address why the forms of Gothic architecture were necessary given the concerns of the medieval mind. Pointed arches, ribbed vaults, and flying buttresses are not explained as intrinsically suited to sacred architecture. The current thesis, as will be explored in chapter 4, will describe why these architectural forms were important to medieval masons.

2.3 Contemporary Scholars of Gothic Architecture: Panofsky

As has yet to be introduced, the author of *Gothic Architecture & Scholasticism*, Erwin Panofsky (1892-1968), sought to see connections between the architecture of the medieval period and the concurrent theology.[102] This concurrence is the basis for Panofsky's analysis that the underlying habits of mind within theology are similar to the underlying habits of mind within architecture. The parallel between the structure of the *Summa Theologiae* and the structure of medieval cathedrals becomes evidence with which to characterise the entire period of history.[103] This

[100] To mitigate the risk of postulating a completely immanent God, the current thesis maintains a wholly transcendent and uncreated God draws up immediate material reality and transfigures it in the same manner that Christ is both human, (i.e. material), and divine.
[101] The current thesis is treating metaphor, analogy, and representation as similar in that each is a "mental object" that is supposed to exist only in the mind of the individual.
[102] Panofsky, E. (1957). *Gothic architecture and scholasticism*. New York, Meridian Books.
[103] The Summa Theologiae (1265-1275) by St. Thomas Aquinas (1225-1274).

analysis by way of identifying the tendencies of the human mind is a trademark of Panofsky's work, and can be further explored in his *Studies in Iconology*.[104]

Despite the concurrence of simultaneous developments in medieval theology and medieval architecture, the criticism has remained that no specific proof, (such as writings by medieval master masons), exists with which to justify a direct link between theology and building construction. Even though Panofsky did not necessarily draw a link directly between the discoveries of each discipline, he is often criticised today as putting forth a direct causal relationship. The causal influence Panofsky suggested was not a direct one, but instead a "diffused" causal relationship. This "diffusal" is how Panofsky demonstrates the tendencies and habits of the human mind.[105]

The trend of thought within *Gothic Architecture & Scholasticism* is indicative of the general trend within art history during the first half of the 20th century. The notion of the newly emerging field of study known as art history, thanks to Panofsky, was to understand architecture within the ideas of the time. These ideas of the time are accessed by accumulating different written texts by many different historical figures, and attempting to gain a survey of what medieval people thought.

Therefore, the explanation of gothic architecture in terms of a mental habit that spread throughout culture is to place too much emphasis on consensus. Such analysis of the scholastic tradition as a manner of ordering that is accepted as appropriate, merely through consensus, is to ignore the concerns of the Gothic mind. The ultimate concern was the transcendent source, and no acknowledgment of that concern is present for Panofsky.

With Panofsky, it is necessary to also address Immanuel Kant (1724-1804), for the former owes an intellectual debt to the latter.[106] Panofsky's scholarly method required a contextualization of art

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[104] Panofsky, E. (1962). *Studies in iconology; humanistic themes in the art of the Renaissance*. New York, Harper & Row.

[105] Viola, T. (2012). "Peirce and Iconology". European Journal of Pragmatism and American Philosophy, IV -1, p. 9. "But the main thesis of the book [Panofsky's Gothic Architecture and Scholasticism] is that "in the period from about 1130-40 to about 1270" the link between philosophy and architecture goes well beyond this geographical and chronological coincidence. What is more, this link is "more general than those individual (and very important) 'influences' which are inevitably exerted on painters, sculptors, or architects by erudite advisers." It is, in short, a causal relation, but one which "comes about by diffusion rather than by direct impact." The fulcrum of such a relation is what Panofsky called the mental habit that Scholasticism allegedly instilled into architects."

[106] Cheetham, M. A. (2009). *Theory reception Panofsky, Kant, and disciplinary cosmopolitanism*. Journal of Art Historiography. Number 1, p. 2. "Erwin Panofsky's debt to Kant is one of the most profound exchanges between philosophy and art history. Many of the connections between these thinkers are well known. In his early work, Panofsky explicitly adopted Kant's stable, judging subject and held that this subject apprehends its world through internal 'symbolic forms' – Ernst Cassirer's term - such as one-point perspective, because, as Kant held, we have no access to the thing in itself. For Panofsky, we perceive according to a priori, universal Kantian categories such as space and time and then apply proper epistemological procedures to our mental constructs of the world through Kantian critique."

within the ideas of the past, and Kant demonstrated the need to pin ideas down in a concrete time and place. For instance, Kant postulated that "noumenon" is independent of "phenomenal", or in other words thoughts are independent of material reality. This is a radical break from traditional thought because Kant reinforced that ideas are not objective, but instead are personally subjective. The medieval order where eternal Platonic ideas existed within the mind of God was, by the 18th century, largely abandoned in favour of philosophies that reinforced the Republican political order that was taking root.[107] The revolutionary transition of Western society from traditional to modern is addressed later in this chapter, but suffice it to say that traditional religious thinking of the past is of a very different nature to Kantian thinking.

Panofsky established within Art History, that human ideas about art change over time, and placing the art of the past next to the concordant ideas of the same time allowed for a method which produced modern knowledge. The very nature of knowledge is different here, as art becomes meaningful through context, as opposed to art being ontologically meaningful in itself.[108] Modern art is one sign amongst signs, and the network of signs and references relies upon the interrelated network for meaning.[109] Here modern art history could even suggest that art has no meaning

[107] The Republic of the United States and the Republic of France were founded, respectively in 1776 and 1792. The failed English Republic existed from 1649 to 1660.

[108] Rockmore, T. (2015). *Art and truth after Plato*. Chicago, The University of Chicago Press, p. 199. "Anticontextualism is more common than contextualism. From Descartes to Davidson, a long series of writers, including Kant, advance versions of the view that the subject is unconstrained by its surroundings…Kant is a philosophical anti-contextualist, concerned to work out the conditions of knowledge in general on the a priori plane, by definition prior to, hence in independence of, context however understood. In varying degrees, all the post-Kantian German idealists are epistemological contextualists, hence aware of and interested in the relation between cognitive claims and the context in which they arise."

[109] Neville, R. C. (2002). *Religion in late modernity*. Albany, State University of New York Press, p. 186. "Something of the complexity of developing competence with signs can be drawn out through a distinction between two senses of meaning mentioned earlier, network meaning and content meaning. Network meaning is the meaning structure defined by a semiotic code, according to which there is a range of other signs to which a given sign can refer, and a range of yet other signs that can interpret the sign, and a range of respects in which the given sign can be interpreted as referring to certain signs but not others. The network meanings of signs are far more complicated than dictionary definitions or textbook expositions, but knowledge of a specialized sign network might begin that way. A person can learn to manipulate the signs within a code according to their network meanings, and experts such as art historians, certain kinds of literary critics, and other symbol analyzers can spell out network meanings in detail. Content meanings, by contrast, are those by which realities are engaged. Signs have content meaning when a person is able to use them, along with the relevant referents and interpretations in their coded networks, to refer to and interpret realities so as to shape and be shaped through engagement. Novice musicians and scientists might know a lot of network meaning before they can turn that into content meaning and engage the relevant things musically and scientifically. Within the network of the semiotic system, signs have *extensional* reference and interpretation, which is a function of their coded structures. But the signs with their network connections can also have *intentional* reference and interpretation as content meanings when they are the medium by which engagement is shaped relative to human interests and purposes and to the nature of the things engaged. Signs set in their network structures have both intentional reference to realities and intentional interpretations in real life when people are competent at their content. Content meaning is what signs have for persons who have mastered their network meanings and internalized them, becoming competent to use them in the intentionality of engagement."

outside of the network of references. Such an assertion is obviously antithetical to medieval meaning, for traditional knowledge was predicated on a "metaphysical objectivism", where medieval art participated in the metaphysical realm to varying degrees. In the medieval mind, it is possible to be ignorant of the metaphysical realm, but it is impossible to exist outside of the metaphysical and meaning-giving realm, unlike the modern thinker whose proximity to nihilism is closer.[110] At this point we can see the rift between epistemological systems and assumptions about meaning, and the difficulty for modern thinkers to access medieval thought and Gothic architecture.

2.4 Contemporary Scholars of Gothic Architecture: Frankl

In the early twentieth century, Paul Frankl (1878-1962)[111] joined scholars such as Panofsky and Simson in exploring an understanding of Gothic architecture that added to, and deviated from, previous understanding handed down by influential figures such as Viollet-Le-Duc. Frankl differs from Panofsky and Simson in his treatment of Gothic architecture as aesthetic and functional. His divisions and categories are often based on specific elements that certain periods possess, but others do not. The emphasis on ribbed vaulting and pointed arches during the medieval period is one tool Frankl uses to distinguish it from its predecessor, Romanesque.

The historical exploration of Gothic architecture moves along with the aid of the theoretical aesthetic understanding and categories employed by Frankl. Ultimately Frankl seeks to define Gothic style, and its historical development. Any exploration of Gothic architecture within the medieval cosmology is lacking. The engagement of Frankl with medieval theology is not as developed as Simson, and many attempts to recognize meaning often fall short because of a misunderstanding of the medieval concern. The medieval concern is instead replaced with Frankl's theoretical understanding of formal structure.

The fundamental premise which *Gothic Architecture* states throughout its pages, is that particular form becomes the symbol of particular meaning. It follows that architectural form, and specifically in this instance, Gothic architecture, symbolizes the meaning of the civilization of the time. In this way, Frankl is inverting the method employed by Panofsky, where instead of establishing the literature of the time first, Frankl is establishing the architectural forms first, which then leads to symbolic and non-literary understanding. In this instance, symbol is described as a third degree of meaning, where the first two are material, and representation,

[110] Weller, S. (2011). Modernism and nihilism. Basingstoke, Palgrave Macmillan, p. 6. "Within the sphere of philosophical modernism, Nietzsche is paradigmatic above all because his critique of modernity exerts an influence greater than that of any other philosopher of the period, and because it was he who deployed the concept of nihilism to capture the essence of modernity."

[111] Frankl, P., & Crossley, P. (2000). *Gothic architecture*. Yale University Press Pelican history of art. New Haven, Yale University Press.

respectively. The first degree of meaning, material and natural materials, alongside the second degree of meaning, representation and iconography, are not as important as the third degree of meaning, which is the symbol.[112] Here Frankl is describing symbolism in terms of *Gestalt psychology*, which postulates that the human mind forms an all-inclusive whole with self-organizing tendencies.[113] Sympathies with the current thesis and *Gothic Architecture* can be described, but ultimately the former says something the latter does not; Gothic architecture is determined by the daily work and preoccupations of a masons' lodge, and *achieves the same objectives as those of a theological lecture-hall or monastic cloister*. That is to say the goal is ultimate access to the transcendent and mystical realms.

For Frankl, the "symbol" is a general character or shape made up of disparate parts, but the whole is other than the sum of the parts. Something completely different is accessed when considering the whole. This notion might seem like a reasonable facsimile for accessing Gothic architecture and medieval religious knowledge, but it falls flat for an obvious reason. What is being described is a general process of individual perception of indescribable experiences. For instance, describing how strawberry tastes to someone who has never tasted a strawberry is impossible. Or perhaps describing what the colour red looks like to someone unable to see colour. This ineffability is essentially trivial despite the larger attempt of psychology to describe the end products of perception, for while mystical union with the transcendent source may be ineffable, it is of a magnitude and other-worldly character that shares little with Frankl's "symbolism". Therefore, we are brought no closer to medieval religious knowledge, or the co-extensive metaphysical activities of the monasteries and masons' lodge.

Ultimately *Gothic Architecture* fails to describe its subject accurately because it suffers under the weight of a modern cosmology. Like Simson and Panofsky, Frankl places far too much emphasis upon the thinking individual, and discards nature and the transcendent.[114] Metaphysical objectivism is antithetical to modern thought, and therefore assuming that God is present in all degrees of meaning, including the initial material degree, as described by Frankl, would seem foolish to modern eyes. This can be recognized by Frankl's subtle portrayal of religion, where he superficially recognizes that 1) God doesn't change, and 2) the eschatological aspect of Christianity, but ultimately denies the medieval cosmology by attempting to study the changing

[112] Ibid., p. 274.
[113] King, D. B., & Wertheimer, M. (2008). *Max Wertheimer & Gestalt theory*. New Brunswick, NJ [u.a.], Transaction Pub, p. 69. Max Wertheimer was one of three founders of Gestalt psychology. In 1908 Wertheimer specifically mentions Paul Frankl in a letter to a friend named Hans, asking if either of them could look after a "harmonium, (a pedal reed organ than Wertheimer had apparently rented)".
[114] Dupré, L. (1993). Passage to Modernity: An Essay in the Hermeneutics of Nature and Culture. Yale University Press, see entire essay. Nature, God, and Man were synthesized in traditional societies. This idea is explored in detail later in the chapter.

conceptions of God by religious men.[115] By subtly placing God within man as a conception amongst other conceptions, it is possible to create a modern narrative of Gothic architecture.

2.5 Contemporary Scholars of Gothic Architecture: Mâle

Moving on from the three most well-known modern scholars of Gothic architecture, it is important to introduce authors whose sensibilities lay in more traditional times. The remainder of the chapter will explore traditional thinkers that have explored religion, architecture, or both.

The Gothic Image, written by Émile Mâle and published in 1913 established just how Christian artists understood their work.[116] Through a thorough understanding of the medieval literature, such as *The Golden Legend*, Mâle relates to us the meanings of medieval sculpture and stained glass.[117] The method of understanding used in *The Gothic Image* is gothic as well; Emile borrows Vincent of Beauvais' four part structure in order to divide the book.[118] The "mirrors" are nature, morals, instruction, history, and within "nature" is established the basic symbolism taken for granted by the medieval mind. Everything is seen as symbolising Christ including characters within the stained glass, and characters rendered in statues. Furthermore, Mâle postulates the existence of a book of artistic doctrine now lost to us.

The bulk of the argument is conjecture, and mostly a synthesis of previous work. Mâle also corrects misunderstandings that were prevalent at the time. As he shows, there is no precursor to the French revolution within the Gothic cathedral, nor are nineteenth-century civic virtues carved in the porches of Notre Dame as Violet-Le-Duc postulated.[119] The gentleness which Mâle

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[115] Frankl, P., & Crossley, P. (2000). *Gothic architecture*. Yale University Press Pelican history of art. New Haven, Yale University Press, p. 277.

[116] Mâle , E. (1958). *The Gothic image; religious art in France of the thirteenth century*. New York, Harper, p. 31. "They [Middle Ages] organised art as they had organised dogma, secular learning and society. The artistic representation of sacred subjects was a science governed by fixed laws which could not be broken at the dictates of individual imagination. It cannot be questioned that this theology of art, if one may so put it, was soon reduced to a body of doctrine, for from very early times the craftsmen are seen submitting to it from one end of Europe to the other. This science was transmitted by the Church to the lay sculptors and painters of the thirteenth century who religiously guarded the sacred traditions, so that, even in the centuries in which it was most vigorous, mediaeval art retained the hieratic grandeur of primitive art."

[117] *The Golden Legend*, also known as *Readings of the Saints*, is a collection of Christian hagiographies, (study of saints). As a popular medieval text, it was a compilation of the lives of Saints canonized by the Church. Likely complied around the year 1260, it was added to over the centuries. The book is an invaluable source of traditional lore which surrounded the biographies of the Saints.

[118] Vincent of Beauvais was a Dominican friar that lived between c. 1190-1264. He wrote the *Speculum Maius* which was the most important encyclopaedia of the Middle Ages.

[119] Van Santvoort, L., Maeyer, J. D., & Verschaffel, T. (2008). *Sources of regionalism in the nineteenth century: architecture, art and literature*. Leuven, Leuven University Press, p. 61. Not only was the notion of "nation-state" nebulous when Notre-Dame cathedral was completed in 1345, but Viollet-Le-Duc was removed from the cosmology of the Middle Ages. For Viollet-Le-Duc, the epistemological argument was between rationalism and empiricism, which presupposed a thinking man in a material and causal universe. The argument Violet-Le-Duc presented was that a French proto-nationalism caused the iconography and architectural forms.

describes medieval society is evident throughout, and the veneration of Creation is presented throughout *The Gothic Image.*[120]

Furthermore, Mâle suggests how art influenced popular conceptions of the medieval period by retelling his readers the story of St. Denis. The statue in stone of St. Denis, who was beheaded, depicted a figure holding his head. Whilst the theologians of the time wanted acknowledgment of his martyrdom, the artist was forced to create an image of this unique character. The people however saw things differently, and the legend became St. Denis miraculously offering his head to Christ after the beheading. The necessity of portraying saints and theological figures in material form thus influenced popular legends and conceptions. Here Mâle suggests the myth of a beheaded St. Denis walking to his final resting place with head in hand was started because of artistic necessity in depicting the beheaded martyr.

The systematic and comprehensive study of French art and icons is of great importance to the study of medieval history. Understanding everything in terms of analogous relationship to Christ renders the study as true to the spirit of the age in which it was built, and avoids any preconceived methods or notions imposing upon the intended meaning. However, the relegation of non-iconic aspects of the cathedral is evident. For instance, the construction of the stone pillars, vaults, and buttresses are dismissed as "ordinary" work. These architectural elements are not seen to be as important as the icons, and given the subject of the book is art and not construction, it is possible for the current thesis to show how the less iconic features fit in with the *Gothic Image*; specifically, how non-iconic architectural features fit into the medieval desire for order, respect for tradition, and scripturally informed imagination.

2.6 Sacred Architecture in Contemporary Discussion: Lindsay Jones

Continuing the presentation of contemporary religious thought in architecture cannot exclude the scholar Lindsay Jones. Criticism of accepting the influence of religious thought on the design and construction of medieval cathedrals has centred on the absence of written documents to prove

[120] Armstrong, C. (2017). *Glimpses of what Creation meant to medieval Christians, from Emile Mâle's the Gothic Image*. [online] Grateful to the dead-A church historians playground. Available at: https://gratefultothedead.wordpress.com/2011/05/31/glimpses-of-what-creation-meant-to-medieval-christians-from-emile-males-the-gothic-image/ [Accessed 27 Sep. 2017]. "What follows are a few notes from Mâle's book that deal with Creation and related themes...: the medieval passion for sorting and ordering information; the absolute subjection to the authority of tradition, especially written tradition; the importance of scripture in forming the medieval imagination. All of these, say Mâle, deeply influenced medieval artists. On the theme of what I think can fairly be called medievals' "Creation spirituality," Mâle portrays medieval artists and art as saturated in that sense of the sacramentality of all created things that Gregory the Great bequeathed to the Middle Ages—the understanding that God is continually communicating to us in everything he makes. Mâle takes this to be an extension of the principle of allegorical interpretation: that under the literal sense of scripture hide deeper spiritual meanings. So: 'The artist, as the doctors might have put it, must imitate God who under the letter of Scripture hid profound meaning, and who willed that nature too should hold lessons for man.'"

master masons sought God's presence in stone. No master masons wrote about their design intentions; therefore, master masons could have had a number of intentions. The construction of medieval architecture has been suggested as a secular endeavour as well, but Jones describes a framework with which to describe most, if not all, religious architecture.

Excellent studies into sacred architecture in general have yielded contributions that certainly help in bringing an authentic understanding of cathedral architecture to a critical audience. The priorities of various architectures from very different cultures and times have been articulated in a single morphology as presented by Jones.[121] These priorities are used to understand sacred architecture, but it is conceded the morphology is not to be confused as actually sacred *per se*. As a starting point for sacred architecture it is a useful introduction, but encountering the sacred directly is not the intention of the morphology.

What Jones brings to the discussion about Gothic architecture is a decisive argument for the sacred nature of not only the medieval cathedrals themselves, but the act of constructing the cathedrals is seen as sacred within the Jones' morphology. Modern academic priorities of analysing and testing different fields of study according to human reason and logic would seem to place the study of Gothic architecture outside of academic study, given that Gothic architecture was understood by the medieval imagination and informed by scripture. The answer to this would be, like Panofsky or Frankl, to impose a method or taxonomy of architectural forms to establish a reasonable explanation of historical buildings. As pointed out previously, this is inauthentic. Lindsay Jones' unique contribution as an academic is to propose a taxonomy of sacredness. While Jones' taxonomy is not established as sacred in itself, it takes for granted religious architecture as sacred. Readers can then comparatively evaluate different sacred architectures, and see similarities or differences, but when the discussion is framed as one of religious sentiment, the priorities of Gothic architecture can no longer be questioned as even sacred in the first instance.

Jones presents his readers with twelve religious priorities. While sacred architecture from cultures other than the medieval European episode may only exhibit one or two of the priorities within the morphology, it could certainly be argued that the cathedrals of Western Europe exhibit every aspect so described. Each path to the sacred is different, and provides a clue to how sacred architecture is implicitly understood during the time it was constructed. For example, medieval sacred architecture could be said to meet each of the following 12 ritual priorities:

[121] Jones, L. (2000). *The hermeneutics of sacred architecture: experience, interpretation, comparison*. Cambridge, MA, Distributed by Harvard University Press for Harvard University Centre for the Study of World Religions, p. 336. "Eliade often invoked Goethe's morphology of plants as his preeminent model for a morphology of religions."

1. Orient the Christian, and instigate ritual-architectural events.
2. The cathedral also presents a miniaturised replica of the universe, and conforms to a celestial archetype.
3. The cathedral certainly conforms to traditional rules and influential mythico-historical example.
4. Authors have also emphasised the alignment of the cathedral with celestial phenomena, bodies, and extra-ordinary earthly occurrences.[122]
5. The cathedral, through ritual-architectural events, brings to remembrance, and creates a place for Divinity as the source and completion of ultimate reality.
6. Cathedrals also attempt to instil a sense of mythico-historical episodes, and miracles.
7. The list of activities in the house of worship continues through the remembrance and enfranchisement of socio-economic rank and earthly rights and duties.
8. There are certainly chapels within the cathedral that remember deceased martyrs, and other saintly characters.
9. During important yearly festivals, the cathedral was a place to present religious rituals, and other sacred operations.
10. There are many elements within the cathedral that require meditation upon, and bring focused attention and devotion upon one icon.
11. The progress of cathedral building was understood as a favourable rendering, and a place of reconciliation with Divinity.
12. Finally, the cathedral was a place of protection, sanctuary, and refuge.

The ephemeral events that accompanied the material of sacred architecture are difficult to retrieve, but scholars such as Lindsay Jones suggest it is possible to access these ephemeral events.[123] These ephemeral and sacred events can be rediscovered through an active interpretation that requires participation from the interpreter. The important notion here is that contemporary interpretation *can* be authentic and valid, and it is this permission to engage with the sacred architecture from the past that we get from Lindsay Jones, via Gadamer. Without the

[122] Critchlow, K., Illig, L. R., Robinson, A., Adderley, J., & Briers, J. (2003). *Chartres Cathedral a sacred geometry*. [Harrington Park, N.J.], Janson Media. Documentary film exploring Chartres Cathedral in France.
[123] Jones, L. (2000). *The hermeneutics of sacred architecture: experience, interpretation, comparison*. Cambridge, MA, Distributed by Harvard University Press for Harvard University Centre for the Study of World Religions. Despite a focus on South American examples and emphasis within Jones's previous work, his morphology can certainly be helpful as a heuristic guide when attempting to interpret sacred architecture many years preceding modernity. To come to an appropriate understanding of medieval Christian architecture for example, it is important to understand the religion which existed at the time. The foundation of Gadamerian hermeneutics informs Lindsay Jones throughout the exploration of sacred architecture by providing a means to encounter a way of looking at the world that is inaccessible for many scholars today.

universality of hermeneutic reflection there is no possibility of accessing past sacred architectures.

This universality of hermeneutic reflection is presented and defended throughout Jones' thesis, and becomes a source of validity for Jones. Making the strange familiar is the task of Jones, and even though he acknowledges the possibility of doing this through hermeneutical reflection, the Christian tradition would suppose the universal nature as being inherent within the shared being of humanity. That is to say, if we are to speak for the Christian tradition, insofar as we participate in being, we participate in a universal hermeneutic.

As Lindsay Jones reminds us, hermeneutics has been a tool for defending the meanings of ancient Christian scripture against "rational criticism", positivism, and empiricism. That Gadamer discarded the task of his hermeneutical predecessors in discovering a method for interpretation is unique because it suggests no method is available, nor is necessary. The adoption by Gadamer of Heidegger's refined ontology means that Gadamer, like Heidegger, does not articulate his approach within a Cartesian separation of knowing subject and known object, nor does he seek to prescribe methodical rules for interpretation. Instead, an inescapable appropriation in the act of understanding is affirmed by Gadamer, as well as raising hermeneutics above other modes of inquiry, as the "Gadamer mode" is *the* fundamental mode of being in the world.

However, Jones believes Heidegger's contributions to be a radical critique of the very foundations of Western metaphysical thinking.[124] This thesis disagrees with seeing Heidegger's contributions as a critique, but instead sees Heidegger's contributions as a continuation of Western metaphysical thinking that can be traced to ancient Greece, and medieval theology.[125] The Heideggerian critique would have to be directed at the Modern era and Cartesian thought, and

[124] Jones, L. (2000). *The hermeneutics of sacred architecture: experience, interpretation, comparison*. Cambridge, MA, Distributed by Harvard University Press for Harvard University Center for the Study of World Religions, p. 8.

[125] Mansbach, A. (2002). *Beyond subjectivism: Heidegger on language and the human being*. Westport, Conn, Greenwood Press. "Heidegger is one of the few Western thinkers to have succeeded in going beyond the Western philosophic tradition. Because his radical criticism is believed to have fractured the foundations of modern philosophy, his thinking is usually at the center of the controversy between the defenders of the tradition and those who wish to break with it and start afresh. In the heat of this debate, the question of Heidegger's place in relation to that tradition in general and to Cartesianism in particular has been neglected. I wish to address the question by focusing on the major aspects of Heidegger's critique of Cartesian philosophy and the modern tradition. I will first show that the strength of his criticism lies in its all-encompassing penetration of the foundations of modern philosophy, running through both the ontological and epistemological channels. Ontologically, Heidegger presents a critique of subjectivism; epistemologically, he discredits the correspondence conception of truth and its underlying visual metaphor. I will then look at his view of history and the meaning of his concept of "overcoming" in order to show that his aim is not to destroy the tradition, but to provide a wider basis for it by rescuing forgotten elements imbedded in the tradition itself. Finally, I will show that in this process of "overcoming," Heidegger did not really depart from the tradition, but absorbed some of its basic tenets, as his concept of death echoes major elements of Cartesian doubt."

both could be argued to have distance and separation from metaphysics. It is more likely that Heidegger restored metaphysics to Western thought. However, Jones reminds us that "*the decisive question is not in what way being can be understood, but in what way understanding is being*".[126] For the current thesis, we can then describe the way medieval mason's understanding is being, for participating in tradition was of supreme importance for medieval man, and said tradition established the importance of appropriation in the act of understanding. As Jones has described, rituals are important for appropriation, and as will be described, the medieval construction process was ritualized.

Religious buildings, it is then explained, "*are at once expressions of and sources of religious experience*."[127] Our understanding of religious buildings is being insofar as the architecture first manifests religiousness then transforms it. It follows that architecture and art have a certain priority within hermeneutical reflection because they are inexhaustible, and provide a superabundance of meaning. Furthermore, Gadamer finds religious art and symbol as exemplary when seeking the fullness of ontological disclosure. Lindsay Jones finds a solid foundation in Gadamer from which to work. Indeed we are given advice when considering, "*Thus, particularly in the case of long enduring structures such as megaliths or cathedrals, the agenda of the planners and builders, however well considered, constitute only the earliest of a largely unpredicted (and unpredictable) sequence of transactions of meaning in which those constructions will participate*".[128] Thus we see the possibility of understanding all aspects, including all work and manual construction, of the cathedral as participating within the sacred understanding.

Despite issues we may take with the privileging of a secular methodology when investigating sacred architecture, the morphology does provide helpful and interesting insights. The conjoining of religion and orientation gives the act of finding and constructing man's place in the world a sacred character. The rituals and rites of religions allow for a symbolic understanding as well as a functional necessity, and it is an opportunity to find and discover these sacred places. The most influential scholar of these sacred places is Eliade whose three fundamental rules, 1) Adherence to celestial archetypes, 2) Microcosmic replica of the macrocosm, 3) Symbolism of the centre and cardinal directions, provide the foundation for the first category of Jones' morphology. From this point, we can begin to notice homologized architectures.

The second of twelve priorities within Jones' morphology – that of the cathedral being a microcosmic replica - is explained with the help of an example by Otto von Simson's comments

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[126] Jones, L. (2000). *The hermeneutics of sacred architecture: experience, interpretation, comparison*. Cambridge, MA, p. 9.
[127] Ibid., p. 22.
[128] Ibid., p. 25.

about Chartres cathedral.[129] For our purposes it is important to note that Chartres cathedral is not to be understood as representation, but instead as "analogous". Analogy was a medieval way of seeing the cosmos as ordered, and proportion is similar to analogy in that it related seemingly unrelated parts for the medieval mind. Umberto Eco is cited within Jones's thesis as exploring St. Thomas Aquinas' aesthetics and system of proportion.[130] This common religiousity when speaking of archaic society is furthered by Jones' exploration of ancient astronomy.[131] Jones goes on to demonstrate how his morphology is a cross-cultural understanding of sacred architecture through examples from around the world. When considering architectural elements and divine attributes, Jones reminds us not to assume one-to-one correspondences. The seemingly concrete and stable architectural elements such as doorways, windows, and ceilings can take on different meanings within different moments of the liturgy.[132] Resisting a single definition of sacred architecture, Lindsay Jones suggests "*religious structures always commemorate some conception of the divine, the exceptional*."[133] Indeed Jones even cites Burckhardt: "*The building materials, wood, brick or stone, correspond to the hyle or materia prima, the plastic substance of the world...The tools used to shape the crude materials accordingly symbolize the divine "instruments" which "fashion" the cosmos out of the undifferentiated and amorphous materia prima*."[134]

The last four priorities of Jones' morphology consider sacred architecture and ritual, and provide the most information for our study. The identification of indirect apprehension of sacred architecture as compared to direct apprehension of sacred architecture is synonymous with

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[129] Ibid, V.2, p. 48. Quote: "Simson argues that the symbolism of the Gothic cathedral has been misunderstood. In his attempt to remedy that error he articulates what amounts to a heuristic distinction between architecture conceived as a literal image of the universe (homology, priority I-A) and architectural adherence to codified prescriptions of order that were "discovered" by earlier generations and canonized by tradition, that is, one seminal variation on the convention priority. Simson repeatedly describes the Gothic cathedral, which in his opinion attains its classic expression as Chartres, as a "symbol of heaven", a "'model' of the cosmos", and a "image of the Celestial City" – all metaphors that connote homologized architecture. Yet, he argues persuasively that the nature of the relation between the symbolic cathedral and the larger cosmos is not, as Hans Sedlmayr has contended, "representation", and even less is it "optical illusion." Alternatively, according to Simson, the built form of the cathedral and cosmos are linked by what he calls "tie of analogy". He argues, in other words, that a particular set of abstract laws of measure and proportion, deemed "universal" by the Western Christian tradition, were considered to inform both the universe at large and the physical form of the cathedral. Accordingly, the architectural configuration of the Gothic cathedral is, from this perspective, conceived not so much as a kind of three dimensional representation of the universe, that is, as a microcosmic reflection of the macrocosm (as in the case of the homology priority, I-A), as it is a reflection of a commitment to replicate traditionally validated standards of "Augustinian aesthetics of number and proportion," that is, a design initiative more aptly connected to the convention priority (I-B)." Homology: analogy between beliefs.

[130] Ibid, p. 60.

[131] Ibid, p. 69. Quote: "Nonetheless, for too long archaeoastronomical researchers would not (or could not) appreciate that, in archaic astronomy, whether in northern Europe, pre-Columbian America, or elsewhere, the quest after "empirical data" was nearly always subsumed by wider orientational agendums of conventionalized and/or homologized unification of space, time, society, and polity."

[132] Ibid, p. 185, "It was for the performance of liturgy that any church was ever built", Sindig-Larsen, *Iconography and Ritual*, 9.

[133] Ibid, p. 108.

[134] Ibid, p. 111, Citing Titus Burckhardt, *Sacred Art East and West, p. 52.*

architecture existing as a stage and context as compared with architecture whose ritual participants engage directly with the architecture. For instance, construction becomes a symbolic ritual event whereby participants, like stone masons or other craftsmen, live the religious event.

The problem when approaching medieval sacred architecture in terms of its theatrical and liturgical qualities is the loss of ritual evidence from that time. The lack of evidence from ephemeral rituals has led to speculation but no consensus. The evidence that we do have is in the form of archaeological artefacts such as the stones of the cathedrals, and the order in which it was constructed to guide us in understanding construction as ritual. There is a consensus that hand-masonry, chisel-and-hammer techniques are largely unchanged, even eight hundred years later. Furthermore, the categorization of architecture as contemplation, propitiation, and sanctuary are all applicable to medieval sacred architecture. The first offers a direct catalyst of "religio-ritual" experience, the second is realizing a state of harmony, and the third is a retreat from the mundane into purity and perfect order.

Despite the trend within the Christian tradition to reject art and images, "*By the Middle Ages, however, most Christians had come to endorse precisely that position, [Neo-Platonic position that artistic images of Divinity are both appropriate and necessary aids in the step-by-step spiritual ascent to the realm of pure intellect and spirit], and thus to endorse the utility of so-termed contemplative modes of ritual-architectural presentation*."[135] Jones even acknowledges Abbot Suger's endorsement of anagogical illumination in the realm of architecture as influenced by Pseudo-Areopagite. Contemplation of the architectural elements lifted Abbot Suger to new heights of bliss and religious ecstasy. Jones even states that "*For Suger, the only route to God is through material things*".[136] It should not be forgotten that these material symbols also served the illiterate masses to bring them closer to God. Indeed, "*Suger, a dedicated servant of the royal, military, and national state as well as the Church, believed that art and architecture had the potential for working an almost magical transformation on learned and unlearned soul alike, a changed outlook that would not only recast and refine their status as responsible Christians but also as loyal French citizens*."[137]

The emphasis upon architecture to the detriment of the building process by scholars of sacred architecture is addressed by Lindsay Jones with the emphasis upon propitiation. In his words, we need to embrace the hermeneutics of *building* more fully rather than the hermeneutics of buildings. The identification and appreciation of the significance of deliberately tedious, and

[135] Ibid, p. 227.
[136] Ibid, p. 229.
[137] Ibid., p. 230, Here Lindsay Jones references Lefebvre, *The Production of Space*, p. 257.

laborious production should characterize this hermeneutical priority, and the process of medieval construction is certainly described here.

All previous categories are helpful in interpreting the anagogical agenda of the Gothic cathedral, but are not complete without the final agenda of architecture as sanctuary. Sacred architecture as a place of solitude away from turmoil in order to foster continual prayer was an ideal that occurred at a similar time as St. Denis and Abbot Suger. The monastery was the most perfect example for a religious architecture seeking distance from society, and to create a perfect example that could possibly become a model for larger society.

Therefore, Lindsay Jones provides a far-reaching survey of all sacred architectures, and is extremely helpful when investigating religious structures and construction. The comparison between cross cultural examples illustrates the investigation, and is ultimately influential for this thesis.

2.7 Contemporary Scholar of Religion: Eliade

The current chapter has discussed architecture and religion, but for the next section, religion will be presented in order to later establish how stone masonry was religious. Eliade is applicable as an erudite scholar of religion, for in 1987 he wrote the 16 volume *The Encyclopaedia of Religion*. His scholarship of sacredness will inform the current exploration and provide an understanding of traditional sacredness.

For the medieval Christian mind, holiness is necessarily the ultimate value in human affairs. How holiness fits within the Christian metaphysics is best described by recognizing the unity of uncreated being. That there is one God, and that his uncreated being is a unity, is evident once we remember that uncreated being is also self-creating. Within his own being is the reason for his being, therefore he is whole.

The etymology of 'sacred' gives a glimpse of what the sacred is. The Latin root of 'sacred' is 'sacer', which means 'holy'.[138] The understanding of sacredness is bound with understanding holiness. The word 'holy' finds a modern counterpart; 'whole'-y. Completeness and perfection find mention alongside 'holy', or 'whole-y'.[139] The etymology of 'sacred' shows that what is sacred is also what is whole, complete, and perfect.

From an introduction to the etymological root of sacredness, we are brought to the fundamental characteristic of sacredness; a consideration of things insofar as they are whole. Sacredness

[138] Chantrell, Glynnis. (2008). *The Oxford Dictionary of Word Histories*. Paw Prints.
[139] Skeat, Walter W. *An Etymological Dictionary of the English Language.* Oxford: Clarendon Press, 1910. Holy: Sacred, pure, sainted. This word is nothing but Middle English *hool*, (now spelt whole), with suffix-y. The original sense is 'perfect' or excellent.

renders parts into a whole, elements into a universe, and processes to completion. Concern for wholeness is necessarily a concern for sacredness as the two concerns engender a similar response from man. The treatment of that which is sacred is similar to that which is whole; sacredness and wholeness engender awe, solemnity, reverence.

This concern for the whole has been explored by Mircea Eliade in 'The Sacred and the Profane'.[140] His work on the nature of religion as an exploration of what is sacred and how it is sacred reveals the wholeness of myths, symbols, and rituals. However, Eliade reveals an important paradox that must be given consideration when attempting to understand sacredness. The paradox is that 'by manifesting the sacred, any object becomes something else, yet it continues to remain itself, for it continues to participate in its surrounding milieu.'

How something 'becomes something else, yet continues to remain itself' is possible through the manner in which sacredness manifests itself. Eliade illustrates how this manifestation is possible through the founding of a centre that is not only a fixed point in the formless profane space, but also an ontological passage from one mode of being to another. At the moment of founding the centre, everything 'becomes something else, yet continues to remain itself' because the centre renders orientation possible.[141] Through this manner of 'existential orientation from the centre' is the very idea of the multiple rendered into the whole. At this point, nothing lies outside the whole including the multiple, and nothing lies outside of the sacred including the profane.

For Eliade, the centre is the formative principle in understanding sacredness. The centre is not only the place of sacredness, but its founding is of importance as well. Eliade's equating of the founding of the centre with the mythical moment of creation of the universe, so as to imitate the gods and take a position close to the origin of existence, allows man that ontological passage from one mode of being to another which was mentioned earlier. This mythological act of creating the universe from founding the centre illustrates how man consecrates the world around him through rendering it as a whole that emanates from the point at which he *is*.

Furthermore, this notion of creation holds a special relationship to architecture. As was noted by Joseph Milne: 'This mythic 'beginning of all things' is not, however, a chronological beginning, but rather a sacred pattern that underlines and governs the unfolding and meaning of temporal time. It crosses the motion of temporal time vertically and is present within it in all moments, uniting it

[140] Eliade, M., & Trask, W. R. (1987). *The sacred and the profane: the nature of religion*. San Diego, Harcourt.
[141] Ibid., p. 12.

in the eternal beginning or *arche*.[142] It follows that architecture holds a place at the beginning of all things at a moment of eternal creation.

"[Religious man] always believes that there is an absolute reality, the sacred, which transcends this world but manifests itself in this world, thereby sanctifying it and making it real."[143] Everything acquires a new relationship for the religious man whose 'existential situation' is rooted in the sacred, as opposed to the profane. Nor is relativity possible for the religious man. No thing has *being* or is real insofar as it is considered outside of its relation to the sacred. The foundation of the centre is an act whereby the actor inhabits the thusly created world. Indeed, man participates in *being* through a sacred existential situation where he 'ritually re-actualises the paradigmatic act of Creation'.

Eliade gives an example of sacredness by contrasting it with profaneness. In every example, the manifestation of the sacred is of something of a completely different order, as opposed to the profane where the absence of manifestation is only homogony. The profane stone is indistinguishable from all other stones, but for those to whom the stone is sacred its immediate reality is transmuted into a supernatural reality. Furthermore, by manifesting the sacred, the stone becomes something else, yet it continues to remain itself, for it continues to participate in the cosmic milieu. In this manner, recognizing the stone as sacred also recognizes the cosmos as sacred. Nothing lies outside of sacredness.

Furthermore, Eliade goes on to say that the sacred is equivalent to *reality*, and is saturated with *being*. The polarity sacred-profane is often expressed as an opposition between real and unreal or pseudo-real. Things such as rocks become real only insofar as they participate in reality and the cosmos; a part of the whole.[144]

Another example given by Eliade, is that of construction in ancient India. Initially, an astronomer instructs where the first stone is to be laid. Mythologically speaking, this point lay above the head of the snake that supports the world. A stake is driven into the ground to fix the snake's head. A foundation cornerstone is laid at the exact centre of the world, as the ritual fixing of the snake is a conquest over chaos and the un-manifested. This act of construction is rendered as an act of creation. Man gains orientation and being through ritual construction. Eliade goes on to say that

[142] Milne, J. (2008). *Metaphysics and the Cosmic Order.* London, Temenos Academy, p. 34.
[143] Eliade, M., & Trask, W. R. (1987). *The sacred and the profane: the nature of religion*. San Diego, Harcourt, p. 202.
[144] Sacred things are real in a special way, and sacredness can't collapse into and undifferentiated ontology. What is meant here is that, for traditional man, all things are saturated with being in an absolute reality, and any rocks that are seen to not be saturated with being, are illusory.

the house is the universe that man constructs for himself by imitating the paradigmatic creation of the gods, the cosmogony.

2.8 Establishing the Tradition of Masonry within a Religious Metaphysic

Now that Eliade and his distinction between sacred and profane has been established, it is possible to describe how stone masonry, as a traditional and religious institution of human action, was sacred.

This mythic beginning of participation and wholeness has two important aspects when considering architecture of the Middle Ages. The first aspect is the traditional passing of mythic stories onto successive generations, and the second aspect is an apprehension of wholeness instantaneously.

The founding of communal life begins with these foundational myths, and is passed onto subsequent generations. Often these religious myths undergo successive transformations and compilations throughout their life.

For architecture of the Middle Ages, tradition and traditional myths were an essential aspect of the building trade. Successfully constructing monuments would not have been possible without a building tradition that passed on knowledge of success and failures of the past, for medieval master masons had no system of mathematical prediction such as we have today. Modern material science was a foreign idea, nor was their ultimate aim to predict the causal behaviour of materials exclusively. The medieval rules of proportion would be considered inefficient by today's standard, which leaves us to conclude about their ultimate aim if not strict functionality.

The apprehension of wholeness instantaneously is a feature of these founding myths. This eternal beginning is ever present and apprehended in temporal unity. These myths allow for a number of meanings, and are inexhaustible sources for meaning. Curiously Joseph Milne uses the term "templates" when describing these myths and symbols, and finds that from these templates a number of meanings can be found.[145]

Instantaneity can be seen in the way medieval masons constructed the cathedrals. The lack of construction documents and reliance upon templates suggests a sacred and whole apprehension of the construction process. From a mythic and symbolic understanding of medieval masonry we can begin to see a process of construction whereby templates derived from geometrical principles became the instructions for building the monuments of 800 years ago. In the same manner that poetic creation myths were handed from generation to generation, we can see the building tradition adopt the same mechanism for passing information to successive generations.

[145]Milne, J. (2008). *Metaphysics and the Cosmic Order.* London, Temenos Academy, p. 34.

Furthermore, we can begin to understand the thought process behind a master mason who did not rely on construction documents but instead apprehended the cathedral in its entirety from the beginning. These craftsmen would have had to love, venerate, and authentically create the cathedrals. As will be discussed later in chapter 4.6, geometry allowed for the masons to fulfil their duties as the demand for authenticity is met with uncreated-being. The craftsmen did not rely upon another source, but instead allowed the geometry and material to develop naturally into the pointed arch of the Gothic style.

Speaking of matter as sacred requires an understanding of its relationship to form. The relationship between the two is synonymous with the relationship between the particular and the universal which we have been exploring. We must come to some understanding of how 'founding the centre', as Eliade describes it, relates to the link between matter and form.

We can begin by stating that the form of something is the being of something. Its form is what it is. It does not follow that material is rendered as profane, as might be assumed. Instead material is understood as sacred once it is in-formed. Nor can we assume that any or all interaction with material is inherently formal, or sacred. On the contrary we must continue with the characteristics of 'founding the centre'.

This foundational act which we speak of assumes presence before the act, or in other words assumes wholeness. It is pointless for an act not to be whole, nor for the act to not participate in some wholeness. The lack of participation inherent in an incomplete act implies nihilism and meaninglessness. Therefore, a participation in wholeness, being, and the universal is required when in-forming material.

This participation renders the question of matter and form in a unique fashion. We cannot consider matter without form.[146] The resultant form is not possible without the material, and an understanding of material without form is not sacred. We could even state that form is sacred. Material can only disclose its being and universal aspect insofar as it is informed.

However, form owes its birth to the material. Without the being of material, there would be no form. The given-ness of material is inescapable, and without what is given, being and form is not possible. The two, matter and form, in-form each other through sacred ritual.

[146] Eco, U. (1988). *The aesthetics of Thomas Aquinas*. Cambridge, Mass, Harvard University Press, p. 68. "Form is a structure or pattern which is materially at one with the object – something in virtue of which an object lives and is what it is, but which possesses reality and character only in virtue of being materialized in the object. It means a binding and ordering of parts which form themselves into a unity according to a rule and a finality."

2.9 The Problem of Sacredness in Contemporary Discussion

The current chapter has presented traditional and modern renderings of Gothic architecture. The remainder of the chapter will explore how it is possible for subjective modern thinkers to overcome autonomy and access the transcendent source, and will conclude with a presentation of the traditional thought of René Guénon.

Within architectural discourse the absence of serious discussion about sacredness, cosmology, or theology has been noticeable since the seventeenth century. Changes ushered in by Galilean astronomy, and Newtonian mechanics fundamentally altered how the world was understood. A transcendental source of uncreated being was no longer taken for granted as it was during the medieval period, nor are thought and action understood as mutually reinforcing. Today, architectural theory and material construction exist as divorced realms that converge to produce our built environment. Architectural theory as a rational exercise seeks to explore the logic and rules of a self-referential system of related parts whose ultimate value and meaning is generated by the system itself. No orientation regarding a transcendent source is permitted as all meaning is subjective. It is accepted that meaning cannot possibly come from the objective reality, for Kantian thought proposed a noumenon/phenomenon dichotomy that has since been generally and implicitly upheld.[147]

Even within contemporary philosophies such as phenomenology that are not concerned with detailing the laws of scientific method, the acknowledgment of a transcendental source escapes consideration. Phenomenology never progresses beyond the Kantian foundation of subjectivity, and is categorized as poetics. Beauty forever remains in the eye of the beholder, and never regains its medieval status of objective truth. Changing ideas also changed what was taken for granted, and Beauty was not alone in the new role it was given by Enlightenment thinking. Teleology was no longer a consideration of uncreated and divine being over a period of time, but instead was replaced with a technological process that sought efficiency and minimum effort. Uncreated being has no beginning or end as it is outside time, so consideration of the temporal and material process of sacred cathedral construction would necessarily be teleological. In medieval cosmology, the end and beginning point cannot be considered separate, but scientific methodology would suggest otherwise. Considering Gothic cathedrals and construction from a 21st century lens presents many problems for theological and historical considerations.

[147] Noumenon is thought or events separate from the senses, while phenomenon in contrast is an objective and observable occurrence. So entrenched is such a conception that it permeates many aspects of contemporary life.

Presuppositions of "scientistic" thinking are incompatible with medieval theology and cosmology, and it is anachronistic to suppose the cathedral builders held "scientistic" views.[148]

What Gothic architecture can teach is the fundamental syndicate between thought and action, or mind and body.[149]

It follows that contemporary thinkers can find encountering Divinity difficult, or even impossible. The accumulation of changes in philosophy, cosmology, architecture, and science throughout history has left us with a very different conception of the world, and our place in it. Our contemporary conception of the world is learned along the way from childhood to adulthood, and presuppositions about how and what we see are never far away. The same holds true for specific contemporary notions that participate in a cosmological understanding of such things like Divinity, or in modern terms the "ineffable".

The inversion of medieval cosmology from divine and eternal ideas founding consequent understanding of material, to the contemporary cosmology where material founds consequent understanding in the form of private and ever-changing theory, can be demonstrated by architectural scholars such as Kenneth Frampton (b. 1930) and Lebbeus Woods (1940-2012). Both have addressed the notion of the sacred, and their treatment of Divinity discloses the pattern of contemporary cosmology to assume a material reality devoid of divine order unless conceptualized by the privately thinking individual.

Kenneth Frampton attempts to see in Le Corbusier a pattern of sacredness or profaneness, and despite multiple examples of Corbusian constructions there is no evidence of sacredness outside of a theoretical concept employed as an overlay to objective and material structures. Kenneth Frampton suggests certain architectural volumes, structures, and elements could be seen as

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[148] Pérez Gómez, A. (1983). *Architecture and the crisis of modern science*. Cambridge, Mass, MIT Press, p. 13. A Gothic cathedral, for example, *is* the City of God on earth, regardless of contemporary religious convictions, structural preoccupations, concerns with efficiency and stylistic coherence, or opinions about useless formal elaboration. The point is to disclose the transcendental intentions that generate form.

[149] Pérez Gómez, A. (1983). *Architecture and the crisis of modern science*. Cambridge, Mass, MIT Press, p. 11. "Around 1800 a second great transformation took place. Faith and reason were truly divorced. Scientific thought came to be seen as the only serious and legitimate interpretation of reality, denying any need for metaphysics. Euclidian geometry was functionalized. Infinitesimal calculus was purged of its residual symbolic content. Geometry and mathematics were now purely formal disciplines, devoid of meaning, value, or power except as instruments, as tools of technological intentionality. It is around this time that the great obsessions of contemporary architecture were first clearly expressed. Practice was supposed to follow theory since theory now assumed that one day, through the fruits of mathematical reason, it would thoroughly control design and building. Eventually, the split between thinking and doing became a critical problem. The belief in the symbolic richness of the external world, in a Divine Nature that ultimately revealed its meaning through observation, was replaced by the notion, by now familiar, of the material world as a mere collection of inanimate objects. In such a framework, architecture was forced to reject its traditional role as one of the fine arts. Deprived of a legitimate poetic content, architecture was reduced to either a prosaic technological process or mere decoration."

sacred, or as an interplay between sacred and profane, but ultimately Le Corbusier's position on the matter is summarised by acknowledging Corbusier's exclusion of all forms of institutional religion from urban planning as well as quoting him: "Into my work I bring so much effusion and intense inner life that it becomes something almost religious".[150] The treatment of sacredness as an individual and personal idea homogenised to exist amongst all other ideas including profaneness is evident on two counts; Kenneth Frampton's usage of sacredness to analyse various built examples, and Le Corbusier's relegating of religious sentiment to the strictly personal realm of inner psychology.[151]

Lebbeus Woods recently informally published his thoughts on Divinity with a definition and treatment that betrays how unaccustomed contemporary thinkers are to notions of Divinity.[152] Divinity is presented as essentially unspeakable, ineffable, and beyond expression. The contemporary cosmology treats God as removed or even non-existent, so it is no surprise to see Divinity explained as unspeakable in this instance. Furthermore, Divinity is likened to personal and private experiences that occur during car crashes, tornadoes, or the extreme activities of thrill seekers, or that Divinity is to be apprehended and owned by the personal and private mind.

In agreement with Lebbeus Woods on the absence of dialogue about ineffable-ness or Divinity within architecture, there is very little being said about the divine character of our constructed world. Furthermore, in agreement with Lebbeus Woods, the current thesis acknowledges that Divinity reveals a very different world to us, and sometimes this revelation occurs during extreme events. While it is agreed that Divinity and ineffability shows us a revelation, and that Divinity and ineffability are not topics of contemporary discussion, it is not agreed that Divinity and ineffability are set opposed to normalcy, comfort, and habit. It is not necessary for calamity, disaster, or confrontation to elicit a response from the thinking individual. Encountering Divinity through ordinary existence and work is necessary for understanding Gothic cathedrals, and portrayal of Divinity as violently breaking through an impenetrable barrier is a pre-relegation that medieval thought never would have imposed in the first instance.

Furthermore, it follows that if contemporary thought has taken seriously so little about Divinity, then how seriously are we to take contemporary conclusions about Divinity? Implied is the notion that past periods of time might be able to tell us something different about Divinity,

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[150] Frampton, K., & Schezen, R. (2002). *Le Corbusier: architect of the twentieth century*. New York, H.N. Abrams, p. 183. Here Frampton is citing: Walden, R & Purdy, M. (1986). Le Corbusier and the theological program. *The Open Hand, Essays on Le Corbusier*. Cambridge, MIT Press, p. 289.

[151] Eliade, M., & Trask, W. R. (1987). *The sacred and the profane: the nature of religion*. San Diego, Harcourt, p. 202. [Religious man] always believes that there is an absolute reality, the sacred, which transcends this world but manifests itself in this world, thereby sanctifying it and making it real.

[152] Woods, L 2010, 'TERRIBLE BEAUTY 2: the ineffable', *Lebbeus Woods*, weblog post, 24 July, accessed 29 July 2010, <http://lebbeuswoods.wordpress.com/2010/07/24/terrible-beauty-2-the-ineffable-2/>

especially if those past periods of time were singularly focused and mesmerized by questions of Divinity.

Roughly and generally speaking civilizations of the past have emphasised Divinity and God's place in the cosmos up until the seventeenth century with the development of Enlightenment thought. Prior to this crucial period God was explored in a myriad of different ways, and unique contributions to religion and world view were recorded by each civilization. Four hundred years after the birth of Enlightenment thought religion no longer influences how we view the workings of the world, and our everyday life is not characterized by ritual, sacrifice, and prayer. Instead our world is characterised by technology, mechanics, and progress, none of which rely upon a religious understanding of the world.

It is understandable that today Lebbeus Woods would relegate Divinity to unspeakable status, but past historical trends of thought would not have. Instead God would have been real, accessible, and necessary in understanding how the world worked and what was required in everyday activity. For example, medieval stone masons would have crafted rough stone into finished forms using geometrically derived wooden templates whose ultimate source was a religious understanding of the cosmos. Suffice it to say that the everyday work of crafting stone was a ritual in which God's presence was realized in the Gothic cathedral. Other craft trades would have operated under the same cosmological views that assumed God was and is potentially present.

Ultimately it is the obstacles which Lebbeus Woods imposes upon architecture to participate in sacred-ness, and the inability to see the possibility of sacred architecture that is most troubling. Despite architecture having throughout history in its very definition a participation in Divinity, the contemporary thought would have us believe a definition outside of a traditional context.

The treatment of Divinity before a myriad of cultural changes prompted a view of Divinity as popularly held, is completely different in character. While there is an aspect of medieval Divinity that is unknowable and unspeakable, as explored by Johannes Scotus Eriugena with uncreated being, it does not follow that God is removed and therefore inexpressible. God’s Word, and eternal Ideas were seen to exist, and man was able to know them. In fact, all knowledge was from God, and it was a requirement that knowledge must be divine. How the world was understood was divinely ordered. It follows that Divinity could not have been a private experience, but instead a knowledge of the cosmos common amongst all of humanity. Knowledge of the cosmos was the foundation of civilization, and not the patented property of any one individual. Furthermore, normal everyday tasks and traditional work such as masonry were

seen as divine insofar as they participated in God's eternal reason. If Divinity is a topic of consideration, the lessons from the history of ideas serve us well, for prior periods excelled in knowing God and the cosmos. The subtlety and treatment of Divinity has yet to be surpassed in contemporary thought.

2.10 Conflict: From Divine Being of Medieval Cosmology to the Divine Will of Enlightenment Theology

After the cultural transformations of the Enlightenment, certain presuppositions were found entrenched within the way the world was viewed. Perhaps the most fundamental is the dominance of the subject as knower. Emphasis upon the subjective knower is not unique to Enlightenment thought as some Christian Mystics perpetuated a subjective and quietist tradition. What was unique in the Enlightenment was the discarding of the world around as inherently ordered, and readily understood by the human mind. Prior to the seventeenth century it was assumed that mind was inherently able to understand the God-ordered world around.[153]

The shift from one manner of understanding the cosmos to another begets the thesis of Louis Dupré 's *Passage to Modernity.* Ultimately the shift to modernity from a medieval worldview began when the conception of man as autonomous and free subjective willing agent began to spread, following the nominalist theological conclusions about the nature of God as owing to an inscrutable free will. God's will is free, so must man's be too.[154]

The autonomy and freedom of man becomes necessary within the philosophy of Immanuel Kant, whose critique of religion left faith as a matter of pure subjectivity. Religion could tell us very little about objective reality after the Enlightenment. Immanuel Kant's work has been tackled by subsequent thinkers such as Louis Dupré, whose investigation gives an ordered interpretation of the effects, and an ordered interpretation of the challenges for religious thinking.[155]

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[153]Milne, J. (2008). *Metaphysics and the Cosmic Order.* London, Temenos Academy, p. 19. "I refer to the fundamental insight of Western philosophy which is to be found expressed, in one way or another, from the Pre-Socratics until the Renaissance, in which it is understood that 'thought' originates in reality itself and is integral to reality itself. It means that 'mind' and 'knowing' are primordially the same, and that it is this knowledge which philosophy was always concerned to bring into active reflection and articulation."

[154] Dupré, L. K. (1993). *Passage to modernity: an essay in the hermeneutics of nature and culture*. New Haven, Yale University Press, p. 3.

[155] Dupré, L. K. (2004). *A dubious heritage: studies in the philosophy of religion after Kant*. Eugene, Ore, Wipf & Stock Publishers, p. 3. Three points identified by Dupré to be considered: 1. Since reliable theoretical knowledge is restricted to the objective, phenomenal sphere, the religious consciousness can expect no direct support of its beliefs from theoretical reason. 2. Since the transcendent does not belong to the objective phenomenal sphere, it must be approached through the subject's awareness of itself rather than through that of its world. 3. Since the subject must be conceived as essentially autonomous, no transcendent reality can ever interfere with the exercise of human freedom. Each of these conclusions contains a fundamental challenge to all subsequent speculation about religion. 1. How can we restore theoretical support of religious faith after Kant's critique of the arguments for the existence for God? 2. How can a method be conceived for the philosophical study of religion on the basis of experience alone? 3. How can that experience itself be legitimated within the context of human autonomy?

The challenges to religious thinking are many, for few have bothered to answer the questions about theoretical reason and transcendent reality, religion versus autonomy, finding objective meaning in religion, or the possibility that religion is more than speculation. While outlining these issues for contemporary religious thought, Louis Dupré suggests solutions, but stops short of concluding about the possibility of a contemporary religious cosmology that accounts for these challenges.

The problem, as Dupré explains it: *The religious man, on the contrary, does not try to understand; the purpose of his contemplation is not to obtain more insight into the world structure, or even into the object of supernatural revelation. His contemplation is not immanent, as all rational cognition is; it is an ek-stasis, a complete surrender to a totality which transcends the self, although the self is part of it. Religion...is a search for God not insofar as he is a perfection of my own being, but as he is in himself, that is, insofar as he is transcendent.* [156]

Ultimately Louis Dupré explains the incompatibility with seeing the Self as freedom compared to the ontological dependence suggested by the Christian tradition. The person as autonomous chooser has no place within transcendentally dependent assertions within the tradition. Freedom versus destiny invites closer scrutiny, and Dupré suggests how other Christian thinkers like Kierkegaard attempted resolution.

Christianity is the greatest possible paradox, and, consequently, leads to the greatest inwardness. In the *Philosophical Fragments* Kierkegaard showed how any relation of a being in time to an eternal truth is paradoxical, because to be related to an existing subject the eternal must be placed *in time*, and this implies a beginning, a coming into being, which conflicts with the very essence of the eternal. Ultimately the solution is to be found in the person of Christ where eternity is no longer *related* to time (thereby becoming paradoxical); the eternal itself has become temporal and God *exists* in time. This is the absolute paradox, the absurd.[157]

2.11 Resolution: Immanence and Transcendence

Converting sensible and material existence into a symbol and receptacle of Divinity, religious theology synthesises the divided and subjective consciousness and demonstrates to the subject, as Dupré says, "*a sense of its own unity with the unchangeable*".[158] Escaping from the mundane present imagination allows man to see the possibility of a genuine future. It follows that the subject's awareness of freedom grows proportionally to the trust in his/her imagination. The cultural transformations outlined by Dupré in *Passage to Modernity* are understood subsequently

[156] Dupré, L. K. (2004). *A dubious heritage: studies in the philosophy of religion after Kant*. Eugene, Ore, Wipf & Stock Publishers, p. 13-14.
[157] Ibid., p. 47.
[158] Ibid., p. 55.

in an apologetic that emphasises the immanent structures of continental philosophy cannot be understood without acknowledging a transcendent source, and Dupré 's apology is briefly recounted here in the next ten paragraphs.

Dupré reminds us that religious images are never invoked for their own sake, but instead as symbols or allegories of transcendent content. Furthermore, religious representation exists as part of a tradition and therefore includes mythical and historical accounts. The complete and true religious content is never exhausted by religious representations despite the importance placed upon myth and historical narrative. The transcendent content of religious faith is not conveyed by a factual reporting or photography of events. A material representation of pure spiritual concepts is certainly conveyed despite the seeming incompatibility of matter and spirit, and creation is such a concept.

Seeing how transcendence or the transcendental can ever be represented symbolically is an issue for contemporary thinkers. The move of a purely immanent thought beyond mere interiorized intuition has presented philosophers with a difficult problem. While it is acknowledged that every representation, to some extent, is symbolic of the individual mind and shares in the ability to transcend exclusive sensibility, the specific religious transcendence of religious ritual and religious act requires the subjective and finite mind be itself transcended. However, the finite mind symbolized in any religious representation, and its ability to achieve this transcendence, is not common material for discussion.

Speaking and verbalizing constitutes the religious representation and without this fundamental human ability representation could never be more than a primal and undeveloped capacity. As Dupré says, "*Language alone enables the representation to convey total transcendence by loosening the ties between the symbolized content and the symbolizing intuition. Over and above the represented structure language imposes its own system of meaning, thereby reshaping it into a more articulate bearer of a spiritual content and endowing it with a wholly new kind of symbolism."*[159]

God's self-revelation is the concern of religious language. God's intra-Trinitarian nature envelopes creation and redemption, and through religious language God's revelation, creation, and redemption is evidently of his action. God's grace and inherent nature account for the ability of religious language to convey God. Indeed, it must be remembered that the Christian tradition presents all appearances of the God for Himself, rather than for an autonomous subject. Any

[159] Ibid., p. 64.

notion of otherness is foreign to God, and estrangement is not indicative of the qualities of God. The otherness of God as understood subjectively is ultimately an internal understanding.

This understanding is best understood as the Absolute appearing for itself rather than for the subject, and the Absolute and universal is taken as self-identical. The "otherness" of the absolute is an internal positing of itself as other. The religious act does not merely reach toward an unknown transcendent universal Absolute, but it actually attains it. There is no division between an immanent reaching toward, and a transcendent Absolute. The revelation originates in the religious act, and this revelation falls beyond the reach of autonomous reflection. The revealing of self-identification with the Absolute is necessarily beyond subjective isolation. Furthermore, not only does the transcendent Absolute become immanent in order for man to understand, it does so only insofar as it is known to be *beyond attainment*. Immanence is only possible through the acknowledgement of transcendence.[160]

The Christian religious tradition therefore establishes faith as important because sharing in the religious act requires an essential connection with the transcendent Absolute. It follows that understanding the Christian religion on its own terms requires at least *some* faith and love of the religious act and its intentions.

Investigating religion philosophically is difficult, as revealed religion demonstrates transcendence, but philosophy seeks to investigate immanent structures. It would seem that philosophy is most concerned with the subjective individual, and addressing a transcendent object is impossible. The religious requirement of a transcendent source is a problem for philosophy even though the transcendent object must fit the immanent structure of the mind. Applying this to Christianity, Blondel Writes: "*Even if (by an implausible hypothesis) we would discover, by a stroke of genius, almost the entire wording and content of revealed doctrine, we still would possess nothing, absolutely nothing of the Christian spirit, because it is not ours. Not to have it as received and given to us, but as discovered and originating in ourselves is not to have it at all; and that is precisely the scandal of reason."*[161]

The discovery of the transcendent order as a reality by philosophy is impossible as its discovery would preclude any possibility of transcendence. While immanent reflection is unable to grasp

[160] Ibid., p. 70.

[161] Ibid., p. 95. To say something more about Maurice Blondel (1861-1949), Louis Dupré places Blondel within a larger context of non-causal thinkers in his essay *Passage to Modernity*: "But far more important than Nietzsche's failed solution is his incisive critique of the traditional idea of transcendence, conceived on the model of an efficient cause, when applied to the modern concept of freedom. Only recently have a few thinkers, foremost among them Maurice Blondel, Karl Jaspers, and Paul Ricoeur, begun to rethink the relation between freedom and transcendence in noncausal terms." Dupré, L. (1993). Passage to Modernity: An Essay in the Hermeneutics of Nature and Culture. Yale University Press, p. 163.

the supernatural as an actual reality, Blondel admits the hypothetical transcendent source is necessary for any immanent philosophy.

The freedom of subjectivity becomes aware of its insufficiency and desire to terminate beyond the chain of physical phenomena in an absolute. Conquering through freedom, the subject is always unsatisfied in attaining only phenomena whilst the need to postulate a trans-phenomenal reality impresses upon the subject with greater intensity. The completion of human action is ever elusive and unattainable, yet completion and rest is ultimately what human action strives for.

Is it possible to experience the transcendence of God when his presence must be known in the here and now of material and sense? The human language and religious symbols are unique to particular cultures, civilizations, and time. Sacred books and scripture can be compared to secular philosophies, and often religious ideas find their origins in pagan myths and legends. Christ was man in flesh, and he lived at a time in the past. How can this character from two thousand years ago be considered divine and supernatural? Ultimately the Christian tradition uses faith and love to demonstrate the truth of Christ. The act of love plays a role in demonstrating the transcendent and supernatural character of the central character of the Christian religion, for there is an essential similarity between the human lover and transcendent source. The divine cannot be experienced as such by the subjective viewer, but instead revealed to be ever present. "*If you go to the heart of the matter, there is not more in a miracle than in the smallest, ordinary event...Miracles are miraculous only in the eyes of those who are already prepared to recognize God's activity in the most common events and acts."*[162] Values are not created by God, but he is at the original act of the creation of man's values. Man's created-ness is the source of his creativity, and his dependence is the source of his autonomy. Through creating meaning and value the self expresses its essential relation to the One.

Here concludes Dupré's apology and answer to modern questions of the autonomy of the subjective thinker, and existence of a transcendent source. The final section in this chapter will discuss the nature of modernity.

2.12 René Guénon and his Importance for Contemporary Discussion

The eventual dissolution of the medieval cosmology over the centuries was accomplished by changing attitudes towards religion, science, and man's place within the world. Contemporary world views are radically different in that certain suppositions are discarded whilst others are adopted. The comparison of medieval cosmology to contemporary cosmology has been suggested by authors such as René Guénon (1886-1951) whose work groups synonymous terms along the form and material divide, then proceeds to explain the emphasis each period placed

[162] Ibid., p. 102.

upon form or material. For instance, one group of synonymous terms consists of form, idea, quality, manifestation, unity, archetypes, and essence whilst the other group of synonymous terms consists of matter, quantity, uniformity, homogenous, atomic, multiplicity, mechanism, and materialism. Contemporary cosmology sees ideas as the effect of material because material is foundational, whereas medieval cosmology sees material as the manifestation of ideas because ideas are foundational. As explored throughout *The Reign of Quantity,* the medieval cosmology presupposed a transcendent source of ideas and therefore could only understand material insofar as it manifested the inherent order.

The terms of medieval cosmology such as matter and form are explained in contemporary terms such as quantity and quality. Despite the introduction of terms familiar to contemporary readers, the similarity of medieval and contemporary world views stops there. If we were to explain the modern world view in terms of Eriugena's division of nature, the material and form would be inverted whilst the transcendental beginning and end would be discarded. This inversion of matter and form is not simply a mirror image, but holds important consequences for the understanding of the terms matter and form. When inert matter, as science calls it, is presupposed over form, then form is reduced to quantity. Matter is then quantified in terms of measure and number, and loses the medieval sense of form and quality. Mechanism and materialism are then alien to the medieval world view.

Matter, and its Latin translation of *materia* as the medieval mind understood it, was the root or potency that allowed for manifestation of form or essence. Furthermore, it was the passive support and foundation that allowed for manifestation, so to some extent it was necessary. The etymological suggestion of René Guénon finds material closely related to "maternal", and the symbolically female notion of birth. The Latin verb *metiri* is also related to material, and it means "to measure". In the medieval mind measure was ordering finite content of the cosmos, and determining how material was ordered according to a transcendental source. Geometry was a system of measurement in which the finite earth was measured according to God the creator. Essentially measure was another manner of understanding the world religiously. René Guénon also reminds us the etymology of *order* is closely related to *rite*. "*A rite is, etymologically, that which is accomplished in conformity with order, and which consequently imitates or reproduces at its own level the very process of manifestation; and that is why, in a strictly traditional civilization, every act of whatever kind takes on an essentially ritual character*."[163] That is how the human being realizes the corresponding degrees of transcendental manifestation and so becomes himself the measure of all things. Furthermore, according to Christian scripture, God has

[163] Guénon, R. (2001). *The reign of quantity & the signs of the times*. Ghent, NY, Sophia Perennis, p. 338.

"*ordered all things in measure, and number, and weight*". Geometry is then an imitation of Divine activity.

The contemporary and 'scientistic 'world view instead sees matter as inert, space as dimension, and time as duration. Space, time, and matter are empty, and to understand them we must measure them with a system of measure that is acknowledged as meaningless, but useful because of consensus among those who use it. We see the difference between the medieval and modern world views in that matter no longer is the foundation of essences, space is no longer altered by what is placed, and time is no longer changed by occurrences and events. Ultimately the progression has led to a world view inverted from the medieval precedent in which the world is understood only in terms of its quantification; number.

Art and craftsmanship outside of the quantified worldview is a ritual act that re-enacts the moment of creation and mimics Divine activity. Inside the quantified worldview art and craftsmanship is considered a luxury without purpose, if it is considered at all. Everyday work is imbued with religion, and for the medieval craftsman there was no distinction between profane and sacred, but instead all was sacred. The craft tradition existed as a part of a religiously construed society, and the initiation of members into a certain craft would have been possible only if the work was essentially qualitative. The contemporary conception of work is to see man as interchangeable units with no quality of their own, whereas the medieval crafts required a certain nature and connection with what man really is. The worker must be the work.

Ultimately René Guénon suggests that the contemporary cosmology as based upon the quantification of everything is an illusion. The treatment of time, space, and matter as empty containers that can easily be divided according to systems of dimensioning in order to allow for consensus tells us nothing of the true nature or quality of time, space, and matter. The quality and quantity are unified, but appear as discontinuous when quantity is emphasised over quality. When quality is given its rightful position as in the medieval cosmology, the synthesis between quality and quantity are readily apparent and no dualism is present.

Concluding this chapter with the ideas of René Guénon will establish the traditional ideas which provides access to medieval thinkers, those men of the past that fuelled the medieval imagination with their sermons and teachings. This chapter began with getting right to the point and presented Doig's scholarship which described the relationship between monasticism and the medieval craftsmen, then the chapter juxtaposed the ubiquitous modern ideas of Simson, Panofsky, and Frankl. Recent scholarship more appropriate for a religious understanding of Gothic architecture followed, with the work of Mâle and Jones, then exactly how stone masonry is religious is described. The problem of religious thought for modern thinkers is addressed, and

from the traditional versus modern ways of knowing, a description of how the essence of religious thought can inform the current thesis is presented. The following chapter will describe the traditional thinkers and thoughts of medieval Christianity in order to describe how geometry and craftsmanship are understood religiously.

3 Medieval (c. 500-1200) Christian Cosmology from Late Antiquity (c. 200-500) Precedent

The first and second chapters highlighted some significant differences between a medieval worldview and what might be termed the modern worldview, and discussed some scholarly problems which arise when studying the medieval era. This section will establish the written sources of the medieval Christian cosmology, and identify their inheritance from the philosophy of late antiquity. The differences between medieval cosmology and the Platonic cosmology that was so prevalent in late antiquity was resolved through placing Platonic ideas within a monotheistic God. The section will conclude with introducing the pointed arch as an appropriate form for Gothic architecture.

To argue from the weight of the Christian tradition, we must establish what medieval man considered important: sacralisation of man and nature within God's order.[164] The medieval thinker was occupied with making things whole, and the Christian sacraments were of central importance. The divine revelation of hidden spiritual significance and mystical truth within the sacraments, (the Eucharist is an example of a sacrament), was not only sought in literature, but also in nature and other corporeal matters. The restoration of God's whole kingdom was possible through the sacralised prayers and actions of medieval man, and it was of singular importance that the mystery of God's cosmos should occupy the thoughts and actions of medieval society.[165] This argument from the weight of the Christian tradition will allow us to articulate what medieval masons would have valued, and the qualities the mason sought in his work. The unique position of craftsmen within a Christian society that so valued a transcendent source of the cosmos can be understood through placing the *materials* used by the craftsmen within this cosmology. This suggests that earthly material and heavenly transcendence needed to be wedded if craftsmen were to find their place in medieval Christian society. Thus, the role of geometry in the meeting

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[164] Harrigan, A. (2002). The Medieval Mind: A Meditation. *Humanitas*. [Online]. XV, p. 114–119. Available from: http://www.nhinet.org/harrigan15-2.pdf. "To a very large extent, we have lost the sacramental view of life which was the heart and soul of the medieval world. The cost is beyond any reckoning. The medieval sacramental character was a priceless possession."

[165] Orr, J. (1984). *The International Standard Bible encyclopaedia*. Grand Rapids, Eerdman, p. 2104. "'Mystery' and 'revelation' are in fact correlative and almost synonymous terms. The mysteries of Christianity are its revealed doctrines, in contrast to the wisdom of worldly philosophy…the point of contrast being, not that the latter is comprehensible while the former are obscure, but that the latter is the product of intellectual research, while the former are the result of Divine revelation and are spiritually discerned…From this it follows that Christianity has no secret doctrines, for what was once hidden has now been revealed. But here arises a seeming contradiction. On the one hand, there are passages which seem to imply a doctrine of reserve. The mystery revealed to some would seem to be still concealed from others. The doctrines of Christ and of His Kingdom are hidden from the worldly wise and prudent,…and from all who are outside the kingdom,…and there are truths withheld even from Christians while in an elementary stage of development…On the other hand, there are many passages in which the truths of revelation are said to be freely and unreservedly communicated to all…The explanation is that the communication is limited, not by any secrecy in gospel message itself or any reserve on the part of the speaker, but by the receptive capacity of the hearer."

of God and material was of vital importance, as geometry was understood to exist in the mind of God. Geometry also guided the craft of the mason and, ultimately, the everyday tasks of stonemasonry through applied geometry. Medieval thinkers, whose sources were ultimately the gospels of Christ, were left without an *explicit* Christian cosmology, for the gospels present no such worldview.[166] Because no explicit Christian description of the universe was presented by the very scriptures through which medieval man knew of the Divinity and validity of Christ, a void remained that needed to be filled by a compatible cosmology. The construction of this cosmology in accord with the Trinity, Eucharist, and Resurrection central to Christian gospels occurred over the course of hundreds of years simultaneously with the construction of the emerging Christian architectural style.[167] Sources of understanding the cosmos and descriptions of the cosmos in Christian terms were found mostly through an encounter with ancient and pagan philosophers, the most important of whom was Plato. Some cathedral schools such as that at Chartres accepted every source of divine inspiration[168], and excluded nothing in seeing God's presence. An important source of cosmological thinking is attributed to Plato, as some portions of his *Timaeus* had been available in Latin since Roman antiquity.[169] An important characteristic of medieval thought contrasts with contemporary thinking when considering tradition. Whereas the modern approach to art and architecture celebrates attempts to innovate precisely through breaking with tradition, medieval culture – theologians and masons alike – attempted to continue the tradition and sought for their work to be grounded in it. In fact, imitating or repeating the past was seen as a virtuous activity.

As the contemporary consensus about the importance of the Basilica of St-Denis shall be upheld in this thesis, the cosmology prevalent around the years 1137-1144 will need some specific elucidating. A significant circumstance of locating the cosmology at this point in time is the absence of Aristotelian primary texts. While a limited Aristotelian influence can be seen in St. Augustine's (354 A.D.-430 A.D.) theology and St. Maximus the Confessor (c.580 A.D.-c.662 A.D.), it was not introduced and translated in complete form until the early thirteenth century, many decades after the Basilica of St-Denis was completed. Scholasticism, which worked extensively to incorporate Aristotelian philosophy into Christianity, did not reach its culmination until the

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[166] Wildiers, N. M. (1982). *The theologian and his universe: theology and cosmology from the Middle Ages to the present*. New York, Seabury Press, p. 25. "In point of fact the Bible does not contain an explicit cosmology".

[167] Christians sought to differentiate their art and architecture from the Polytheistic and Jewish religions.

[168] Ellard, P. (2007). *The sacred cosmos: theological, philosophical, and scientific conversations in the early twelfth century school of Chartres*. Scranton, University of Scranton Press.

[169] Somfai, A. (2002). 'The Eleventh-Century Shift in The Reception of Plato's Timaeus And Calcidius's Commentary'. *Journal of the Warburg and Courtauld Institutes.* 65, 1. "Two Latin versions, both incomplete, circulated in the period prior to the Renaissance: one by Cicero from the first century BC (Timaeus, 27D-47B, with some passages omitted), the other by Calcidius from around 400 AD (Timaeus, 17A-53C), accompanied by his Latin Commentary."

completion of the *Summa Theologica* by St. Thomas Aquinas in 1274: 137 years after the Gothic architectural style was underway. It follows that the Christian/Platonic cosmology had not yet given way to a Christian/Aristotelian cosmology when the Abbey of St-Denis was renovated under Abbot Suger.

As was intimated above, medieval cosmology was founded upon ancient Greek sources. How medieval man understood the cosmos was not radically different from how ancient Greek man understood the cosmos.[170] The classical works of wisdom from Plato, Socrates, Euclid, and Ptolemy established the foundation from which medieval man speculated cosmologically. It was Plato who recognized that it is in the realm of ontological ideals that the mind finds God.[171] A significant difference between Greek and Medieval cosmology lay in an understanding of nature as wholly divine, by the former.[172] For the Greeks, the cosmos itself was seen as divine and self-sufficient. The difficulty for medieval man in adopting Platonic cosmology therefore arose when the self-sufficient, (as in not dependent on another for being), Christian God negated the possibility of a self-sufficient Greek cosmos. The cosmos relied upon God for its being for the medieval thinker, and it was not until St. Thomas Aquinas and his *Summa Theologica* (c.1274) that we have the culmination of the medieval synthesis between theology and ancient philosophy. Essentially then, the medieval cosmos was held to be dependent on God and Christ for its salvation and being, and Platonic cosmology was presented as supporting Christian transcendence. Ultimately, however, it was the personality of Jesus Christ that defined the character of medieval culture over and above other intellectual and cultural sources.[173]

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[170] Dupré, L. K. (1977). *A dubious heritage: studies in the philosophy of religion after Kant*. New York, Paulist Press, p. 117. "Ancient philosophy was well aware of its religious roots and made no attempt to hide or ignore them, as philosophy did later. It is a well-known fact that Western philosophy originated in a reflection upon the religious cosmologies of the Near East. Less known, perhaps, is that the umbilical cord with the living religious experience was maintained for many centuries after the origin of philosophy. For Socrates and Plato, whom we generally regard as the initiators of purely autonomous thinking, philosophy remained religious in form (the myth) and in content. In fact, the mystical trend of Plato's philosophy became the very heart of Plotinus's thought. In the Middle Ages the relation between philosophy and religion was drastically altered. Revelation became the proper object of the science of theology as such. As a result, except for a few isolated attempts, revealed religion ceased to be an object of philosophical inquiry [for modernity]. The study of revealed religion was not to be taken up again until after Kant. And not until the contemporary phenomenological movement was it generally accepted that philosophy might have something positive to say about the entire realm of revealed religion."

[171] Boodin, J. E. (1929). Cosmology in Plato's Thought (I.). *Mind.* 38, 489-505, p. 499.

[172] Dupré, L. K. (1993). *Passage to modernity: an essay in the hermeneutics of nature and culture*. New Haven, Yale University Press, p.3. "The earliest Ionian concept of *physis* had combined a physical (in the modern sense!) with an anthropic and a divine component. The classical Greek notion of *kosmos* (used by Plato and Aristotle), as well as the Roman *natura*, had preserved the idea of the real as an harmonious, all-inclusive whole. Its organic unity had been threatened by the Hebrew-Christian conception of a Creator who remained outside the cosmos. Yet, through his wisdom, support, and grace, he continued to be present in this world."

[173] Frankl, P., & Crossley, P. (2000). *Gothic architecture*. Yale University Press Pelican history of art. New Haven, Yale University Press, p. 14.

Through Platonic philosophy the world was seen as ordered and logical, and through the insights of the medieval theologians, order and reason were incorporated into a Christian understanding of reality. This logic and order was an ontological order however, and the Platonic foundation provided the insights to allow for a Christian cosmology whereby everything was related hierarchically to a transcendent God. Greek cosmology provided the starting point from which medieval theology could approach the material realm without blaspheming or de-emphasising the importance of a universal Creator. Platonic ontology supposed forms or ideas to be lying behind the material and sense world, and these forms or ideas were seen as eternally existent in the mind of God. Because of the ideas' existence in the mind of God and their relationship to material form, an aspect of God could be seen to underpin material form as well as human beings' knowledge of material. Thus, the ideas in the Mind of God became the means by which the various aspects of the Christian cosmos – God, God's ideas, human beings and the rest of material creation - were made intelligible and linked together.

Thus, an understanding of cosmology emerging from both religious and philosophical texts, was reconciled with a conception of the material cosmos. Establishing the relationship between the material world and its transcendent source through Platonic ontology allowed for newly emerging architectural forms to be understood within the developing cosmology. The increased use of pointed arches and ribbed vaults in religious structures indicates their acceptance in theological regard. The virtues of the pointed arch and ribbed vault are demonstrated not only in structural rigidity, but also in the medieval assumption that pointed arches followed their due course through a straighter line. There was something within the form that caught the medieval eye. It is helpful here to note the significance placed by medieval thinkers on dutiful conduct in accordance with natural ties specifically in relation to the natural course which the pointed arch exhibited. The absence of as much outward thrust, (when compared to a semi-circular arch), placed the pointed form amongst other self-creating forms, for it did not require dependency upon another structure.[174] Thus, the pointed arch was seen as self-sustaining and virtuous, and therefore to some extent shared in God's being. Not only was the pointed arch seen as self-sustaining, but implied within the arch form was the process of construction itself represented as teleologically determined. From raw stone material to completed rib vault, the process of medieval construction was seen to be in accord with the intelligible ideas in the mind of God.

[174] It should be noted that flying buttresses support vertical walls and colonnades upon which the rib vault, as a combination of pointed arches, rests upon. The vertical wall needs external support near its apex, and even more so if a rib vault is placed upon it. The rib vault, if it were sitting upon the ground and not rising above the nave of a Gothic cathedral, would not need flying buttresses because it is much lighter than a barrel vault, and the smaller outward thrust is concentrated at discrete points.

Furthermore, the given-ness of the materials was also seen as bearing the potential for begetting form. This dialogue between material and form, in which the two were united, was an acknowledgment of the intrinsic material order of the cosmos. This order of materiality was learned and passed onto successive generations through the workforce hierarchy, oral traditions, and traditional craftsmanship. Synonymous and necessary for this acknowledgement of intrinsic and self-creating order is the use of Platonic geometry, the constructions derived from which illustrate an order and logic that presents itself as actualising essences and first principles.

3.1 Human Action as "Liturgical"

The previous section established the synthesis of pre-Christian and Christian cosmological ideas, and that medieval masonry craft can be seen to fit within the Christian worldview. This section will present Gothic architecture as the setting for liturgical rites, and suggest that construction of Gothic architecture was liturgical as well. Acknowledging the importance of matter in medieval cosmology naturally develops into acknowledging the importance of human activity in crafting matter.

Gothic architecture established the setting for liturgical rites and rituals, and this thesis argues that the practice of the masons was itself liturgical.

The Eucharistic sacrifice as an example of human action, alongside the Platonic cosmology inherited from the theology and translations of Maximus the Confessor (c. 580-662), Johannes Scotus Eriugena (c.815-877), and the extensive Christian tradition, characterised the entire medieval period and her architecture. Christ and his all-pervading divine nature were a fundamental element of medieval cosmology, and artistic productions such as iconography and church buildings were thus seen to participate in the Christian cosmos, and to make manifest, to some extent, the presence of God. It is through this participation that the salvation of material creation was understood to be realized. It is impossible to understand Gothic architecture without this fundamental emphasis upon the church as transcendent icon and metaphysical symbol *as well as* participating in the religious destiny of the material cosmos.

Contrary to popular opinion, the hierarchical organization of medieval society was not oppressive, nor did it stifle humanity.[175] Though there was a strong emphasis on the continuation of

[175] Chazelle, C., Doubleday, S., & Lifshitz, F. (2012). *Why the Middle Ages Matter: Medieval Light on Modern Injustice*. Florence, Taylor and Francis, p. 191. Emphasizing the Carolingians' demand for order and obedience can therefore blind us to something more interesting – and in the long run, more important. The Carolingians did not simply create a specialized genre known as mirrors for princes that imposed moral obligations on kings and society's other leaders. Nor did their legislation only demand that subjects obey leaders. The Carolingians created a wide array of moral obligations on kings and society's other leaders. The Carolingians created a wide array of moral exhortations applicable to all individuals, whatever their status or office. By virtue of membership in a Christian society, every single individual had moral responsibilities – and not just moral responsibilities but essentially the same moral responsibilities.

tradition, this continuation was inevitably innovative as the tradition also required authenticity and renewal, a return to the source of the tradition, which metaphysically was understood to be being itself. The source of the traditional hierarchical organization was Christ, and the Christians became the mystical body of Christ; or Church. The hierarchical Christian tradition allowed for organization and a continued body of knowledge that outlined certain dangers, and passed onto successive generations the knowledge and skills necessary for the progress of civilization.[176] It should be noted that the Church as the mystical body of Christ was understood cosmologically, and that the universal and cosmic Church was an explicit expression of the Christian tradition.

The Church had always instructed its artists, but simultaneously recognized the importance of artistic skill and development. The second council of Nicea (787) expressed "the execution alone belongs to the painter, the selection and arrangement of subjects belong to the Fathers".[177] Therefore, the work and execution of the artists was also given place within the Christian tradition, and participated authentically in God's creation. The culture and civilisation of the medieval age was unquestionably Christian, including the masonry tradition and how the cathedrals were constructed.[178]

Furthermore, matter, material, and the realm of sense were important elements within medieval Christian cosmology, and the tradition also articulated their place within the hierarchy. The essential goodness of the material world was defended against the Manicheans in the third and fourth centuries, but since the seventeenth century age the emphasis of secular culture has been on a different cosmology, one that focuses on materiality at the expense of Divinity. Yet during the Middle Ages, matter was also a vehicle for divine goodness as demonstrated by Saint John Damascene (c.676-749), pseudo-Dionysius (c.5th century), John Scotus Eriugena (c.815-877), and

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Whether they addressed kings or aristocrats, leaders or subjects, ordinary lay persons or monks, Carolingian moralists applied the same ethics to all. The common identity of Christians as equally children of God was so deeply axiomatic that in profoundly important ways, not even slavery and gender stood in its way. The ethical measures of behaviour and the moral imperatives that applied to kings therefore applied to all men and women, of all social classes and orders. There was a single Carolingian ethics, a single Carolingian political morality. If kings were emblematic of ordinary individuals, the flipside was that ordinary individuals were kings of themselves.

[176] Modern Western readers, as children of the French revolution, might find hierarchy disagreeable, as the waning years of the 18th century saw social upheaval and the establishment of *equality* as a moral good. The Gothic mind, however, has no qualms with hierarchy and discrimination, for the fundamental discrimination in traditional society is that between sacred and profane.

[177] Mâle, E., & Nussey, D. (1972). *The Gothic image: religious art in France of the thirteenth century*. New York, Harper & Row, p. 542.

[178] Pieper, J., Dru, A., & Pieper, J. (1964). *Leisure, the basis of culture*. New York, Pantheon Books, p. 15. Joseph Pieper argues that public worship and sacrifice generate culture. "Their common origin or foundation might be stated in the following words: Culture depends for its existence on leisure, and leisure, in its turn, is not possible unless it has a durable and consequently living link with the *cultus*, with divine worship." Furthermore, the word *culture* has linguistic roots in the Latin *cultus*, or worship of deity. The Greek language gives us *leit—ourgia*, which means the work of the people or public worship, and is the root for the contemporary word, *liturgy*. Of all societies, what is valued or worshipped is embodied in the products of the culture

Saint Thomas Aquinas (1225-1274). Such an idea and articulation of material is difficult for post-Enlightenment thinkers to access because the contemporary notion of symbol supposes a poetical intention is placed upon a 'bare' material reality. Medieval thinkers and the Christian tradition asserted otherwise; the material and physical *as such* is symbolic of Divinity regardless of instances of human misplacement.

It is therefore through the lens of medieval cosmology that the cathedral is best to be understood. The building elements, stone, craftsmanship, and social organization were symbols of Divinity, and only through placing the unique features of medieval construction within the contemporaneous theology and liturgy can an authentic and appropriate analysis be undertaken. The Gothic cathedral was a very real divine presence for medieval man, and this realisation must play an integral role in contemporary discussions about the architecture of the period. The stained glass, ribbed vaults, rose windows, and flying buttresses participated in this earthly, yet celestial city.

This thesis suggests human action was seen as divine, and uses the phrase "liturgy in construction". It must be acknowledged that no written medieval rubric for a "liturgy in construction" exists, and it would be awkward to suggest a different liturgy was assigned for each human activity. The single liturgical tradition of the Western Church is a custom of public worship, or literally public work, and is a participation in Divine action. Suggesting a multitude of liturgies also (wrongly) implies a multitude of divinities, so by definition the Christian liturgy is singular even if different Christian services and rituals exist for getting better from sickness, or death, or marriage. Instead, the "liturgy in construction" as used throughout this thesis could be considered a "lesser", or "minor" liturgy that shares something generally with the official liturgy and tells us something of Christian communal action.

With that distinction being made, the "liturgy in construction" is appropriate when describing Gothic architecture because the masons and community which constructed the buildings and cathedrals were undertaking ritualized building tasks in order to participate in the divine cosmos.[179] Divine agency was established through Christian liturgy, and the official liturgy was a template from which medieval man understood the world.

3.2 God as Uncreated Being for Late Antiquity and Medieval Cosmology

The previous section presented human action as divine. This section illustrates the metaphysical notion of God as 'uncreated being', and discusses how such notion is fundamental for

[179] The building tasks were ritualized as the masonry craft was passed on from one generation to the next, in a traditional continuation and memorialization of the techniques and activities of the past.

understanding the Medieval Christian worldview, and, by extension, an understanding of Gothic architecture.

Through the Christian metaphysical system and the inclusion of geometry within that metaphysical system, we can paint a picture of why the cathedrals were constructed, and how the cathedrals were constructed. So far, we have attempted to illustrate the metaphysical and religious worldview which the master mason would have adopted, and we have suggested that such a worldview is considerably different from our own. We are also certain of the use of geometry, and its inclusion within the Christian metaphysical system. The use of geometry as a practical tool for construction does not eliminate its metaphysical importance, but instead illustrates the metaphysical and salvific potential of construction work for medieval Christians. In medieval cosmology, form and being are an expression of what something *is*, and as such share to some extent in God as uncreated being, insofar as they are an expression of the ideas in the mind of God, which were understood to be co-existent with God.

To say that God is uncreated Being is to establish that God is *causa* sui, that is, that he is the cause for his existence. No external agent or cause brought God into being, nor any condition. His presence flows from himself, and he has no dependency. Furthermore, God is superior to everything else in the logic, order, and reason for his existence. As René Guénon suggests, the "*world is not eternal because it is contingent. In other words, it has a beginning as well as an end because it does not contain its principle in itself, that principle being necessarily transcendent with respect to it*".[180]

Not only does God owe no contingency to another, but he is also the cause of contingent things, and is thus the source of creation. The idea of 'uncreated being' thus included both the concept of essence and existence. This essential nature of God having no external source of creation provides the basis for knowing anything "in itself". God's essence is to be, and his act of being is also his act of knowing himself. Thus, to know anything 'in itself' also meant to participate to some extent in God's knowledge. [181]

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[180] Guénon, R. (2001). *The reign of quantity & the signs of the times*. Ghent, NY, Sophia Perennis, p. 48.
[181] Orr, J. (1984). *The International Standard Bible encyclopaedia*. Grand Rapids, Eerdman, p. 496. *Self-Revelation of God*. Attention has been drawn already to the original self-revelation of God in nature and conscience. It is to be note, however, that this does not form the substance of the biblical presentation. The reason is that sin has blinded the eyes and minds and hearts of mankind to this revelation. Due to the fall, it has become unprofitable. In fact, as Paul pointed out, it serves only to leave sinners without excuse. By virtue of this revelation humans might have known God, but in fact they do not. Restoration of this knowledge now requires route which allows for the sin and ignorance of mankind. The story of the Bible is the story of this new self-revelation, which is also reconciliation. It is the story of God's revealing and reconciling action for the restoration of mankind to knowledge and fellowship…Two points may be emphasised. God himself has the initiative and superintends the whole process. He is thus the subject of this knowledge. But God also gives Himself concrete embodiment in acts and words and records, and

The Latin term, "*ipsum esse subsistens",* used throughout the medieval Christian tradition also characterises this understanding of God as the subsistent act of existing itself.[182] It should be noted that the existence of God was taken for granted by the medieval mind, and the attempt to demonstrate or prove philosophically the existence of God was unnecessary. Even later theologians such as St. Thomas Aquinas did not attempt to define and demonstrate the existence of God philosophically.[183] The attempt to allude to the essence of God in this study is not an attempt to prove his existence or know his essence, but instead an attempt to define the characteristics that were accepted by the medieval mind, and use such an understanding as an axiom with which to define and understand medieval architecture.

The uncreated light of the Creator was seen to illuminate the cosmos. Insights which were expressed metaphysically were also understood in more practical terms, and thus even masonry and construction were influenced by this theological insight. The Platonic doctrine of forms were incorporated into Christian thought through the forms existing as a thought of God, and hence sharing essential knowledge about the material as in-formed. The order of everything according to its inner essence generated a law of nature that was supposed to exist in all things. Masonry and cathedral construction shared in the forms through geometry, whose inner essence was made readily apparent through its construction. Hence the construction of geometric forms, figures, and icons shared to some extent in the nature of God.

The simplicity of the complex formulation of a God that is uncreated presents a theological mystery, yet simultaneously presents an axiom. In one sense, it is impossible to understand something as uncreated, for it would not be "something". It is a mystery that it even is. To establish God as uncreated being for the purpose of founding a central tenet with which to argue from is slightly problematic. Hopefully the ambiguity of attempting to refer to God as uncreated being will be cleared up through examples from the study of masonry, geometry, and craftsmanship.

However, we can say uncreated being has certain characteristics. As mentioned earlier uncreated being's existence and being is not caused by another, and as an aspect of God has always existed;

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supremely in the incarnate Word. He is thus the object of this knowledge. In His self-revelation God is known as He presents Himself. He presents himself in such a way that data are given by which He is accessible to us. He is thus known as the data are assessed and expounded. But by the Holy Spirit He Himself remains the subject even in this exposition, so that what we have is not just true knowledge about God. It is in the ultimate sense knowledge of God.

[182] The essence of God is His existence, that he is *ipsum esse subsistens*, and yet that we cannot know His essence.

[183] Narrow logical proofs for the existence of God were written in Europe during the medieval episode, but Theology didn't rely upon these qualified and narrow logical proofs. Anselm, for instance, tried to prove God's existence logically, but it was in an effort to incorporate logic into the Christian system. Medieval logic, then, should be understood as placing human reason within a divine cosmos, but ultimately religious reasoning, when reduced to logic alone, can sometimes result in nothing more than circular reasoning.

nor does this "always" refer to any point in time, or an endless chronological series. Furthermore, not only does God's uncreated being place God above created being, it establishes that God is the source of being. As the only thing that is uncreated, God becomes the logical source for all things created. God is uncreated being and therefore transcendent, yet simultaneously the source of created being and therefore immanent. Ultimately the full nature of God is an unknowable mystery, yet the Christian tradition teaches a certain aspect of uncreated being is something we can know.

This very characteristic of God as emphasised by the Christian tradition is what allows for the presence of God in the created world. The metaphysical explorations of medieval Christianity saw a parallel between the uncreated being of God, and man's rational ability to see that uncreated nature in the world and gain glimpses of divine consciousness. The Platonic forms provide this link for medieval thinkers between an uncreated God, and the created world that relies on God for its *formation.*

Such reliance upon pagan philosophers is a feature of the Western European Christian tradition, and monastic meditations on Greek philosophical texts occurred simultaneously with the innovations of cathedral design and construction that would later be known as Gothic. It is no coincidence that an increase in building campaigns in Western Europe occurred simultaneously with theological speculations that Eastern Orthodoxy would later condemn as pantheistic.[184] While such criticisms ignore the fact that Western Christian tradition always maintained a transcendent source and never stated being only existed within the cosmos, it remains that the created cosmos could be seen as divine given onto-theological investigation by thinkers such as Thierry of Chartres and William of Conches. It follows that the cosmos, cathedrals, and materials would all share in some divine character.

While the distinction between Western and Eastern Christian orthodoxies emphasise different conceptions about the nature of God's uncreated being, the disagreements should not obscure our understanding of what the Christian tradition as a whole can demonstrate. The accusations of pantheism from the East find relevance when considering the division of God's essence from his energy and activity in the cosmos as illustrated by Eastern tradition. The uncreated being of God is a hyper-being that is unknowable, and all we know is *of* his nature but not his nature directly. Therefore, we can know *of* his activity or energy, but not his essence since his essence is uncreated and as created beings we are therefore denied knowledge. While the Western Christian tradition would not deny the transcendent nature of God, such a solution to the

[184] Lossky, Vladimir. (1976). *The Mystical Theology of the Eastern Church*. [Crestwood, N.Y: St. Vladimir's Seminary Press], pp. 40-65.

problem of knowing God apart from the realm of sense is inherent within the initial notion of God as uncreated.

God as essence and God as energy brings about a distinction that can be resolved, and has been resolved by the Western tradition. It has been stated that through God's uncreated being does the created order find its cause. At this point it should be noted that creation is an act. Within the exploration of God's uncreated being we have so far neglected to emphasise the character of action within being. To be, exist, or create is essentially one and the same action, and this characteristic *action* of uncreated being is what the Eastern Orthodox tradition, and St. Maximus the Confessor, reminds us of. God as creator denotes God as acting agent, and it is within the essence of God's uncreated being to act. God's being is self-subsisting, and so too therefore is God's action. Where we see God's action we also see his essence, for action and essence share the same source. It follows that God's uncreated being is also his uncreated action. This nothingness of the uncreated, and creativity of being of God is ever present in the Christian tradition; for example, Pseudo-Dionysius' negative theology in which nothingness points to a hyper-meaning instead of a lack thereof. The uncreated and unknowable character of God is also a source for encountering God.

For the remainder of this thesis this notion of God as uncreated being will become the measure by which we understand terms in virtue of its higher correspondence. Despite the trend to reduce medieval theology to an outdated symbolic theory of reality, every effort will be made here to describe explicitly how lower terms relate to the highest term of God as uncreated being. What presents itself immediately from the cardinal principle is a hierarchy which numerous scholars maintain existed for the medieval mind.[185] Each hierarchical level shares in essence and being through its participation in uncreated being above it. For instance, some things, like plants or vegetables, have less of the divine spark, while other things, like humans, have more of the divine spark. This hierarchy of divine presence was ever present for medieval thinkers.

3.3 Interpretation of John: An Example of Uncreated Being within Christian cosmology

The previous section established God's uncreated being. This section will demonstrate by way of example that God's uncreated being requires something unique from humanity. Like God creates the cosmos, so too does man create, given the example set by Christ.

As a further example of God's uncreated being in the Middle Ages we can look to a number of sources. One passage from Christian scripture demonstrates God's likeness, and it does so by

[185] Wildiers, N. M. (1982). *The Theologian and His Universe: Theology and Cosmology from the Middle Ages to the Present*. New York: Seabury Press, p. 58 & 73. "The principle of hierarchy is therefore to be found everywhere—not only in the church, but in the choirs of angels and even in God." "The Church as a whole thus displays a perfect, firm, solid, and irrefutable order. At the very top stands Christ, our hierarch, from whom all wisdom and grace flow."

emphasising the *miracle.* The Middle Ages regarded scripture as miraculously manifesting God, and is central to the Christian tradition. The first four books of the New Testament were undoubtedly circulated amongst the monasteries and bishoprics, and were certainly widespread. The original manuscripts were penned in the Koine Greek language, and for our purposes, we will look at the Gospel of John Chapter five, and the miracle of verse eight.

The manner in which the medieval scholars and clergy understood scripture is synonymous with the manner in which everything was understood by the medieval mind.[186] Interpretation becomes an act of participation and wholeness where the interpreter and scripture are unified. The appropriation of text also implies an appropriation of interpreter. The being of each affirms the other through the sacred ritual of interpretation. The ordinary relation of reader and text is transfigured into something extra-ordinary.[187]

[186] Lubac, H. D., Hemming, L. P., Parsons, S. F., Price, R., & Stephens, C. (2013). Corpus mysticum: the Eucharist and the church in the Middle Ages. Historical survey. Notre Dame, University of Notre Dame Press, p. 2. De Lubac himself said of *Corpus Mysticum* 'this book is a naïve book' – it was only his second major work (after *Catholicism* of 1938) – and he had fallen into its concerns almost by a series of accidents. He remarks how little formal training or background he had for the research he undertook, not least because the discipline was defined by scholarship that was almost entirely in German, a language de Lubac did not read or speak. He notes, 'I was not encumbered by any of the categories and classical dichotomies into which I would necessarily have fallen if I had read the historians, who were nearly all German' and so had to work out for himself how to read and interpret the sources. There is in this attitude something astonishing and at the same time utterly modern – that sources that arose from a disciplined (sometimes even febrile) tradition of self-interpretation in an age long past could simply fall open and announce their inner meaning to a reader unversed in, and unfamiliar with, the world in which they arose. Attending this is the unspoken suggestion by de Lubac that even had he been schooled in the leading (German) tradition of interpretation, he might not have gained better access to the sources: the tradition of interpretation to which he lacked access (but of which he was aware) had also moved far beyond the world of the sources, with the suspicion that, far from unravelling them, it left them locked up in their meaning even when in close examination of their opened pages. De Lubac was not the first to experience this perplexity of *distance* to what is needed to be known, and darkness in how to come near, but the question remains whether his answer – to read the texts for himself and unaided – sufficed to resolve the difficulty posed.

[187] Storer, K. (2015). Reading Scripture to hear God: Kevin Vanhoozer and Henri de Lubac on God's use of Scripture in the economy of redemption. Cambridge, James Clarke & Co., p. 28. The centre of Lubac's scriptural hermeneutics is the premise that Christ is at the same time both singular object and subject of Scripture. As object, "Jesus Christ brings about the unity of Scripture, because he is the endpoint and fullness of Scripture. Everything is related to him. In the end he is its sole object." The goal of scriptural exegesis, then, is to look to the reality of Christ and read all Scripture in light of him as object. Yet to exegete Christ in Scripture is not simply to read Scripture in light of some new doctrinal principle or teaching, but to participate in Christ's presence, as Christ stands as subject of Scripture. As Subject, "Inasmuch as he is the exegesis of Scripture, Jesus Christ is also the exegete. He is truly Scripture's Logos, in an active as well as passive sense." Christ is always active in the process of exegesis, mediating himself through the texts of Scriptures to readers. "Christ's exegesis", De Lubac claims, "does not consist of words first and foremost. It is actual. It is Action…The mysteries of Scripture are 'revealed in action'". This action is both the action of God and the action of the interpreter. Scripture cannot be understood without participation in Christ because Christ, as subject of Scripture, must incorporate the reader into the mystery in order for it to be understood. Without participation, the reader could only understand things about Christ, and would miss the reality of the one to whom the whole Scripture points. Yet participation is only possible as Christ incorporates readers into his body, the *totus Christus*, through reading.

To speak forth the meaning of the text is to create the text. The being of the scripture is created in a manner where the reader is taking part in creation whilst appropriating the text. The sacred order is being created as we live it in an eternal present through re-actualizing scripture. Understanding the sacred scripture is not to merely register, but to allow the inherent order of the scripture to unveil itself through the interpreter. It is a participation in the cosmos becoming aware of itself as creation.

The medieval mind understood this moment of creation as *miracle.* The founding of the centre and the crossing through an ontological passage was seen as *miraculous*, and as a transfiguration.[188] The virgin birth is a miraculous transfiguration of mankind whilst the resurrection of Christ is a miraculous transfiguration of death. Through these miraculous symbols the medieval thinkers participated in a sacred creation.

With that in mind, the verse we will focus on in chapter 5 is the miracle. When Jesus gives the command to "rise, take up thy bed, and walk"[189], and the lame man does so, we are witnessing the lame man gaining a sacred understanding through his expression of walking. The lame man is healed and made whole because of his will. This is evidenced in verse six when asked, "Wilt thou be made whole?"[190] The lame man is made whole through a participation in things as they are; sacred. When the lame man was not participating in his being, he laid victim for thirty-eight years.

In verse seven, the impotent man gives us the reason for his suffering. He expresses that "sir, I have no man, when the water is troubled, to put me into the pool: but while I am coming, another steppeth down into the pool."[191] His expression lacked understanding and being and was a pseudo-expression. Because he continued to lie next to the pool in the hopes that some other thing would help, he never achieved what he sought.

The only way for the miracle to make sense is to realize what is required of the lame man in order to walk. What is required is expression of his being in its fullest sense. It could be said the lame man was expressing when he was laying for thirty-eight years, thus he was expressing an incompleteness. This incompleteness was not actually expression as being was not present.

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[188]Eliade, M., & Trask, W. R. (1987). *The sacred and the profane: the nature of religion*. San Diego, Harcourt, p. 63. Founding the centre is terminology used by Eliade when describing ancient religions. "…we could say that the experience of sacred space makes possible the "founding of the world": where the sacred manifests itself in space, the real manifests itself, the world comes into existence.

[189] Bible English. Authorized. (1980). *The Holy Bible: Containing the Old and New Testament; King James Version, 1611.* New York: American Bible Society, (John, Chapter 5:8). The 1611 King James version is chosen for the current thesis despite being rendered into English almost 400 years after the Gothic building episode. The reason for this is English speaking Christendom was determined to have an English translation, which is obvious given that the King approved of the undertaking, and placed his name to it. Capturing something essential of Christianity is the achievement of this unique society in producing the 1611 translation, as it was the central endeavour of scholarship and society at the time.

[190] Ibid., (John, Chapter 5:6).

[191] Ibid., (John, Chapter5:7).

Expression as we are looking at it can never be incomplete, for expression in this case is of being, where the is-ness is whole and present.

In this way, hermeneutics is epistemology, or interpretation is knowledge, where the medieval thinker sees how ideas exist eternally just as Plato described. For the lame man to understand, he had to express. What he had to express was the active role that man must take in creation. This also implies a union between Christ, the son of God the creator, and man.

The question, “wilt thou be made whole”, gives us something to consider with the word “will”. The ”will” appears at the same time as the “whole”. If we are engaged in creation, God’s will becomes manifest. For example, verse 19 states it thus: “Then answered Jesus and said unto them, Verily, verily, I say unto you, The Son can do nothing of himself, but what he seeth the Father do: for what things soever he doeth, these also doeth the Son likewise.”[192] Indeed, if we are expressing and hence creating, then we also have an understanding. This understanding is required if we wish to be made whole. To fully understand something is to have a wholeness of self. This is evident when we compare “wilt thou be made whole?” of Jesus with the incompleteness of, “sir, I have no man, when the water is troubled, to put me into the pool: but while I am coming, another steppeth down into the pool.”

The relationship between wholeness and will is made clear through verse thirty. Jesus states, "I can of mine own self do nothing: as I hear, I judge: and my judgment is just; because I seek not mine own will, but the will of the Father which hath sent me."[193] The absence of personal, individual will is clear. What we have instead is God’s will, or the being of things operating harmoniously.

3.4 Johannes Scotus Eriugena and His Text in Christian cosmology

The previous example from the gospel of John demonstrated how man through Christ participates in creating a divine cosmos. This section describes in more detail the uncreated nature of God, and the onto-theological investigations of Eriugena. How God simultaneously transcended the cosmos, yet was fully present within the cosmos is described by Eriugena.

The most influential medieval scholar to expound the notion of uncreated being was Johannes Scotus Eriugena (circa 800-877). Influenced by Gregory of Nyssa, Pseudo-Dionysius, and Maximus the Confessor, Eriugena walked a path between the differences of Eastern Christian and Western Christian theologies. His theology of God extolled the utterly simple nature of God, as well as

[192] Bible English. Authorized. (1980). *The Holy Bible: Containing the Old and New Testament; King James Version, 1611.* New York: American Bible Society, (John, Chapter 5:19).
[193] Bible English. Authorized. (1980). *The Holy Bible: Containing the Old and New Testament; King James Version, 1611.* New York: American Bible Society, (John, Chapter 5:30).

providing a metaphysical hierarchy that began and ended with God. Man too was to play an active role in this return to God.

The Western Christian metaphysical tradition held that being was the original notion with which to speak of God. That everything was *a* being was obvious, but God was understood to be Being itself. Eriugena takes a step further by saying that God is also Nonbeing, for being something implies not being something else. Because God is all being, he is more rightly considered infinite and therefore unlimited and essentially an utterly simple unity. Terms to describe God beyond being and non-being include self-articulation, procession, self-creation, and "the non-being that transcends being".[194]

Eriugena's most popular treatise *On The Division of Nature* (circa 866) was not widely cited in medieval literature until the twelfth century when members of the cathedral school at Chartres sought to demonstrate knowledge of philosophical and theological teachings. Despite no immediate widespread dissemination during the early medieval period it is suggested as "inconceivable" that an intellectual accomplishment such as the *Division* would be completely ignored. [195] It would have had at least *some* influence, especially since Eriugena's contributions to translating Pseudo-Dionysius were not ignored.

When exploring the idea of God as uncreated being in medieval thought, it is important to recall Eriugena's fourfold division of nature. In essence, the fourfold division is also a division of a unitary whole, because it is a division of nature and ultimately of God. This division implies God is unknowable yet, paradoxically, it also suggests the possibility of knowing God exists through divine appearances. Eriugena thus divides nature into four elements:

1. That which is created and uncreated; God.
2. That which is created and creates; Form, Being, Ideas.
3. That which is created and does not create; Material.
4. That which is neither created nor creates; Non-being, Nothingness.

Eriugena further refines his understanding of the nature of God as 'for the being of all things is the Divinity above being'.[196] This means that through the uncreated nature of God, all being

[194] Johannes, & Uhlfelder, M. L. (2011). Periphyseon: on the division of nature. Eugene, Or, Wipf et Stock., p. xxi. This [infinity] is what leads Eriugena to follow the Pseudo-Dionysius and Maximus in speaking of God as Nonbeing or Nothing.
[195] Erigena, J. S. (1976). *Periphyseon: On the division of nature*. Indianapolis, Bobbs-Merrill, p. xxiii.
[196] Moran, Dermot, "John Scottus Eriugena", *The Stanford Encyclopedia of Philosophy* (Fall 2008 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/fall2008/entries/scottus-eriugena/>. Eriugena particularly admires a Dionysian saying from the *Celestial Hierarchy* (CH iv 1; PG III.177d1-2): *to*

shares in uncreated-ness, for God as 'being above being' is also the source of all things. The essence or essential nature of something must shine forth of its own accord, or it could not be considered essential. This appearance of God within the being of creation is ultimately due to His nothingness, unknowable-ness, and infinite-ness. Here Eriugena is emphasising the *via negativa* theology of the apophatic tradition.

The unique nature of God as transcendent, uncreated, and unknowable allows the created order to exist within God, yet not submit to the medieval profanity of pantheism. Yet in a miraculous manner God is also not separate from material creation because he creates himself in creation, so that creation and God are the same. Eriugena sought as a counterpoint to the immanence of God the transcendence of God.[197]

Because God is all things, he must be said to be being and nothing. There can be nothing outside of God, including nothing, so it follows that a negative or apophatic theology is necessary. Thus, Eriugena's division of nature allows the incorporation of the uncreated being of God as an articulation of the source and return of the creation. Whereas previous theologians such as Augustine had emphasised the unknowable character of God[198], Eriugena sees in the unknowable the source of creation thereby integrating more fully what can be said about God into a systematic theology. Ultimately though Eriugena develops a theme, because of its unknowable-ness, that allows for a fuller integration of God and cosmos, and hence a fuller articulation of God's presence. This unknowable feature of God creates an integrated cosmos through a manifestation of the unknowable in the known. Eriugena then describes what is knowable is

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gar einai panton estin he hyper to einai theotes ('for the being of all things is the Divinity above being', III.686d) which he translates as*esse omnium est superesse divinitatis*, ('the being of all things is the super-being of divinity', III.686d, I.443b; see also I.516c; III.644b, V.903c). This is perhaps Eriugena's favourite phrase from Dionysius. (Indeed, Maximus Confessor had also commented on it in I *Ambigua* xiii, *Patrologia Graeca* XCI 1225D, a passage well known to Eriugena who translated the *Ambigua*.) Sometimes, instead of invoking the Dionysian formula *superesse divinitatis*, Eriugena speaks of the 'divine superessentiality' (*divina superessentialitas*, III.634b), or — quoting *Divine Names* I 1-2 (PG III 588b-cb) — of the 'superessential and hidden divinity' (*superessentialis et occulta divinitas*, I.510b).

[197] Erigena, J. S. (1976). *Periphyseon: On the division of nature*. Indianapolis, Bobbs-Merrill, *(IV.759a-b). "*For just as God is both beyond all things and in all things — for He Who only truly is, is the essence of all things, and while He is whole in all things He does not cease to be whole beyond all things, whole in the world, whole around the world, whole in the sensible creature, whole in the intelligible creature, whole creating the universe, whole created in the universe, whole in the whole of the universe and whole in its parts, since He is both the whole and the part, just as He is neither the whole nor the part — in the same way human nature in its own world (in its own subsistence) in its own universe and in its invisible and visible parts is whole in itself, and whole in its whole, and whole in its parts, and its parts are whole in themselves and whole in the whole*."*

[198] Carabine, D. (2015). *The Unknown God: negative theology in the platonic tradition: Plato to Eriugena*, p. 265. "Although Augustine does not emphasize the negative attributes of the divine nature in the same manner as Dionysius and Eriugena were to do, nevertheless, we find abundant references to the transcendence of God couched in negative terms: God is unchangeable and has no human attributes; he cannot be thought of in terms of time or place; he cannot be numbered or measured; he is uncontained, immutable and has no contrary."

known through being, but the ultimate source of being is transcendent non-being. Thusly, unknowable-ness results in fuller integration and articulation between the known and unknown cosmos through the genesis inherent within non-being.

3.5 Maximus and the Importance of Laity and Labour in Christian Cosmology

The previous section described the medieval understanding of God the creator. This section establishes the importance of laity and labour for the transcendent and divine cosmos. It follows that written sources explicitly give room for manual laborers, like medieval master masons, to participate in the divine cosmos. It is from Saint Maximus the Confessor that we can see a logically implied "liturgy in construction" which served the medieval master masons.

The articulation of God's presence within the Church was outlined by Saint Maximus the Confessor (c. 580-662), and was introduced to the West by Eriugena.[199] Eriugena references the Confessor's work in his own, and the Confessor would have been a source of Aristotelian influence upon Western Platonic Christianity despite Aristotle not being fully translated into Latin until the first decade of the thirteenth century.[200] Saint Maximus the Confessor ultimately gave the laity an explicit position within Christian theology, and systematically articulated the soteriological role the Church was to have for medieval Christianity.[201] The symbolic, heavenly, and mystical Church was also pragmatic, earthly, and sensual, for Saint Maximus the Confessor resolved any decisive tension between the two considerations.

The mystical ecclesiology of Saint Maximus the Confessor is essentially a celebration of the Eucharist, and fundamental to Christian existence and the Church.[202] Through daily Eucharistic activity the Christian is confronted with God's divine presence, and the Confessor describes those

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[199] Moran, D. (1989). *The philosophy of John Scottus Eriugena a study of the idealism in the Middle Ages*. Cambridge [u.a.], Cambridge Univ. Press, p. 52. "Maximus was originally thought to have been born in Constantinople c. 580, but since the publication of an ancient Syriac hagiography, it is now thought that he was born in Tiberius. He was a strong opponent of monothelism, the doctrine that Christ had only one will, and he engaged in a number of important Christological controversies before being persecuted as a heretic, exiled, and martyred in 662. His position was declared orthodox in 680. He is important for his attempt to express Cappadocian and Dionysian NeoPlatonic Christianity in terms of Aristotelian categories, such as dynamis and energeia."

[200] Moran, D. (1989). *The philosophy of John Scottus Eriugena a study of the idealism in the Middle Ages*. Cambridge [u.a.], Cambridge Univ. Press, p. 52. "The 'Ambigua' and 'Ad Thalassium' by Maximus is referred to by Eriugena, but the 'Ad Thalassium' (which Eriugena calls 'Scolia') is referred to far less although he makes use of it in his 'Commentary on the Gospel of John'.

[201] Soteriology (Greek σωτηρία *sōtēria* "salvation" from σωτρ *sōtēr* "savior, preserver" + λόγος *logos* "study" or "word") is the study of religious doctrines of salvation, which is a central feature of Christianity.

[202] Ecclesiology usually refers to the theological study of the Christian Church. However, when the word was coined in the late 1830s, it was defined as the science of the building and decoration of church buildings and it is still, though rarely, used in this sense. "Ecclesiastic", however, is from late 15th century Middle French, *ecclésiastique,* which means assembly or church. The meaning of *ekklesiastikos* in Greek means "of the (ancient Athenian) assembly", in late Greek, "of the church", from *ekkalein* "to call out or shout".

elements of the liturgy that are open not only to the clergy, but to everyone. The continuity of tradition which characterises medieval thought also had mystical importance, for participation in that tradition allowed for Eucharistic activity and divine presence. The individual participant realizes that his/her own goal is the goal of all humanity through participation in traditional Eucharistic sacraments.

For the Confessor, the being of the Church is made possible through a turning or "tropos" from created and natural being to a unification of being in one source. This "tropos" corresponds to soteriological providence. The Church is then analogous to creation in that the multiple is reconciled to the whole through a "tropos" or turning to the sacred and divine character of creation, for it is God's action and energy that sacralises, as He is the source of unity.[203] The Church then accomplishes the same unity among Christians as God, and is thus an icon of God. The multiple individuals recognize their created and multiple being, but also recognize the common source of their own being. The common humanity as organised by God's being is then the Church.

Hence it was possible, for the Confessor, to realise the Divinity of humanity through liturgical rituals whose emphasis upon the ultimate good allowed for the participants to rightly be called gods through the gift of grace. Ultimately the Eucharistic ritual emphasised the material and created realms as symbolic of a higher, divine realm. The material plane, what could be seen and experienced by the sense pointed, in Platonic fashion, towards that which is higher and could not been seen through sense. It follows that not only was the Confessor interested in liturgical exercise, but also cosmological speculation. The scope of what the Confessor considered the "Church" is none other than the cosmos itself, literally realizing the salvific potential as taught within the Christian tradition. The Church is creation as a totality. It follows that theological ideas such as essences which point to God, and a God which points to essences is necessary for the Christian Church. To clarify, the Church as a gathering of people engaged in Christian ritual, was not only equated with the fullness of Christ as divine presence within the material cosmos, but the Church was the human essence of the congregation being realized materially.

[203] Meyendorff, J. (1987). *Christ in Eastern Christian thought*. Crestwood, New York, St. Vladimir's Seminary Press, p. 139. The Church is analogous to creation in that the destiny of all creation is tied to that of mankind, for man is creation's high priest and mediator. "Originally, man was called to overcome sexual opposition (one kind of division) by "impassibility", and to unite through holiness the universe and paradise, thus making one single and new earth. He was then to unite earth and heaven by virtue, in order to make one single, tangible creation, to unify the tangible and intelligible worlds by acquiring angelic gnosis, so that creation might no longer be divided between those who know and those who do not know God. Finally, man was to reunite by love the created and the uncreated, so that in His love for creation, God might become all in all."

The transition from individuals in the Church, and multiplicity in creation, to unity and unification of disparate elements is possible through the image, and ideas, of God. The thoughts and energy of God were ultimately responsible for unifying the individuals into a common humanity, and the Christian tradition understood this energy and thought of God as Logos, order, and geometry. The ideas, images, and order of God, was the cause of all that is. Through the Christian Logos the organization of individuals into a common humanity dispelled confusion whilst simultaneously asserting the Divinity of each individual. Such was possible through rituals that acknowledged the realm of sense was symbolic in itself. The roles of sense would play an important part in the medieval craft of stone masonry.

It is understood by the Confessor that through the Christian revelation the created realm has a common tendency of coordination in unity, and that single common tendency of the cosmos is the Logos. It follows that the cosmos is both sensible and intelligible in itself; two assumptions continued from Greek examples. The Confessor therefore explains how it is possible for the invisible and spiritual things to be understood through icons and sensual things.[204] The earthly nave certainly participates in liturgical celebrations, and is not necessarily excluded from the heavenly sanctuary.[205]

To position Gothic cathedrals within the religious context, the clear articulation of the physical church alongside the cosmic Church is necessary. For Maximus the Confessor the two were inseparable. The Church, and its physical manifestations in stone, participated in God's presence. That such ideas were formulated and committed to a place within the tradition is evidenced by the importance placed by later thinkers such as Abbot Suger at the Abbey of St-Denis. For Suger, whose interests lay with constructing the basilicas of the faith, such articulations by the Confessor

[204] Thunberg, L. (1985). Man and the cosmos: the vision of St. Maximus the Confessor. Crestwood, N.Y., St. Vladimir's Seminary Press, p. 113. "To Maximus the Church is not an ecclesiastical institution distributing divine grace, but truly a Mystical Body that represents symbolically the whole divine-human mystery, the whole mystery of God's good counsel, and the economy of salvation. One might even say that ecclesiology in this sense is not only one of the dimensions but the supreme dimension. It contains the total vision of Maximus, a vision that is altogether liturgical and sacramental at the same time. It was not by chance that Hans Urs von Balthasar labelled his great study of Maximus *The Cosmic Liturgy*."

[205] Thunberg, L. (1985). Man and the cosmos: the vision of St. Maximus the Confessor. Crestwood, N.Y., St. Vladimir's Seminary Press, p. 114. "In his commentary on this feast of the Lord, he gathers together in an admirable way all his essential considerations regarding the soteriological mysteries, especially those of creation, incarnation, the ascetic life and the mystical communion (understood for preference in monastic terms), and the mystery of deifying consummation. It is in this presupposed structure of worship and it is also before this altar invisibly present in his text that he places all the truths of his theological cosmos. His speculation on the "mysteries" of the Church are thus rooted in daily eucharistic reality, but they do not stop there in any superficial way. This same reality is for him a true mystery, i.e. an effective and totally inclusive symbol, which has the purpose of bringing us—in a sense he calls "anagogical"—all the way to the most elevated mysteries, to the very goal of our spiritual life."

alongside spoken descriptions of Hagia Sophia in Constantinople[206] were extremely influential during the development of the Gothic style. The Eastern Orthodox tradition had something to teach, and Suger was eager to learn what little he could despite the absence of images and Eastern manuscripts. The liturgical emphasis of the Confessor can be detected in Abbot Suger's chronicles of the rebuilding of the Abbey under his supervision when Abbot Suger touches upon craftsmanship and the work. There was certainly nothing outside of religious consideration, and the Confessor establishes the position of the individual craftsman within the Church.

Positioning the individual within the Church was accomplished through emphasising daily activity, and the soteriological mysteries of the religion are given an additional place besides the written text. This daily Eucharistic activity would prove essential for constructing the medieval cathedral. It should be noted that the daily Eucharistic rituals allowed for elevation to the highest mysteries as well, and did not stop short of any elevation. That Maximus the Confessor would emphasise the laity is no surprise given that he himself was not a priest, even if he devoted part of his life to a monastery. The emphasis upon those elements of the liturgy that are open to any participant characterises the Confessor's exploration of Christian ritual. Such themes present themselves regularly in medieval literature, and the example of the school at Chartres as explored by Peter Ellard demonstrates the inclusive nature of the medieval Christian tradition.[207] Everything could reveal itself as a part of God's creation, including the action of the laity, and physical objects.

The consummation of everything in God was described as a transformation through itself, in a fashion similar to the Platonic good as the cause of being. By identifying the individual human as participating in God's being, Maximus the Confessor was able to merge Platonic cosmology with the emerging Christian communion. It is possible to see the compatibility of the Platonic forms with the Christian Church when considering the form of man. It is through the communion that we find the culmination of the liturgy, for it was assumed the cosmos was created by God and that man was created in God's image. It follows that it is humanity's providential potential to actualise Divinity in the created realms. It should be noted that such notions are individualizing, but do not presuppose individuality. Instead, through realizing his individual divinity, the individual is simultaneously realizing the potential Divinity of others within the community. The individual's aspirations at realising Divinity are common to all mankind thereby dissolving the communal-individual-divide. It is through the communion of God-oriented and sacred energy that the Church is an icon, image, and idea of God. God's ideas and icons are understood to be

[206] Suger, & Panofsky, E. (1946). *Abbot Suger on the abbey church of St.-Denis and its art treasures. by Erwin Panofsky*. Princeton, N.J., Princeton University Press, p. 65. "I used to confer with Jerusalemites, and I was eager to learn from those who had seen the treasures of Constantinople and decorations of Hagia Sophia whether these here were worth anything in comparison."

[207] Ellard, P. (2007). *The sacred cosmos: theological, philosophical, and scientific conversations in the early twelfth century school of Chartres*. Scranton, University of Scranton Press, p. 43.

naturally unifying and a consequence of unity. This mystical orientation and turning is inherent within the being of man, and the Church allows for acknowledging the unity of humanity.

Maximus the Confessor was not only concerned with the mystical Church, but also drew upon the architecture and physical buildings to draw symbolic analogies. In Platonic fashion, the Confessor divided creation into two aspects, the sensible and the intelligible and saw both important because synthesised. This synthesis could also be glimpsed in church building, as it is impossible to have a sanctuary without a nave, but also impossible to have a nave without a sanctuary. Like the creation, the church building for Maximus was unified, and the unity is confirmed through the liturgy of the Eucharist, and as will later be argued, the liturgy of construction

These liturgical and ritual actions of the cathedral builders were not committed to written text, but given archaeological evidence and continuity of hand crafted masonry over many hundreds of years we can begin to outline what the liturgy in construction would have looked like. The ruling principles of stone, which was a necessary material for medieval builders, were revealed by medieval Christian principles. Such a revelation of ruling principles was possible through the parallelism between the higher Godly realm, and the lower created realm. Some aspect of God was present on earth, even if his sublime and unknowable aspect was not. Ruling principles and eternal essences were accessible not only through solitude and revelation, but also through liturgy, work, and communion. There was a certain “sanctuary within the stone” that was accessed.

Through St. Maximus the Confessor, therefore, the Church, (as building, as assembly, and as the mystical church), is given position within the medieval cosmos. The communion of man realises the Christian narrative as the sensible and intelligible realms of creation are given proper placement through the activity of the participants. Through the activity of man celebrating the Christian narrative, all human activity can be understood as symbolic. St. Maximus the Confessor devoted attention to explaining the idea of Church as man, and man as Church. As the Church is universal man, individual man participates in the cosmological hierarchy by recognizing his own nature; the hierarchy of being finds its ultimate source in God. It is through man’s activity and anthropomorphising his surroundings that the creation realises sacralisation, for man’s ultimate source is God; therefore, a humanized creation is also a sacred creation.

For St. Maximus the Confessor there is no division between symbolic and practical, for the practical was symbolic. The natural reasons inherent within action owed its being to God, and this fundamental reasoning of medieval thought has been replaced by personal thoughts within

contemporary scholarship.[208] For modern minds symbolic and efficient thinking are habitually divided. The pregnancy and abundance of divine meaning within creation are recognized through acknowledging providence and divine purposes. The cosmic liturgy allows for symbolic rituals to simultaneously be practical and real actions that transform creation. It follows that creation has sacred potential and is pregnant with Divinity, and through the potential of creation man realises his Divinity whilst in turn divinizing that same creation. The processes of man, cosmos, and God are synthetically intertwined and cannot be divorced at any time, even if each element is explored in detail and individualized.

3.6 The Geometry of Christian Cosmology

The previous section explained how the physical church building was a manifestation of divinity. This section describes geometry, and how it fits within the Christian cosmology. Geometry is vitally important for the masonry craft, and the construction process relies upon applied geometry.

We cannot be certain of the extent to which the medieval mason knew about the theologies of Plato, Plotinus, Augustine, or St. Dionysius. We do know the Christian tradition held a special place for both laity and material, and the clergy and monks involved in the construction of the cathedral would have brought that tradition with them. We also know that medieval masons utilized geometry for their craft, and it is the connection between God and geometry that places the work of the mason within the Christian tradition. Geometry is theological and demonstrates the presence of God because it is self-creating.[209] Geometry therefore has its reason for its being within itself; it is truthful. The singular point that is a principle of geometry creates the multiple constructions of applied geometry through self-creation.

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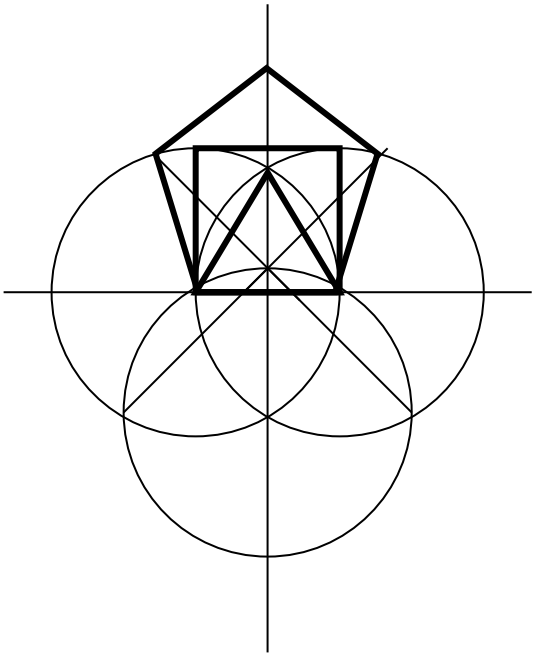
[208] Wilson, George and Shpall, Samuel, "Action", *The Stanford Encyclopedia of Philosophy* (Winter 2016 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/win2016/entries/action/>. Nevertheless, it should be admitted that no one really has a very good theory of how mental content plays its role [in reason explanations of action]. An enormous amount of research has been conducted to explicate what it is for propositional attitudes, realized as states of the nervous system, to express propositional contents at all. Without some better consensus on this enormous topic, we are not likely to get far on the question of mental causation, and solid progress on the attribution of content may still leave it murky how the contents of attitudes can be among the causal factors that produce behaviour.

[209] The nature of geometry and how exactly it is theological is described in this thesis by using examples which demonstrate a natural order, which medieval thinkers would have seen as existing within the mind of God.

The word *geometry* is a compound of two root words, *geo* and *metri*. Literally the word means earth measurement, and throughout history measurement was accomplished through geometry.[210] Geometry as inherited from the pre-Christian past was utilised by medieval society in much the same way, and within the Western Christian tradition geometry was understood as an appropriate component of a metaphysics established upon the uncreated being of God. Thus, geometry was used in the design and construction of cathedrals, and marking the floor plan as well as designing structure was accomplished using geometry.



Pentagon, square, and triangle generated from an initial measure by Robert Lawlor. All images redrawn by the author.

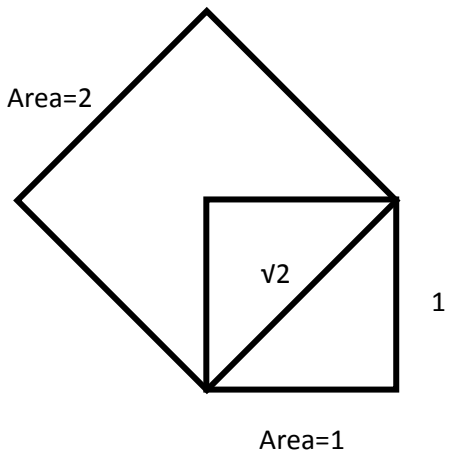
[Figure 3-1 Natural geometry]

[210] Lawlor, R. (1982). *Sacred geometry: philosophy and practice*. The Illustrated library of sacred imagination. New York, Crossroad, p. 6. Robert Lawlor explains how ancient Egyptians compensated for the yearly river flooding that obliterated all plot boundaries through geometry and measuring the earth.

Reflecting the ideas in the mind of God, geometric forms unfolded from unified and simple first principles. Constructing geometric forms on paper provides a useful and pertinent analogy as it is accomplished through defining a starting point, and one distance. The point and distance define and determine all subsequent relations, and it is of the nature of the geometric construction to unfold accordingly. In a sense, the geometric construction naturally flows from its fundamental principles.[211]

The initial placement of the geometric construction begins with the point, and can be understood as that with no width and only location. This initial point becomes the origin of the construction. Addition of another point creates a line, and sweeping the line around the origin creates a circle. The simple first principle of the point is the basic element of geometry, and adding further points creates a multiplicity of geometries and measures.

In the same manner of all multiplicity deriving from the simplicity of the uncreated being of God do we have all multiplicity of geometries deriving from the simplicity of the point with no dimension. The addition of multiple points allows for a division and multiplicity of the whole. Self-contained in its being, the point yields all possibilities, for each additional point added to the geometric construction is placed upon a point previously defined. For instance, an initial origin point is followed by a point that defines a line, and subsequently sweeps out a circle. The placement of subsequent points would be upon the defined circle, or in other words no points can be placed except upon previously defined points, if we accept that a circle is a series of infinitely close points. It is a logical and ordered geometry that is naturally defined.

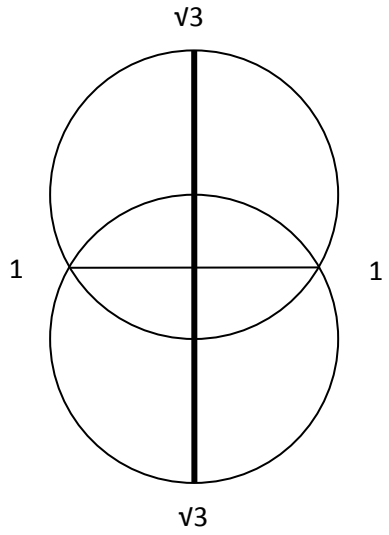


[Figure 3-2 Square root of two]

[211] Allen, J. (2007). *Drawing geometry: a primer of basic forms for artists, designers and architects*. Edinburgh, Floris. There is no substitute for understanding geometry than construction with compass and straight edge. John Allen presents an introduction that is informative and useful.

From the initial placement of the point and at a distance placing another point we can define any number of shapes, but primary shapes whose sides are equal interest us most. The construction of these shapes occurs naturally within geometry regardless of where the point is placed or the distance chosen. The inherent logic, structure, and order of geometry naturally yield the primary shapes of triangle, square, pentagon, etc., as can be seen in the following figure 2 (natural geometry).

The illustration is of the first three regular polygons as they are derived from a singular point whose position determines all subsequent points. Any regular polygon can be drawn with accuracy as the point vertices of any polygon exist within the initial point. The self-generative quality of the geometry is what ties it within the Christian metaphysics of created and creating



[Figure 3-3 Root Three]

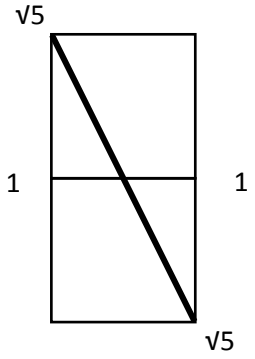
Root Three.

being. Understanding the world through geometry allowed for an explicit understanding of the relationship between God and his creation. Measuring the world in this manner was an understanding through sacralising. The proportion sought was thus seeking a relation to God through the principles in the mind of God, and allowed for man to participate in seeing the world as divine.

Unlike justifications for the significance of geometry based upon an appeal to authority as attempted by Paul Frankl, the justification here for geometry is its participation in the deep-seated imagination and cosmology of the medieval period. Even though "Plato sanctified the equilateral triangle and square"[212], it is their *essential* and *formal* character that ensured continual use and importance.[213] While geometry did have extremely practical uses, its divinity was

[212] Frankl, P. (1945). The Secret of the Mediaeval Masons. *Art Bulletin*. 27, p. 58.
[213] Guénon, R. (1972). The reign of quantity and the signs of the times. Baltimore, Penguin Books, p. 14. This character is described by Guénon when he juxtaposes formal and quantitative. "The Platonic ideas are also

accepted as necessary for its continued use. It is important to remember that unlike contemporary thinking the medieval mind did not discard the metaphysical intent of Platonic thought, and this very intent lay at the centre of geometric apology. Not only was geometry full of metaphysical intent, but the practical act of construction which geometry was a part of that metaphysical intent as well. As Boodin notes, '*The ancient geometricians, including Euclid, felt that they were investigating nature, while the modern geometricians are concerned merely with logic*."[214]



[Figure 3-4 Root Five]

Root Five.

Certain geometries present themselves in historical examples. In many examples of medieval construction, the presence of √2 can be found; so many in fact that the evidence supports the general consensus that medieval masons used √2 as a ubiquitous design tool.[215] The truth of √2 constructions, and its appropriateness within the medieval Christian metaphysic can be demonstrated by illustrating its "self-creating" nature and proximity to un-created-ness.[216]

Within the definition of *root* as the part of a plant that extends underground, and therefore as a source of generation we can begin to see the "self-creating" nature of *root*. Any line implicitly

essences; Plato gives expression chiefly to the transcendent aspect and Aristotle to the immanent aspect, but this does not imply incompatibility; independently of any conclusions to which the 'systematic' spirit may lead, it is only a matter of a difference of level; in any case, they are always considering 'archetypes' or the essential principles of things, such principles representing what may be called the qualitative side of manifestation. Furthermore, the Platonic ideas, under another name and by direct filiation, are the same thing as the Pythagorean numbers; and this shows clearly that although the Pythagorean numbers are, as already indicated, called numbers analogically, they are in no way numbers in the ordinary quantitative sense of the word; they are on the contrary purely qualitative, corresponding inversely on the side of essence to what the quantitative numbers are on the side of substance."

[214] Boodin, J. E. (1929). Cosmology in Plato's Thought (I.). *Mind.* 38, 489-505, p. 495.

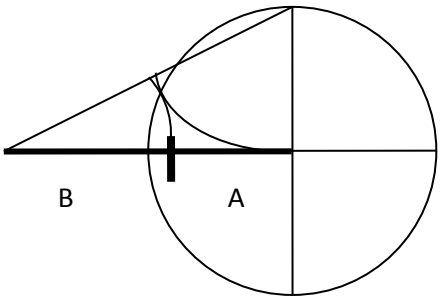
[215] Coldstream, N. (1991). *Masons and sculptors*. Medieval craftsmen. Toronto, University of Toronto Press, p. 37.

[216] The ideas as they exist within the mind of God are one aspect of God's being, and are *created* and *creating,* while God himself is *uncreated* and *creating.* The use of the term "self-creating" in the current thesis is a description of forms and ideas that share something with what medieval minds knew of God.

defines a square, and any square implicitly defines a diagonal. The diagonal of any square whose value is defined as one becomes the *root of square whose area is 2.* The diagonal of the square with area 1, through its own nature provides the *root* or generative principle from which a square with area 2 grows. If you have a square, then you have a diagonal. If you have a diagonal, then you have a square with double the area. The self-generative character is illustrated in the following diagrams, (Figure 3-2, Square root of 2).

Other geometric constructions share in this self-creating character. Not only can this nature be seen with root two, but root three and root five as well. The most striking example of this notion in geometric construction is the golden proportion, but along with √3 the √5 is not found as easily or readily in sacred medieval buildings. All four examples of √2, √3, and √5 can be described as

[Figure 3-5 Golden Proportion]



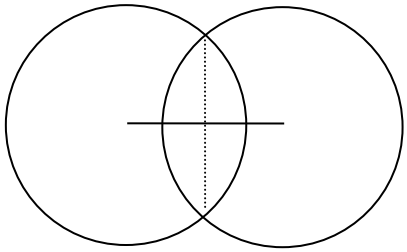
Golden Proportion.

generative of being in that from the polygon of area one, we can derive a polygon whose area is 2, 3, and 5.

From the initial Christian theological tradition of uncreated being we now have geometrical manifestations that can be described, and created in material form. The logical and ordered system of geometry has moved from a purely transcendental nature to a more material nature. What was an initial decision of length has become a system that generates geometries necessary for medieval Christian construction. It is in this manner that material is reborn as a new part of God's creation, and the reliance upon metaphysics is the medieval answer to engineered structure. The master masons did not need construction theory or technology when they had the miracle of God's divinely ordered cosmos.

The "golden proportion" as suggested here is an excellent geometric construction because of its unique propensity for "self-creation", or creative potential. Again, because of the progression from terms of its own definition, it is possible to recognize the golden proportion as also participating in the Christian metaphysic. Instead of as in the previous examples of √2, √3, and √5 whose area is doubled through their use, the golden proportion as a measure of area is always

the addition of two previous areas. The simplest illustration is of a line whose division creates two unequal parts that equal the undivided line, and from the relationship of divided line to whole can determine any subsequent iteration. A numerical illustration such as 1:2:3:5:8:13:21 is sufficient to demonstrate how two sequential numbers combine to create the third. It can be demonstrated graphically by determining the place of division of a line carefully, so that each iteration is a standard progression of proportion determined by the initial division of the line. Instead of a simple doubling progression, the golden proportion allows for a progression of any terms and affords a geometric flexibility. The "self-creating" nature of the Christian metaphysic



Division of a line in half.

[Figure 3-6 Dividing a line in half]

could be seen in more places than previously assumed, or in other words the presence of God was becoming more apparent to the medieval mind with the discovery and use of the golden proportion.

The division of the line into exactly half needs mentioning because of its fundamental and logically apparent nature. There is no need for measurement into standard units followed by an arithmetical procedure, such as measuring a line of five inches then dividing the quantity of five in half followed by measuring the line again at a distance of two and one-half inches. Instead a much simpler and geometrical method is available, as described by John Allen.[217] A line of given length whose two end points serve as the subsequent foci of the compass can be divided by simply ensuring the compass width is greater than half, and drawing circles. The two circles whose radiuses are the same will define two intersections. These intersections will lie exactly at the half way point of the initial line to be divided. The most important characteristic is that it is possible to generate the midpoint given what is known about the line; its endpoints. The only thing we can know are the endpoints, and it is precisely the endpoints that generate the midpoint through the geometrical process of measurement. The dividing of a line can be seen as a

[217] Allen, J., & Critchlow, K. (2007). *Drawing geometry: a primer of basic forms for artists, designers and architects*. Edinburgh, Floris Books, p. 12.

generative and creative process, for the geometrical figure relies upon itself for its completion. Geometrical figures, and their process of creation are therefore uncreated.

3.7 Tenth Century Geometrical Precedents

The previous section described geometrical examples, and how those examples were important for medieval thinkers. This section argues that medieval geometry has not been appropriately understood by recent scholarship, and touches on recent scholarship by Nigel Hiscock which demonstrates modern thinkers are not merely seeing illusory correlations between medieval architecture and Platonic geometry.

Previous scholarship has correctly identified the Christian tradition of God's grace, with which the master builder founds any building.[218] There are recent examples of the attempt to identify the extent of theological influence in the construction of the cathedrals[219], and none of them are explicit about how the transcendental source accounts for design and construction. Fundamentally what is absent from all discussion of medieval architecture, and to what extent medieval architecture was influenced by medieval theology, is an understanding of how geometry fits within medieval theology.[220] The problem has proven inescapable despite studies that search for answers in the Romanesque and conversely, the sub-Roman period. The fundamentally Platonic character of the monastic and learning revival that occurred during the tenth century corresponds to a general revival in Western culture in general, and thus corresponds to cathedrals in particular. The link between metaphysical geometries and architectural design could be forged in the tenth century because medieval monks and masons shared a special relationship.

Despite tracing the sources of Christian geometry to Pythagoras, Plato, Clement, Origin, Plotinus, Basil, Gregory, Augustine, Proclus, Dionysius, Boethius, and Cassiodorus, the explicit connection between theology and geometry is not established in contemporary literature. Instead the list of medieval scholars serves as a reminder of the comprehensiveness of transmittal to the Latin west of Platonism. While the geometry of medieval Christian scholars is acknowledged to simultaneously participate in a universal order and reveal Divinity, it is suggested by recent architectural literature that the universal order of medieval thought was accepted on the authority of Plato and scripture. Furthermore, contemporary scholarship perpetuates the notion of cosmic harmony being the result of constituent parts relating proportionally to the whole. Despite the popularity of such notions, the relation of wholeness as a property of the transcendental source is not explicitly articulated, thereby invalidating such an expression in

[218] Hiscock, N. (2000). *The wise master Platonic geometry in plans of medieval abbeys and cathedrals*. Aldershot, Ashgate, p. ix.
[219] Ball, P. (2008). Universe of Stone: Chartres Cathedral and the Triumph of the Medieval Mind. London: Bodley Head.
[220] The ideas as they exist within the mind of God are one aspect of God's being, and are *created* and *creating,* while God himself is *uncreated* and *creating.*

describing the medieval mind. It is far too easy for contemporary thinkers to accept the idea "part-to-whole" as an isolated logical system without invoking a transcendent source, while the medieval thinker never would have.

Geometry and number are often illustrated as accepted on authority, symbolic, and metaphoric for theological conceptions. Many medieval notions and uses of geometry are treated symbolically; 1) God creating the universe according to measure, number, weight, and 2) geometric schematic design in architecture planning. Despite acknowledging the inherent order of number systems and geometry, the understanding of how the inherent order was necessary for placing geometry within medieval theology is missed. Instead geometry and number are presented as symbol. For instance, the equilateral triangle and the number three are presented as standing for the Holy Trinity, but no attempt is made at understanding how it *was* the trinity, or is an aspect of God *per se.* Ultimately geometry and religious architecture are manifestations of Divinity, not just representations, images, or symbols.[221] While not discarding symbolism altogether, it is important to understand its use and function within a medieval and religious worldview that did not include re-presentation.

The application of Platonic geometry to measured plans in numerous examples led to the conclusion that uneven spacing of nave piers can be accounted for.[222] The varied spacing of nave piers is established as a consequence of design, and not simply builder error. It is in these examples that convincing arguments present themselves, for cultural influences better explain some cathedral plans better than unaccountable builder error. Could the geometrical systems demonstrate unintended correlations between Platonic geometry and architectural elements? Or in other words, has recent scholarship applied geometry to buildings that were not designed using geometry? The geometrical systems which have demonstrated correlations within cathedral plans could also demonstrate correlations among other structures, such as post-medieval buildings. It has been found that there were unintended correlations in post-medieval buildings, but far fewer correlations when compared to medieval examples. Not only was there less correlation with Platonic geometry, but post-medieval building plans, (plans drawn in modern times, for example), did not demonstrate a coalescing of Platonic geometry upon one point. Only in medieval examples has recent scholarship established plans in six, seven, or eight operations.[223]

[221] Eliade, M., & Trask, W. R. (1987). *The sacred and the profane: the nature of religion*. San Diego, Harcourt, p. 202. "[Religious man] always believes that there is an absolute reality, the sacred, which transcends this world but manifests itself in this world, thereby sanctifying it and making it real."
[222] Hiscock, N. (2000). *The wise master Platonic geometry in plans of medieval abbeys and cathedrals*. Aldershot, Ashgate, p. 250.
[223] Ibid., p. 218.

Ultimately the supposed opposition between medieval geometry as purely practical, or medieval geometry as theological and metaphysical is not completely dispelled by recent in-depth studies. Geometry's religious importance was established for master builders of the tenth century, and it follows that given the unbroken transmission of the building tradition, then twelfth century builders would have understood the religious importance of geometry. The current treatise will establish that the masons held religious beliefs about the practical and everyday tasks at hand. To adequately dispel the opposition between geometry as practical and geometry as religious, the contemporary thinker must accept the medieval worldview as valid. The transcendent source of being was true, good, and beautiful for medieval thinkers, and if we are to understand the products of the time, we must accept what they did. The purely practical act of work was not irreligious, as might be assumed today, and geometry manifested Divinity when defining pentagons or roll moulding.

3.8 The Role of Human Craftsmanship in Medieval Christian Cosmology

The previous section identifies that scholars are not merely seeing illusory correlation when finding Platonic geometric relationships between architectural elements. This section introduces form, material, beauty and love in order to position the actions of the medieval master masons within the Christian cosmology.

God as uncreated being is the foundation of a Christian metaphysic that influenced all aspects of life including craftsmanship and work. The importance of work within the medieval religious worldview can be seen in the detail and care of the physical artefacts left to us, and in the presence of craft guild depictions within the stained glass of medieval cathedrals. The most expensive and time-consuming edifices of Gothic history are places for displaying the sacred and treasured aspects of culture, and the depiction of craft guilds in stained glass remind us of their place among depictions of scriptural events of the Bible.

Human work and making within the Christian metaphysic shares to some extent the uncreated nature of God without confusing the source of man and the source of God. Craft is that act that allows man to create in a similar manner to God's creation, insofar as the work flows from itself. Craft can neither be about self-satisfaction, nor pursuit of profit. Nonetheless it must have a purpose, despite Kantian assertions of the uselessness of art.[224] Ultimately human making must increase being and humanity, and the craft of a Christian metaphysic stands in opposition to any form of making that seeks to decrease human participation.

[224] Dovey, K. (2008). *Framing places: mediating power in built form*. London, Routledge, p. 121. "The uselessness of art coupled with the subject's disinterest in its function are the conditions for aesthetic judgement (Kant 1979)."

The increase of mindfulness and humanity is subsequently a sacralisation through craft. The notion that man is inherently mindful and able to see the true, good, and beautiful character of the world around him is important for the Christian metaphysic because no room is allowed for '*tabula rasa',* or an empty vessel devoid of character and waiting to be filled with knowledge. The cosmos and everything in it is inherently mindful, and it is required of man to see it. Knowledge does not exist solely in the mind of man, but saturates the whole of reality.

As the cosmos is itself a beautiful artefact, it is man's task to see that beauty and being. Beauty in this sense is not the pleasure derived from something, but instead a participation in the thoughts of God. Beauty is the fulfilment of the true nature of something, and the realisation of the form and being of the work of art. It follows that the work of art should have the character of being uncreated and self-creating, or the form of the work of art should be indistinguishable from the material. That the material should be unrealised without its form, and that the form is incomprehensible without its material.

Furthermore, wilful form making is not the complete goal either. Form and material serve a certain Christian purpose, and the rational act of making should serve that purpose. Its use must be taken into account, for the use of the crafted object orients and directs the crafting of that object. The purpose is the divine cognitive principle that calls the crafted object forward, and insofar as it serves that purpose is it beautiful, in a way that could be called teleological. The transcendental source and origin of craft along with being and doing cannot be separated. Beauty and utility should not be conflated, but their unique relationship holds special place within the medieval Christian metaphysic. Rooted in the use of an object, making an object for its purpose is the goal of the craftsman. Beauty is not the goal of the workman, but easily recognizable in the finished product whose material and form are unified.

Form then has an aspect unique to it when considering the crafted object. As part of the form, purpose also contributes to being in that form and purpose are united in the crafted object. The purpose or reason for crafting the object pulls the process forward. The end purpose is also the form, and the form is also the end purpose. That the form is married to purpose is unique to the Christian metaphysic because the crafted object whose form and purpose are synonymous has within it the reason for its being. Again, to some extent, the crafted object is self-creating and shares in the uncreated being of God. The crafted object speaks for itself in regards to its creation.

Purpose, form, and material co-exist in unity when considering the crafted object. The purpose or "why?", pull the form forward from its material source into a beautiful object. The skill of crafting an object requires some knowledge of what is to be made, and how. The purpose, form, and

material provide the idea of what and how. Considering the crafted object as good and fit for its purpose requires an act of creation that is similar to God's act of creation. That God created through his uncreated being, so too must Christian craft be an act of creation through un-creation. Recognising the future object has within it the ends and means to bring it to being is this creation through un-creation. This recognition of the ends and means within the crafted object is also a loving of the object. Seeing the being and participating in the created being of the crafted object is creating through loving the essence of the crafted object, for, according to Pseudo-Dionysius, "The Beauty of God is the cause of the being of all that is".[225] Furthermore, it was pointed out by Augustine that love is a necessity in seeing beauty. In crafting being through love can the craftsman create in a manner similar to God, and seeing God reflected in the world is the task and goal of the medieval mind.

The knowledge of things in God such as work is known as craftsmanship, and craftsmanship is recognizing and realizing the perfection and Divinity and good in the object to be crafted. Tools allow for this realization in different materials such as stone, glass, and wood. The quality of crafted things made is beauty, and the form and quality of the crafted and created object is the manifestation of virtue. Through the act of craft, the form of purpose simultaneously determines and is determined by the act of man. The tool in the hand of the craftsman is controlled by the humanity and the intelligence of the human, and his entire attention is upon the material. The skill of using the tool incorporates the tool as an extension of the person, and the material is formed according to the mind of the craftsman and the entirety of the craft tradition. In a way, the object becomes a direct expression of thought and being without an intermediary, but we must not forget that the given-ness of material and tool influence form, being, and thought. Here the suggestion is that it is ultimately God creating, not the individual will of an artist, even in man-made things like the medieval cathedral.

This chapter has introduced the specific medieval ideas which were important for Christian cosmology. Precedents for the twelfth century onto-theological investigations are found in sub-Roman and Carolingian sources, where the continuity of the Platonic tradition can be identified. God's uncreated being simultaneously places the creator above nature, yet present in nature. Christ is the example for seeing how man can create like God creates, for Christ is at once God and human, and the divinity of the material realm renders human action as liturgical when shaping material. Through a shared Christian cosmology the divinity of laity was recognized, and the Platonic geometry used by master masons was understood as ultimately existing in the mind

[225]Ouspensky, L., & Lossky, V. (1999). *The meaning of icons*. Crestwood, NY, St. Vladimir's Seminary Press, p. 35. [St. Dionysius the Areopagite]. Ouspensky & Lossky are here citing St. Dionysius the Areopagite.

of God. Finally, medieval craftsmanship is presented as liturgical insofar as the geometric construction process realized the salvific potential intended in all Christian thought.

4 The Work of the Medieval Master Mason Described

It is possible to see the influence of religious ideas upon the practical work of the mason by articulating the twelfth century Christian cosmology, concurrently with the development of Gothic architecture. Construction documents, as modern thinkers are accustomed to, did not exist. Instead templates and geometric patterns were used to generate specific forms according to divine purpose. For the masons, in addition to geometrical principles, an intimate knowledge of the materials available during the medieval period is unquestionably necessary for any structural integrity to be achieved.[226] These properties were understood within the medieval worldview and simultaneously allowed for a 1) religious understanding of the world, 2) construction without written or drawn documents, and 3) organization of the workforce.

Furthermore geometrical forms and heuristic ratios, as part of the Platonic tradition, were thought to lead humanity to the divine order, and we can see implied in the Platonic geometries that were utilized to organize the cathedrals from initial cornerstone to spire, the same notion of material and intention in-forming each other, for Platonic geometries invite participation in its execution yet require adherence to an intrinsic order; synonymous with the intrinsic order of materials.[227] We must remember "*that in the best art, as in vernacular building, let us say, there is a dialectic between material and intention, so that both in-form the other*."[228] Ultimately, Platonic geometries allowed for material and human will to inform each other.

4.1 The Vocation of Masonry

The vocation of medieval masonry has been explored in contemporary discourse, and the importance of skill rather than "credentialed professional expert" is emphasised.[229] The master mason learned his craft through apprenticeship, and was expected to labour manually throughout his time of service. Unlike the Enlightenment conception of an architect as provider of expertise, the medieval master mason was the most experienced and skilled mason of a team of masons. His position was to engineer the structure, design the form, and contract the labour. The separation of design and building is a crucial post-medieval development. The passage from skill

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[226] Fitches, J. (1986). *Building construction before mechanization*. Cambridge, Mass, MIT Press, p. 8. "[The builder] had to know the properties of materials—different species of wood; different kinds and qualities of granite, limestone, sandstone, and marble; the ingredients and proportions of mortar, stucco, and plaster; and techniques of installing, finishing, and preserving materials from weathering and decay."

[227] Perez Gomez, A. (1983). *Architecture and the crisis of modern science*. Cambridge, Mass, MIT Press, p. 221. "The use of practical geometry for the tracing of walls and foundations (in order to ensure verticality or symmetry) is obviously as old as the building craft itself."

[228] Gorringe, T. *A Theology of the Built Environment: Justice, Empowerment, Re-demption*. New York: Cambridge University Press, 2002, p. 196.

[229] Coldstream, N. (1991). *Masons and sculptors*. Toronto, University of Toronto Press, p.6. "It is modern perceptions of their [mason] role, together with the fugitive nature of much of the evidence, that has caused them to vanish from our eyes, but in the pages that follow we shall try to discover who they were, how they organized their professional lives, and how they designed the castles and great churches that survive as testimony to their creative skills."

to expertise is of unique importance for understanding the master mason and his eventual decline, as cultural modernity manifested itself thusly in the building crafts.

The treatment by contemporary scholarship of the master mason, as skilled in the traditional crafts, without mentioning the importance of the medieval worldview, prevents a dis-jointed picture of the master mason. Design and building were integrated during the medieval period because of this religious worldview, but contemporary scholarship does not attempt to answer why. The unique relationship of monk and master mason in exploring the presence of Divinity in the created world is undermined by the contemporary scholar's treatment of monks as incapable of construction. There is evidence of monks lending their hand to construction, and master masons' religious outlook, even if contemporary scholars rightly wish to dispel the myth of clergy as sole builders of the cathedrals.[230] All men defined themselves in terms of God, and understood themselves in relation to God. The Christian example of Christ allowed for a union of divinity and humanity, so as to avoid blasphemy. Despite the one true architect being God Himself, the architect of the universe, it does not follow that men had to define themselves in human terms only, for in God's terms was it possible for medieval man to define himself. It follows that even if a place was given in medieval society for those that prayed and those that worked, there was certainly no rigid prohibition from mixing prayer and work. The current thesis goes further than this and even suggests that medieval work was prayerful and full of creation.

A cursory glance at the medieval cathedral reminds us of the importance of master masons within the religious organization despite the absence of written documentation about their lives. Rarely are medieval buildings ascribed to only one master mason because of the extended construction duration; however, on occasion those trades responsible for every stage of the building process would be remembered within the cathedral. Their vocation is sacralised through inclusion within the stained glass of the cathedral, and through inclusion within the chronicles of the Abbey of St-Denis's construction. Very few records of the building process exist; most in fragmentary and anecdotal accounts, nor are personal accounts of the master masons available. The most cited examples of written documents about medieval construction are by Abbot Suger, Gervase of

[230] Andrews, F. (1999). The Mediaeval Builder and His Methods. Mineola, NY: Dover Publications, p. 13. "Prof. Baldwin Browne, describing the procedures in the founding of Ramsey Abbey (Hunts.) says that Bishop Oswald of Worcester visited the site, being known to Alderman Ailwyn who had probably invited his (the Bishop's) counsel, and he promised to send a skilled man from the Monastery at Worcester, one who could direct the building work, and he further said help should be sent from Westbury. Then a priest and steward (dispensator), was sent, and he gathered workmen together. He first enlarged the timber church and then prepared materials for the new work and it was set in hand. After the building had been generally completed a crack appeared in the central tower, whereupon Alderman Ailwyn being sent for, he called in certain *cementarii* for expert advice, and the lay-masons are here called in, the work being beyond the skill or knowledge of the monk whose work had failed and they concluded that it must be taken down, the foundations strengthened and the tower rebuilt; this was done, and some of the younger monks were employed to help."

Canterbury, and Villard de Honnecourt. In order of authorship the subject of each: rebuilding of St. Denis choir, rebuilding of Canterbury Cathedral, and portfolio of fifteenth century geometrical building designs. Most contemporary medieval scholars refer to building accounts that detail expenditures, materials, wages, and precise dates.

While this written evidence for understanding the mason's intentions and medieval building practices do provide direct evidence of some construction details, the current thesis also includes medieval literature to articulate the pre-modern medieval cosmology and worldview. To answer how exactly the possibly illiterate workers understood something about medieval religious thought, it is necessary to describe how literacy was taught to the laity, and how religious ideas percolate to a wider possibly illiterate audience.

With the disintegration of the Roman order of late antiquity, the Pagan educational institutions were no longer in place to educate and instruct. Instead the task of education fell to monasteries, and later during the Middle Ages, the cathedral schools and universities. Throughout the medieval episode children of the noble class who were not pre-determined by birth order to inherit familial estates were given over to the monasteries for education. These children were known as oblates, and were educated within the cloister by the monks. It is here that the laity would receive their education, literacy, and memorial skills. These oblates would later in life serve in aristocratic positions and even as military commanders.

Not only were noble children educated by the monastic orders, but younger children of those that worked were educated within the monasteries as well, even if they were not educated within the cloister. The two schools, one inside the cloister, and another outside the cloister, would sometimes be combined if there were not enough pupils for two schools. It is here that the Christian cosmology would be passed onto the possibly illiterate, yet educated laity, for techniques of memorization would have been taught alongside recitation of important literary passages.

4.2 The Importance of Religious Rituals

With medieval education in mind, we can say there as yet exists no direct challenge to the presence of, and influence of Christianity and its institutions, (such as educational institutions), upon the European civilisation of the eleventh and twelfth centuries. It follows that the institutions such as medieval masonry lodges and guilds would have been influenced to some extent by Christianity as a religion, and that the influence of religion upon the craftsmen would have been to advocate, as R.K Seasoltz argues, "*seeking and disclosing of deepest meaning of*

human experience or what is ultimate in life."[231] Furthermore not only would the craftsmen seek the ultimate in life, but he would have used ritual, (ritual as in performing traditional masonry actions), in that search. This is so because religion is communicated, shared, and transmitted above all through symbols, rituals, myths, stories, and metaphors rather than through doctrinal statements and creeds.[232] Not only does this understanding of religious transmittal allow for the possibility of religious influence upon the masons and designers of Gothic cathedrals, but it suggests Christian tradition as a likely influence on masons and designers given the absence of written evidence of theological intention by medieval masons. The trends and weight of the Christian cosmology of the period has not been emphasised today when discussing the Gothic cathedrals.[233] If Christianity influenced the craft of masonry, then it was necessary for that influence to be shared and continued by means other than written doctrinal statements. Religious ritual and oral tradition would have been an important aspect of the medieval mason's life in general, and an important aspect of the masonry craft.

4.3 Religious Ritual in the Absence of Written Instruction

Is it possible that written documents concerning the design intentions of medieval masons were created and existed at the time, but did not find their way to our awareness eight hundred years later? The answer is inconclusive, given the propensity for medieval monks to archive into libraries written works of every nature including architecture, yet a propensity for memorialization leaves open the possibility of a memorized text, whose source is not available to us today. Vitruvian manuscripts recalling the oldest known account of architecture were available at a number of medieval monastery libraries, as Krinsky points out: "*Reichenau, Murbach, Gorze in the south Tyrol, Bamberg, Regensburg, Fulda, St. Gall, and Melk; in the eleventh century, Vitruvius manuscripts existed at Toula and in the Low Countries; in the twelfth century the text was known at Rouen, Cluny, and Monte-cassino."*[234] Furthermore, as Shelby shows, Medieval masons are generally understood to have been illiterate; "*The master masons were by no means*

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[231] Seasoltz, R. K. (2005). *A sense of the sacred: theological foundations of sacred architecture and art*. New York, Continuum, p. 2.

[232] Ibid., p. 57.

[233] Hendrix, J. (2011). *Architecture as cosmology: Lincoln Cathedral and English Gothic architecture*. New York, Peter Lang. The treatise *Architecture as Cosmology* follows a familiar path in architectural scholarship whereby the intentions of the architect or patron are sought in order to understand the physical construction. In this instance John Hendrix isolates a thinker whose writings we have access to, and a building which we have physical evidence for. The influence of scientific methodology and accepted components of research within the contemporary cosmology are clearly implied within the fundamental presuppositions of Architecture as Cosmology. For instance, the emphasis upon "subjective visual perception" is evident throughout the work, and is certainly a modern treatment. The contemporary cosmology and biases prevailing in modern scholarship are suggested by Guénon's use of the term "reign of quantity".

[234] Krinsky, C. H. (1967). Seventy-Eight Vitruvius Manuscripts. *Journal of the Warburg and Courtauld Institutes.* 30, 36-70, p. 37.

all illiterate, but there is little indication that literacy played a part in the acquisition of the technical knowledge necessary for designing and constructing a building".[235] The populace was possbily illiterate in their native vernacular, let alone in the language most books were written in; Latin. Given that a workforce could not be relied upon to be literate, masonry methods for constructing the cathedrals would have certainly taken on a ritual character, for the repetition of traditional building actions, (as taught in the apprenticeship system), according to a prescribed order, is very ritualistic. While the absence of written documents by medieval masons cannot be completely accounted for by the general illiteracy of the period, the need for written documentation may not have been readily apparent given that the process of cathedral construction was largely ritualistic, oral, and traditional. The construction process did not rely upon literacy, and neither did transmission of the tradition onto future generations. There was simply no need for eleventh and twelfth century medieval master masons to spend time and resources on creating prohibitively expensive written documents that served no purpose for the stone mason, as an oral tradition existed in all aspects of life; religious or craft.[236]

4.4 The Intentions of the Medieval Master Masons

We know the mason's intentions because of the pervasiveness of the Christian tradition, and that the Christian tradition sought to articulate the deepest meanings of human life. It would have been inconceivable that the mason would not have been born into Platonic/Christian cosmology, and therefore would have been very familiar with the use of ritual, symbol, and sacrament. The Christian master mason would have transmitted instructions to the mason workers through symbols and rituals that were essentially religious. (The specific series of traditional building actions will be described in later sections on the mason and his craft.) Religious values would have been transmitted inherently through the communication systems, habits, and customs accepted by all participants. The symbolic geometries and ritual construction process could not have been seen outside of a religious framework in twelfth century Western Europe. Indeed, as Emile Mâle suggests,

> "[geometric] Schemes of this kind pre-suppose a reasoned belief in the virtue of numbers, and in fact the Middle Ages never doubted the numbers are endowed with some occult power. This doctrine came from the Fathers of the Church who inherited it from those Neo-Platonic schools in which the genius of Pythagoras had lived again. St. Augustine

[235] Shelby, L. R. (1964). The Role of the Master Mason in Mediaeval English Building. *Speculum A Journal of Mediaeval Studies.* 39, p. 387-403, pp. 388-389.

[236] Fitchen, J. (1986). *Building construction before mechanization*. Cambridge, Mass, MIT Press, p. 17. *"*The universal tradition of training in, and perpetuation of, craft practices by visual example and oral direction goes far in accounting for the virtual absence of written records that explain comprehensively and in detail the methods followed in building erection.*"*

considered numbers as thoughts of God. The divine wisdom is reflected in the numbers impressed on all things. The construction of the physical and moral world alike is based on eternal numbers." [237]

The use of masonry for informing our understanding of Gothic construction is favoured over written documents in some studies, such as those by John James in his exploration of the contractors of the Paris region. James asserts that Gothic buildings were constructed over a series of campaigns by different master masons and each brought unique contributions to the construct. His analysis and contributions have been influential and hotly debated.

The assertion that Gothic construction and building is "messy" is at odds with prevalent notions of the Gothic Cathedral as perfection, or a heavenly Jerusalem. The lack of unity, symmetry, and rationality pointed out by James seemingly demonstrates a lack of concern for regular and uniform construction. James even suggests the cathedrals are "messy". [238] Furthermore, James challenges the tradition started by Viollet-Le-Duc in which the construction process was seen as functionally efficient.

What we are left with is confusion, in that Gothic cathedrals supposedly existed as divinely inspired symbols of perfection. With the criticism of the cathedrals as messy it becomes difficult to maintain the idea of heaven on earth shown to humanity through the cathedral. The problem becomes seeing how the "messy" cathedral fits within a medieval worldview that saw the cosmos as divinely ordered. The mass of mediaeval literature is concerned with God and the transcendent source in Christ, (and Christ as immanent, for God and Christ were seen as comingled yet distinct), therefore we can be sure of the intentions of medieval culture. How a messy construction process fits within the concerns of medieval culture has not yet been articulated, but ultimately what will be shown is that the unique and hand crafted, or messy, character of medieval architecture is a natural consequence of using hand tools within a construction process undertaken by different teams of Christian masons, over the course of

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[237] Mâle, E. (1978). *Religious art in France: the twelfth century: a study of the origins of medieval iconography*. Princeton, N.J., Princeton University Press, p. viii. Emile Mâle presents the point well in his *Religious Art in 13th Century France*: "In medieval art every form clothes a thought; one could say that thought works within the material and fashions it. The form cannot be separated from the idea which creates and animates it...All that was necessary that men should know – the history of the world from creation, the hierarchy of the virtues, the range of the sciences, arts, and crafts –all these were taught them by the windows of the church or by the statues in the porch...The countless statues, disposed in scholarly design, were a symbol of the marvellous order that through the genius of St. Thomas Aquinas reigned in the world of thought...The Middle Ages had a passion for order. They organized art as they had organized dogma, secular learning, and society. The artistic representation of sacred subjects was a science governed by fixed laws which could not be broken at the dictates of individual imagination. It cannot be questioned that this theology of art, if one may so put it, was soon reduced to a body of doctrine, for from very early times the craftsmen are seen submitting to it from one end of Europe to the other."

[238] James, J., (1990). The Master Masons of Chartres. Leura, NSW: West Grinstead Publishing, p. 13.

decades. Medieval architecture was rational despite the absence of machined precision, and was functional if we don't suppose material to be 'inert'.

4.5 **The Argument Against Geometry as Subordinate to Theology**

Acknowledging the use of two basic geometrical figures by medieval master masons often precludes any discussion of medieval geometry. The triangle and the square are often correctly identified as important for constructive geometry, but the cosmological reasons for using these figures is sometimes not apparent to modern readers. It has yet to be demonstrated in contemporary scholarship how God could be present in medieval geometry, and by implication all work of the medieval mason. Medieval geometry was practical, and the use of triangles and squares was useful for setting out structural and facade profiles. The ability to generate the height and elevation of a building from the plan was a necessary skill of the medieval master mason, and "self-creating" geometry played an important role. Scholars have identified triangles in the cross section of Bourges Cathedral, the combination of squares and triangles in the facade of Palazzo Sansedoni, and squares within the plan of Ely Cathedral.[239] Contemporary scholarship has established the use of dividers and a straightedge by masons in constructing the geometries, that half a square is a golden rectangle which is useful for arriving at the smaller elements of a building, and that many architectural elements can be determined by swinging arcs from previously known points, thus establishing irrational relationships so often seen in cathedral analysis. It has also been demonstrated how an intricate two-dimensional design could have been translated into the built stone work by drawing out full scale the entire height of the vault and the length of the ribs, and dividing the arc drawn between the height and length into parts could generate the individual voussoirs.[240] Ultimately the geometric process is presented as merely functional in contemporary literature because the relationship between geometry and theology is not established, nor is the nature of work explored within the medieval metaphysic. Contemporary distinctions are often made between pragmatic concerns, and "aesthetic" concerns.[241] Work, function, and purpose would not have been understood outside the providence of God in the medieval period.

The formulation of objections against the "geometry as theology" treatise is given as: "Though geometry is inseparable from building, its sole function is to set out areas, divide lengths,

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[239] Coldstream, N. (1991). *Masons and sculptors*. Medieval craftsmen. Toronto: University of Toronto Press, p. 37.

[240] This process is described later in section 4.16.

[241] For example, in Fitchen, J. (1986). *Building construction before mechanization*. Cambridge, Mass, MIT Press, p. 13. "This book investigates the pragmatic operations attendant upon bringing the man-made environment into being, and any concern for *aesthetic design* is incidental. Rather than stylistic matters, it seeks to account for and explain technological procedures that are not generally understood nor widely noted and appreciated for their significance*."*

determine angles, and devise construction of vaults or roofs. That and sacred geometry, aiming at magic or symbolism, ever existed, cannot be proved since any experimenting with proportions or the like will always produce some inconclusive results."[242] What will hopefully be demonstrated is that the act of construction at all stages of development was considered holy, and if geometry was used then it must have been considered sacred. The suggestion that the act of labour is somehow divorced from knowledge and ideas is discordant with medieval thought, which understood human work as grounded within the cosmology of the time, and despite ignorance of the specific geometrical figures used to generate specific 12th century buildings, we can be certain that geometry was used, and in a religious manner.

Whilst no issue is to be raised with authenticating the use of specific geometric forms in the design and construction of Gothic cathedrals by master masons, there is an issue with the equating of symbolism with theology.[243] Where the interpretation of a square as a symbol within Christian tradition, and as having a symbolism concordant with Christian theology[244], the current thesis guards against the assumption that such symbolism is necessary for interpreting the geometry as sacred. Stopping short at symbolic associations between Christian numerology and geometric constructions, it is easy to miss just how precisely geometry and cathedrals are sacred. That geometry is formal, and expressive of its nature, (in other words it is "self-creative" or generative), is lost to modern minds, and hence the modern division between geometry as a mechanism of cathedral design, and geometry as theology. The link between the two, practical geometry and theology, lay precisely in the essence as a thought of God finding expression in the geometry and materials of the cathedral.

Contemporary scholarship has relied upon the assertion that formative geometric principles in Gothic architecture rest on two fundamental premises. The first is that the geometries overlaid upon historical examples are indicative of the generative geometries of the original master masons because the geometries describe not only plan, but elevation and section. This concordance of the different aspects of the architectural examples is taken as evidence for the validity of the overlaid geometries. The second fundamental premise is that all geometries utilised by the master masons are derived from either the regular triangle, or the square. Of all possible geometries, the limitation of derivatives from these two shapes hastens the search for the implicit sacred geometries of Gothic cathedrals. Furthermore, the square is found to be more adequate than the triangle in generating large scale planning which becomes an important

[242] Ibid., p. 16.
[243] Often more than one geometry can describe medieval buildings, and decisively concluding about which geometry was used to design can prove impossible.
[244] Pennick, N. (1982). Sacred geometry: symbolism and purpose in religious structures. San Francisco: Harper & Row, p. 97.

discovery when historical architectural elements begin coinciding with the hypothesised geometries. This thesis does not challenge these two fundamental premises; therefore, it is necessary to describe the procedure for creating the basic geometrical figures.

4.6 Creating Geometry

John Allen presents a book of geometrical instruction for anyone seeking the basics of geometry.[245] The foundations of geometry are presented as regular polygons, or those shapes whose sides are equal. The equilateral triangle, square, pentagon, hexagon, heptagon, octagon, enneagon, ten, eleven, twelve, and thirteen sided figures are constructed in a step by step manner. Furthermore, the geometric constructions can be completed with a compass and a straight edge. The initial width of the compass setting is not specified as no standardised unit of measurement is necessary. From the unspecified width chosen by the geometer, all constructions can be successfully completed.

Within the context of medieval history and Gothic construction it cannot be established without a doubt that the methods presented by John Allen were actually used by medieval masons. Despite the absence of written evidence of the procedures of eleventh and twelfth century masons such as those at Chartres Cathedral, we do know that:

1. Geometry was part of the Quadrivium, and hence an obligatory study for the educated.

2. A compass and straight edge were two of the master mason's tools.

3. Geometry is extremely useful for crafting objects and architecture, and examples can be seen in the tracing floors of York Minster (c.1360), and Wells cathedral (1174-1239).

4. There are multiple methods for drawing geometric forms such as triangles, squares, and rectangles accurately.

The most important characteristic of geometry to be learned from the exercises described by John Allen is the logical necessity of the final constructions from the initial condition; geometry is creative, generative, and flows from first principles.

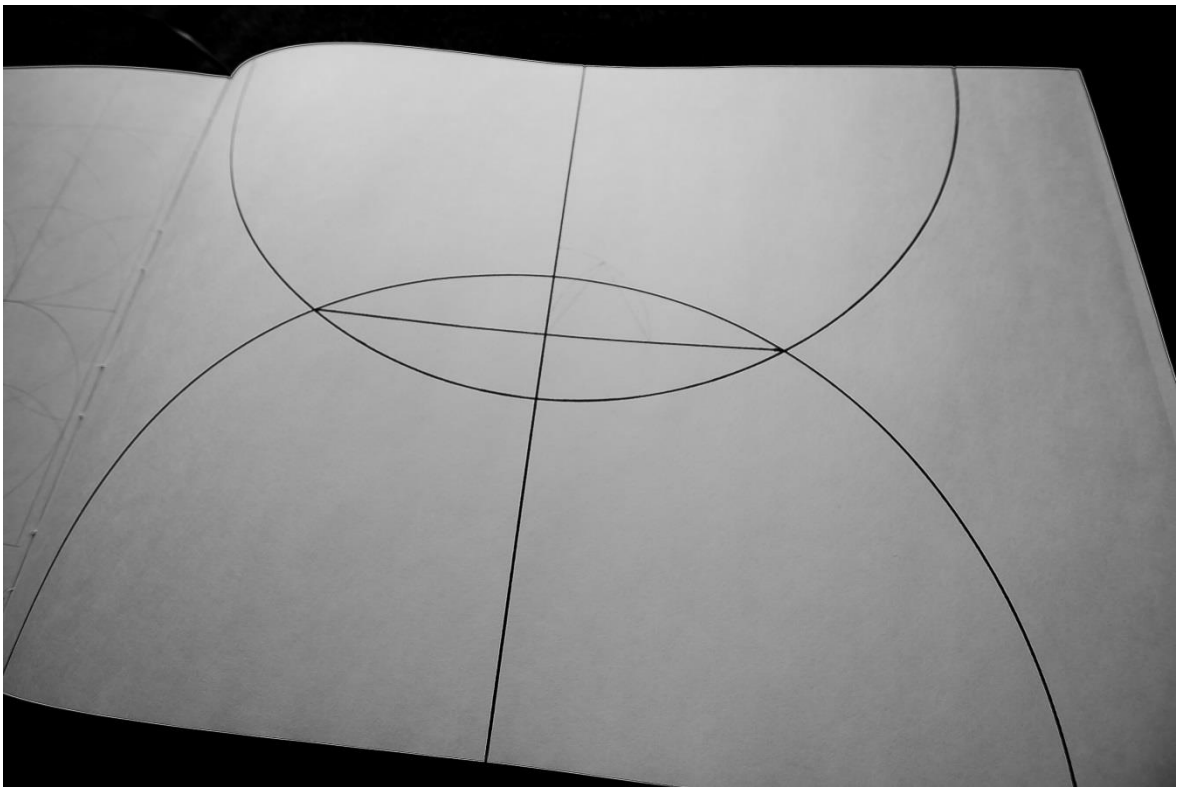
The initial condition is the length of the compass distance. While it may seem arbitrary to set the compass to any desired length, this one act of determination precedes geometric construction. From this compass length, all geometries can be constructed, and the most fundamental is the circle. By rotating the compass around an initial point, (which can be defined as any length, insofar as it does not exceed the extent of the paper size, or cathedral floor, being drawn on), the

[245] Allen, J. (2007). *Drawing geometry: a primer of basic forms for artists, designers and architects*. Edinburgh: Floris Press.

circle defines a centre and uniform distance in any direction. By adding subsequent circles of similar radius we can see that every polygon can be constructed. The intersection of circles whose centre lay upon the circumference of prior circles provides precise locations for polygonal vertices. Through drawing geometry does one become aware of necessity and the importance of conformity to the nature of that being drawn. The essence, nature, and logic of geometry is such that conformity to the natural order cannot be ignored lest the construction not succeed.

Through the geometrical exercises it becomes clear that geometry flows from its first principles in the sense that from the initial determination of compass width, the construction unfolds according to its own nature by necessity. Each point is related to and creates every other point, and the absence of any point destroys the possibility of recognizing the whole. Within the circle whose diameter is ultimately a distance chosen by the geometer can every polygon be described. The division of the initial distance, and division of the initial diameter of the circle yields all regular polygons.

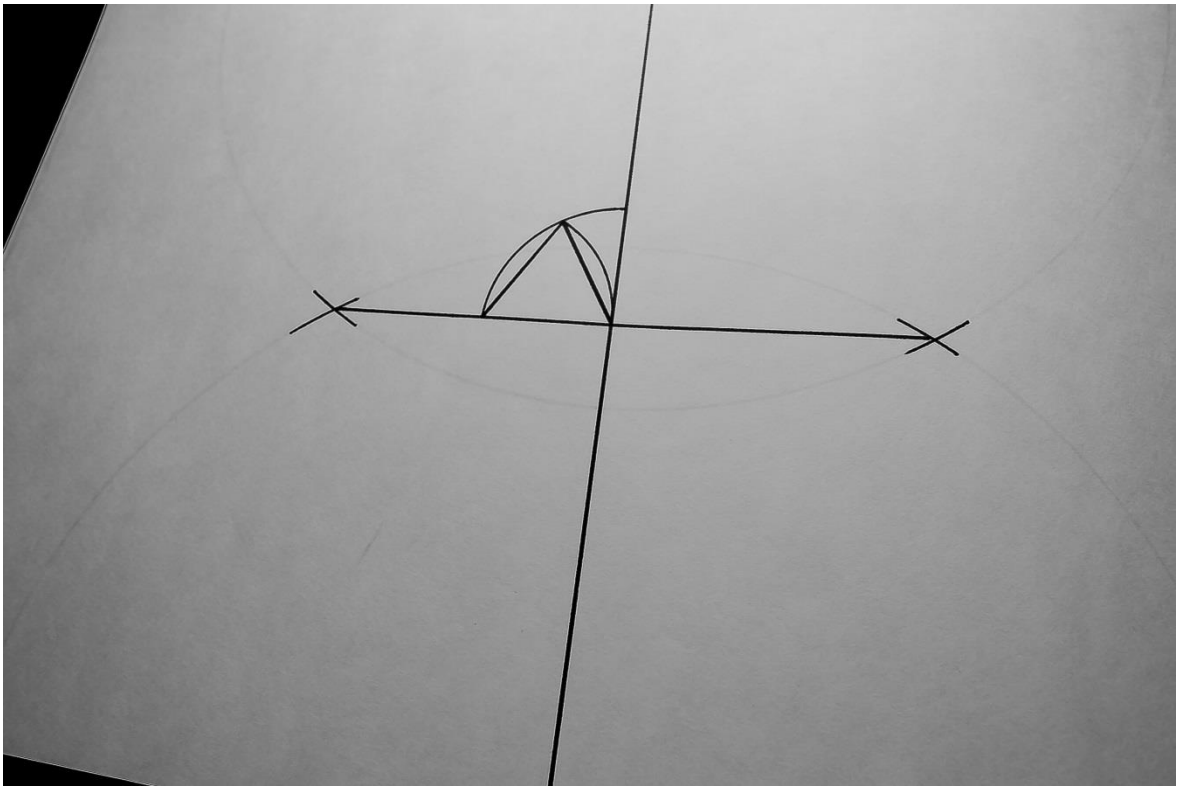
Examples of the first three constructions are included here, with abbreviated descriptions of how they were completed following John Allen's instruction.



[Figure 4-1Dividing a line in half, by the author.]

To divide a line in two, use a radius of greater than half the line distance starting at either end point to mark an intersection on either side of the line. The connection of the intersections on either side of the line will be exactly half.

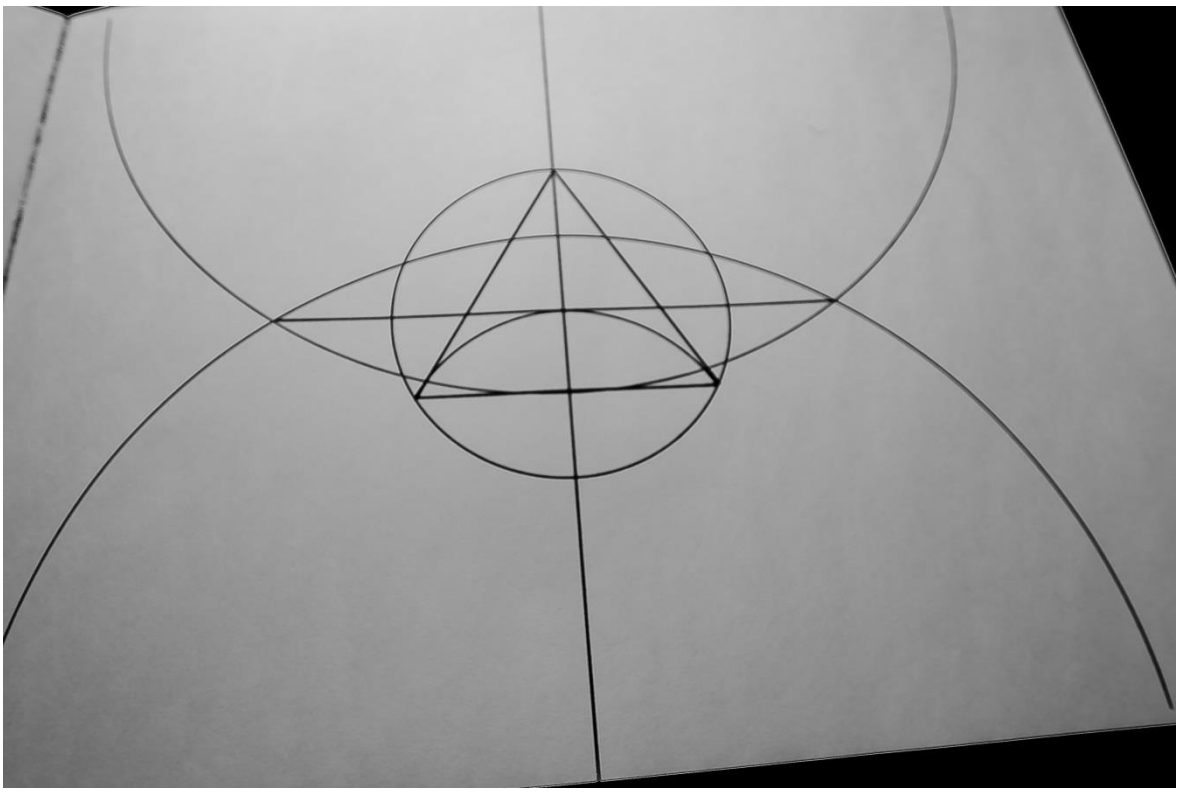
This method is used here to begin every subsequent construction because it allowed for locating the centre of any drawing surface or drawing page. The natural halfway point of the drawing page was located by folding the page in half, thereby demonstrating a practical geometry that presented itself naturally from the circumstances.



[Figure 4-2Equilateral triangle by the author]

To draw an equilateral triangle in a circle, first draw a vertical line followed by a circle with its centre on the line. With compass point at the intersection of circle and vertical line, and compass distance unchanged, an arc passing through the circle centre will locate the two remaining points for an equilateral triangle.[246]

[246] These constructions are a re-telling and demonstration of John Allen's geometric instructions.



[Figure 4-3Equilateral triangle by the author]

To draw an equilateral triangle on a line of given length, set compass length to line length. Swing arcs from both end points onto one side of the line, and the intersection marks the apex of an equilateral triangle whose base is the line of a given length.

From these geometrical examples, it is possible to see the irrelevance of textual literacy. Through ordered thought and the use of hand tools it is possible to describe basic geometrical shapes. The modern demonstration as presented here, using pen and paper, might suggest an abundance of drawn documents from the medieval period. This is not so, and the next section will describe exactly why eight-hundred-year-old construction documents are not to be found.

4.7 The Absence of Construction Documents Before the Thirteenth Century

Drawings by master masons are rare before the fourteenth century when paper began to replace the reusable parchment. It is likely that drawings were limited before the increased use of paper because construction instructions were not delivered in drawing format. Drawing is unnecessary given that instructions were delivered in the form of templates, which were derived from full scale tracings on a plaster of Paris rendered floor. The remains of such a tracing floor can be seen at York Minster c.1360, and Wells Cathedral. Incised in the plaster floor of the tracing house at York Minster can be seen the exact pattern of the choir aisle windows, and profiles of mouldings.

The details and elements were drawn as needed in order to create simultaneously the mason's templates.

Construction documents occupy a certain place in the discussion of medieval master masons.[247] No consensus among contemporary scholars exists, as explanations of the scarcity of drawings before the thirteenth has been explained by either their lack of use, or the practice scraping written text from a page in the creation of a palimpsest.[248] It is unresolved that construction documents were not utilised during any part of the medieval period, but after the thirteenth

[247] Andrews, F. (1999). *The Mediaeval Builder and His Methods*. Mineola, NY: Dover Publications, pp. 80-87. "There is considerable question as to how the mediaeval master conveyed the ideas he had in mind to the actual worker. The most natural supposition is that he made use of drawings, but when search for these is made the results are very meagre, and there is much conflict of opinion about them. Some of the work he actually did by his own hand, but even for this he must needs set-out, and evidences of such procedure are naturally not often to be found, for the doing of the work obliterated them. Here and there some inscribed lines may yet be noted on such items as key-stones of vaults, where the general radiating lines of the ribs are marked out. There is a large inscribed plan on the floor of the Chapter House at Wells, which is supposed to be the setting-out of the later buttress arches of the Crossing. In the crypt at York, on one of the capitals, there is part of the unfinished enrichment clearly set-out. Sketches, patterns, and models are known to have been used, but their existence to-day is very limited. (a) Of actual working drawings a few examples may be cited; (b) of sketches of mediaeval date there are also a few; and (c) of pictorial scenes, some are to be found incidentally set in sundry manuscripts; (d) besides these there are instances of models in stone or wood…(a) Dealing with the classes mentioned, first as to working drawings. Of these there are very few indeed, and it is very doubtful if those which might be so termed were actually drawings made for the execution of work. For example, there is a ground plan of the monastery at Canterbury; this sketch was inserted in the illuminated Psalter of Eadwin; its date is about the middle of the eleventh century. It is a curious and crude drawing showing the buildings partly in plan and partly in elevation, and giving, at the same time, sundry enlarged details of doors and other items which the draughtsman's caprice dictated. It also shows the lines of the drains or water courses, and gives such detail with these that it has been suggested that the purpose of the drawing was rather that of a drain plan than a builder's lay out. Another instance of planning of this sort, but much more carefully drawn, is that of the monastery of St. Gall in Switzerland. Its date is much earlier, c. 829; it is a very complete and careful plan, drawn in red lines on a parchment, and though there is no attempt at scale, some figured dimensions are given, and the whole is annotated in detail by Eginhard (who may have been the architect) in Latin verse. There are other examples of foreign drawings, some of fourteenth century date, of Cologne Cathedral, of the tower of St. Stephen's, Vienna, and of St. Maclou, Rouen. There are also the drawings of Sienna Cathedral and two elevations of that of Orvieto, the latter attributed to Lorenzo di Maitani of Sienna, c. 1310, when he was capo-maestro there. These are drawn in slight perspective and *'are the nearest approach to working drawings to be found in the Middle Ages. . .I doubt (says Sir Reginald Blomfield) if they were made with that object or that the necessity for working drawings was seriously felt by the Gothic builders . . . if it came to carrying them (the drawings) out it is quite possible that little more than such rough indications as these would have been given to the builders, complete and well-founded reliance being placed on the traditional knowledge of the master mason . . . great architecture was essentially a builder's art...designers worked in the concrete and not in the abstract.' The same writer further adds: 'Even in the fifteenth century it is not to be supposed that a man like Sir Reginald Bray worked at a drawing board…when he had to deal with Henry VII's Chapel…His share was to organize and administer and to decide on the general purpose and character of his building. The workman, with an immemorial tradition behind him, would have no difficulty in interpreting directions…In the early days of Renaissance, introduced and run by scholars…it had to be explained down to its minutest detail to unlearned and ignorant men and thus architectural draughtmanship . . . became an absolute necessity*.' Here Andrews is citing: Blomfield, R. (1912). Architectural drawing and draughtsmen. London, Cassell, p. 12.

[248] Palimpsest: A manuscript or document that has been erased or scraped clean, for reuse of the paper, parchment, vellum, or other medium on which it was written. Many historical texts have been recovered using ultraviolet light and other technologies to read the erased writing.

century, elevation drawings and other well rendered ink drawings can be found. It is plausible that drawn documents are absent before the thirteenth century because of the use of masonry templates as well as the prevalence of an oral Christian cosmology that explained all details and multiplicity in terms of one unitive and generational principle, in the same manner that Maximus the Confessor understood the Church. Insofar as the cosmos was understood as multiples of God, and proportional to God, so too was the cathedral understood proportionally and as a multiple of a primary principle. It would therefore be unnecessary for every construction detail to be visually re-presented on paper and passed onto masons crafting the stone. Instead templates that allow for the stone profile to be cut in accord with necessary form, and dependent upon the mason's skill in crafting the stone to fit the originating conditions, would have served in place of construction documents. After the thirteenth century, carefully drawn ink elevations and renderings were used to demonstrate a facade to the client or patron of the building, but were not part of the stone cutting process.

An element of the masons' lodge was the tracing house, or alternatively a floor where tracings could be drawn upon a plaster surface. Incised into the plaster surface would have been moulding profiles and window tracery; (again, for example at Wells Cathedral (1176-1490) and York Minster (1215-1250's) as well as Soissons Cathedral (1177-1479) and Narbonne Cathedral (1272-1332). Other full-scale drawings exist as incisions into the stone in the ambulatory of Clermont-Ferrand Cathedral (1248-1295)[249], but what is important is the use of full scale geometry as part of the construction process. Ground plans and other elements were created full scale on site, or nearby and transposed. The only written evidence of large scale drawing is from the late fifteenth century, so unfortunately, we know little about early examples such as Chartres Cathedral. Within the Christian cosmology of uncreated being it is most appropriate to establish analogous relationships, and this is only possible by the use of full scale lay outs. Without the convenience of a standard measure, and dimensioned and scaled construction documents, it is necessary to establish, for example, a proposed window tracery within existing window frames. The measure in standard units and dimension of previously constructed openings that needed stone tracery was not known, nor was it necessary or desirable. Instead the full-scale geometries allowed for a proportional, analogous, and appropriate solution for infilling existing structure, whilst simultaneously generating the forms from which the templates could be cut.

Templates of wood, canvas, or parchment as a part of the craft tradition, delivered information to masons cutting the ashlar stone. No construction documents were necessary for instruction as the templates provided the outline and setting marks of the cutting. Oral instructions were also

[249] Branner, R. (1963). *Villard de Honnecourt, Reims and the origin of gothic architectural drawing*. Paris, Gazette des Beaux-Arts, p. 131 & p. 134.

used in guiding the stone cutting, and ultimately all instruction served to coordinate the proportional organization and order of all material. It was the task of the master mason to encode the universal principle of uncreated being within the template, and it was the task of the mason to follow the template. The crafting of material becomes a ritual act of creation whereby the form and material of the stone serve the transcendent principle of uncreated being.[250] The material is given new being as it participates in the form of the arch and ultimately the cathedral.

4.8 The Illiteracy of the Masons

The previous section introduced the masonry templates, and examples of full scale geometry, and suggested that construction documents were unnecessary for building. This section acknowledges the illiteracy of the masons, the contemporary notion that labourers would have been uneducated, and introduces the idea that masons were educated by seasoned craftsmen. Ultimately society interpreted and understood its practices within a religious framework, and the idea of an irreligious working population does not reflect the written records.[251]

It is unclear to what extent masons were educated, and some have suggested they were educated in the cathedral schools.[252] There is consensus that mathematical calculations and solutions were not an element of medieval design, but geometry would have been vitally important, as would have human reasoning, insofar as the circumstances of medieval philosophy allowed, before the re-introduction of Aristotelian text. Insofar as the mason was a part of and involved with the cosmology of his period, he had a cultural signpost by which to judge his geometry. Since the cosmology was influenced by pre-Christian and Christian ideas, the newest theological speculation was not necessary for creating stone masonry. Participation and regular attendance at frequent religious celebrations was an integral part of medieval life, and even in the case of illiteracy the religious messages were delivered as part of the oral tradition. We also have evidence that the sacrament of the Eucharist was delivered in Latin, but would also sometimes include vernacular worship, known as *prône*, so named after the screen at the chancel entrance, where the priest would speak in the local language.[253] The institution of the Christian Church with

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[250] This is another way of describing the actions of the Christian masons when using a very deep tradition of stone masonry to complete the tasks of building, where actions and the work at hand were prescribed as if in a ritual.

[251] Coldstream, N. (1991). *Masons and sculptors*. Toronto, University of Toronto Press, p. 34. "No mason needed to know the philosophic basis of his geometric constructions, nor did he need to know the mathematical solution or mathematical calculations." This quote from Coldstream establishes that the craft of masonry did not necessarily rely upon the same textual information as that which informed those that prayed, even if those that prayed and masons operated under the same Christian mindset.

[252] Gimpel (1977, 141ff), Turnbull/ *Building Gothic Cathedrals*, p. 329.

[253] Bergin, J. (2009). Church, society and religious change in France 1580-1730. New Haven [Conn.], Yale University Press, p. 281. "By custom, priests celebrating the main mass on Sundays and some feast days were expected to 'interrupt' the mass proper to conduct the *prône,* which one bishop defined in 1706 as 'an explanation in simple language of the gospel text of the day or of some point of Christian morality, for the instruction and edification of the people'. This definition, while increasingly true for the early

its preservation and continuation of ideas from the past could not have played such a central role in the lives of medieval man without also influencing how man understood himself within the cosmos. During the early medieval period, all learning occurred as a result of the efforts of the Church, and civilization was defined in large part as a result of Church efforts. Even if master masons were unaware of the differences between their geometry and the geometry of their hero Euclid[254], the philosophical and intellectual basis of their geometric constructions can be found within the Christian narrative and metaphysic.

L. R. Shelby presented an argument that addresses illiteracy, which has become common place among architectural historians.[255] It is mostly accepted today that medieval architects transmitted design intentions to masons by using templates. Unlike the contemporary practice of creating schematic construction documents, the Middle Ages did not use such devices. Instead manipulation of geometrical forms would produce a set of templates to be used which would then be proportionally related. Examples are from sketchbooks hand-printed circa 1491, but Shelby argues that the tradition of using templates existed prior to that time.

The production of templates depended upon the tradition of geometrical devices, and the manipulation of these devices to produce the required proportions among separate building elements. These proportions are what were deemed valid within the mason's profession, and correct proportion ensured the building would stand.

Shelby later interprets the geometrical devices and geometrical procedures, and states: "...rules and procedures which he [master mason] sets forth: they are not categorical imperatives which bind the master mason to a rigidly fixed process of design and construction. They are, instead, guidelines within which he has considerable freedom to manipulate the possible variations, so that he can express his own individual tastes and impulses, while staying within the bounds set by the guidelines." Furthermore Shelby acknowledges that the secrets of the master masons were

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eighteenth century, was an inaccurate account of historical practice: while the *prône* could include a sermon of some kind, it had long served primarily as a 'hold-all' that enabled the political, seigneurial and ecclesiastical authorities of the day to communicate their demands to the assembled parishioners; there was no other forum of any kind that was remotely as convenient for such purposes. So during the average *prône* priests might issue announcements and denunciations of a truly bewildering variety, from the record of village assembly meetings, marriage banns, excommunication for debt or non-payment of tithe to threats of excommunication for failure to reveal information about offenders or crimes; they also notified parishioners of royal decrees, seigneurial ordinances and other village events. The religious events announced might include visitations, the conferment of the sacrament of confirmation, the start of a mission and many other items. It was also during the *prône* that the clergy were also instructed to read chapters from the synodal statutes, as well as to recite the Credo, the Pater, the Ave Maria, various 'bidding' prayers and so on, all of which were accepted until the seventeenth century as the normal form of religious instruction."

[254] Coldstream, N. (1991). *Masons and sculptors*. Toronto, University of Toronto Press, p. 34.

[255] Shelby, L. R. (1971). *Mediaeval Masons' Templates*. The Journal of the Society of Architectural Historians. 30, pp. 140-154.

not revealed easily to others outside the institution, and the thought process is not clearly explained in the medieval sketch books: '"Therefore, you should not lay out this art (Kunst) for every man, not even for any stonemason who is not to practice the art, for this art belongs only to the artists who understand it and know how it should be used, for this is not an art which is suitable for just any peasant, so help us God Almighty and grant us his grace thereto. Amen."[256]

Shelby seeks not to unveil the secret of medieval masons, but instead wishes to expound the design and construction of templates through the use of successive inscribing of squares and circles. Shelby focuses on a tension between the prescriptive design techniques and the free will of the artist. The so called 'secret' and the resolution of the tension presented by Shelby are co-extensive, in that the understanding of the stonemason was a spiritual understanding whereby the free will of the mason is simultaneously formed with the stone at hand. Geometry, as described in the current thesis, is the genesis and key to this sacred process and ritual of construction.

4.9 The Workers

Learning this standard of craftsmanship and tradition took place at the masons' lodge. The masons' lodge served as a temporary place for masons to work indoors and store their precise and valued tools. The masons' guild, which is a collection of regional masons' lodges, developed late in the Middle Ages, so regulations and widespread consensus were absent for much of the medieval period. Training apprentices and continuing the shared knowledge occurred without regional organizations. However, as teaching geometry was always an essential and necessary element of the masons' lodge, it would have been a place to learn the guiding standard as established by the medieval cosmology. Learning the geometry of the quadrivium established an ability to recognize the given-ness and self-creating character of the ashlar stone, if such was not already evident before entering the masons' lodge. The skill of recognizing the necessary and "self-organizing" and creative character in the stone was learned through application and hands on instruction at the quarry and at the lodge. By working directly and daily with the stone, both craft and tradition were learned. Skill was developed through that very same tradition, and the craftsman was thought of as virtuous; or having more of a divine spark than an unskilled worker. Drawing upon what was known of Roman building tradition, the neophyte was instructed in the traditional building arts.[257] The teaching of skill also allowed for construction to proceed in the absence of written or drawn documents. Because each mason had it within himself to create

[256] Shelby, L. R. (1971). *Mediaeval Masons' Templates*. The Journal of the Society of Architectural Historians. 30, 140-154, p. 152. Here Shelby is quoting Lorenz Lechler, a mason circa 1516.

[257] Coldstream, N. (1991). *Masons and sculptors*. Medieval craftsmen. Toronto, University of Toronto Press, p. 34. "The ancestry of the method seems rather to lie in the tradition of Roman builders and surveyors, which passed unbroken from late antiquity, using the same methods with the same practical application, to be taught to aspiring master masons in the lodge."

virtuously, the standard of developing the given-ness and "self-organizing" and creative character of the ashlar stone, no direct supervision or direction was required once the axiom was understood. Furthermore, the templates created by the master mason and shared amongst the workforce would have become a tool for emulation and an archetype for the adherence to the cosmic order. The workforce would have undertaken tasks which they were skilled in, and through learning new skills moved onto higher positions within the workforce. The more skilful and understanding of the given-ness of the material, and awareness of God's Ideas, the higher the corresponding rank within the workforce. It follows that through the use of geometry, and templates that guide masons in realising the true nature of the stone, the task of construction would have been seen as a ritual in which God's presence was manifested in the material order.

The role of the master mason has been explored by scholars, and his rising influence is documented.[258] The 1140 account by Abbot Suger did not mention the master mason, but by 1263 the importance of these figures dictated an increase of their presence in memorials, such as Hugues Libergier, the master mason of St Nicaise at Reims.[259] This increased esteem is attributed to his valued skills and accumulated wealth. What contemporary reports miss is the understanding of the Christian cosmology by which the master mason operated, and the increased value placed upon his work insofar as it was in accord with the prevalent cosmology. Any construction seen to have in it the presence of God would have certainly garnered previously absent esteem, for the prevalent worldview sought God's presence in all things. It follows that the new forms of the Gothic, like at St. Denis in 1144, would have been seen as superior to prior efforts for their height, splendour, and divine presence, suggesting that the master masons responsible would have found more admiration than before. What is important to note here is

[258] Kibler, W.W. and Zinn, G.A. (2017). *Routledge Revivals: Medieval France (1995): An Encyclopedia*. Vol. 2. New York: Routledge, p. 259. "These new production techniques led to a greater specialization and division of labor as well as a marked rise of the master mason's social status. He increasingly focused on the graphic design of forms and the coordination of production activity at the quarry and in the lodge, leaving the actual cutting of stone to a second in command, the *appareilleur*. From the mid-13th century on, the stratified workshop organization, together with the use of drawing as a standard procedure, allowed the architect to supervise several projects simultaneously. The names of masters were now recorded in building records, their achievements celebrated on tombstones and in inscriptions. Pierre de Montreuil, a Parisian master who died in 1267, was vaunted as a "teacher of the masons", (*doctor lathomorum*); the Late Gothic architect Martin Chambiges, who oversaw major projects in Beauvais, Sens, and Troyes, was called *supremus artifex* during his lifetime. No longer mere craftsman, the Gothic master mason brought his awesome structures into being through his practical organization abilities, his technical skills, and his gift of design, which seemed a reflection of divine creativity." This encyclopedia entry written by Michael T. Davis describes the rising status of master masons, but also introduces "specialization", "rationalization", "standardization", and "full-scale plans". These concepts and building techniques described as existing in medieval France, under the article titled "Construction Techniques", are at odds with the current thesis.

[259] Kibler, W.W. and Zinn, G.A. (2017). *Routledge Revivals: Medieval France (1995): An Encyclopedia*. Vol. 2. New York: Routledge, p. 886. "(d. 1263). Mason. Although the abbey church of Saint-Nicaise, Reims, is his only known work, Hugues Libergier was one of the most innovative master masons in northern France during the second third of the 13th century."

the developing trend of recognition for the work of master masons, despite the lack of any master mason's names in Abbot Suger's chronicle of 1140.

4.10 The Medieval Mason and His Craft

There is something to be learned from hand crafting stone from the quarry to fit within a larger structure even today, despite the absence of an all pervading sacred cosmology. The stone mason today listens to and acts in accordance with the stone; that has not changed in thousands of years.[260]

Other than the Platonic Christian cosmology about which we have a large knowledge, we are certain that the builders of the Gothic cathedrals were not architects. As has been mentioned previously, the position of expert had not been developed yet, for skills were highly valued. The sixteenth century transition of skilled master mason to expert architect marks a fundamental shift not only in building and construction, but in Western cosmological thinking as well. We can be sure that the conception and execution of the twelfth century Gothic cathedral was due to skilled craftsmen whose traditional building methods existed in a happy marriage with medieval cosmological speculation. The use of small masonry stones that could be lifted by no more than two masons is evident through examining the cathedrals, and while this is attributed to poor transportation systems and lack of heavy machines, this simple fact was important for the masonry tradition whose function was to propagate skill.[261] The skills and work of the masons were given place and consideration within the Christian thinking of the time, and their accomplishment in realising God's creation on earth was certainly recognized. Christian thinking emphasised charity, and its importance for western theology is well established. [262] The mason was actively engaged in charity through crafting stone according to the properties inherent within the natural and God created material; the mason was charitably acting in accordance with what called to be done. His actions were not his own, but instead part of a larger cosmos in which he

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[260] Perez Gomez, A. (1983). *Architecture and the crisis of modern science*. Cambridge, Mass, MIT Press, p. 167. "It would have been sacrilegious to imagine that the world, a living and divine being, could be improved by human actions. Consequently, one's intent was never to modify the world's order but rather to discover and celebrate its harmonies. This traditional humility was indeed very difficult to overcome [for science]."

[261] Smith, T. R. (1880). *Architecture: Gothic and Renaissance*, p. 143. "The Gothic architects adhered, at any rate till the fifteenth century, to the use of very small stones in their masonry. In many buildings of large size it is hard to find any stone heavier than two men can lift. Bad roads and the absence of good mechanical means of hoisting and moving big blocks led to this."

[262] Eliade, M., & Adams, C. J. (1987). *The Encyclopedia of religion*. New York, Macmillan, p. 224. "In post-apostolic and Medieval Christian thought, charity was the will of God, an act of propitiation to a means of eternal reward, a social obligation, and an act of righteousness. The motives might be selfless altruism, desire for fame, inner satisfaction, or a desire to imitate the divinity. Byzantine society, its government and church, made charity a major concern and established numerous institutions for the sick, orphans, widows, indigent, and others in need of rehabilitation and assistance. Charity was also a cardinal feature of medieval western European society, which was guided by the church. Charity is a synonym for love, either as God's love for man or man's love for God expresses in acts of love for fellow men, a conception so central to the western tradition is not explicitly stated in Buddhism, Islam, or Hinduism."

participated. The cosmos and God were creating through the craftsman. In this way is it possible to see the action of masonry construction as both charitable and sacrificial. The mason was sacrificing his own wilfulness in accord with the harmony and order of the created cosmos.

Unlike modern conceptions about sacrifice, in which forgoing personal will is unthinkable for the creative artist, the medieval notion of charity as a cosmogonic act in which the being of the material guided action and was not a hindrance to creation, but instead facilitated creation. The creativity inherent within the material is antithetical to a wilful form making. It was essential for the medieval mason to understand his craft and his task at hand in order to achieve a freedom that otherwise would not have been possible without the knowledge of the material learned through daily work and increasing familiarity with the tradition to which he belonged. The freedom to successfully create stable structures would not have been possible without the tradition and acquired skill of manual masonry. Ultimately the existence of the miraculous religious buildings of the medieval period is a testament not only to the importance of Christianity at the time, but also to the importance placed upon the skills of the mason. Not only were master masons at the leading edge of technological development in constructing the tallest structures in Europe, (until taller structures were built seven hundred years later), but their familiarity with a cosmology that focused explicitly on an understanding of God's being from which all things are created would have been evident as well.

Despite the absence of an explicit role or position within the medieval clergy or medieval monastery, the master mason was nevertheless participating in religious ritual, and through construction also participating in understanding the world as divinely created. It is this absence of explicit mention by Christian chroniclers and clergy in their recounting of medieval construction that has unintentionally misled contemporary scholars as to how far theology influenced the Gothic cathedrals. Despite no recorded mason names at the basilica of St-Denis, it was implicit that masons were doing the work of God. This means that the masons were not only participating in the Church as a religious institution, but also that the masons were realising God's presence in creation; thus, sharing in the work of God the creator through geometry and work.[263]

The division of masonry work was not an attempt at specialization.[264] Different tasks required for the successful completion of a Gothic cathedral would have been accomplished according to a hierarchy of skill level. The more accomplished and skilled masons would be at the top of the hierarchy whilst the lower ranks would be younger and less skilled. The hierarchy would have

[263] Bernard, Anderson, J. D., & Kennan, E. T. (1976). *Five books on consideration: advice to a Pope*. Cistercian Fathers series, no. 37. Kalamazoo, Mich, Cistercian Publications. St. Bernard of Clairvaux (1090-1153): "*What is God? He is length, width, height, and depth."*

[264] Specialization is the separation of tasks and labour so that workers can complete a discrete task, often repetitively. This is not to be confused with division of work.

corresponded to a general acceptance of piety, and the most charitable would be the most appropriate leaders. Unlike a specialized workforce, the medieval masons would have understood the work of those occupying lower positions in the hierarchy. The line of separation between the hierarchical levels would have been indefinite because an essential material understanding underlay all the levels; that is to say revelation is possible for all levels of the hierarchy.

Not only would the construction team be expected to hew the stone from the quarry bed by hand without the use of mechanized machines, but the construction team would be expected to lay out the designs full scale. There is evidence of full scale drawings in Winchester cathedral, and the drawings were usually set out in plaster.[265] The draughtsperson or setter-out would have been well acquainted with geometry and geometric principles. These geometries would have been rendered full scale on the floor of the cathedral in order to facilitate the creation of templates or moulds. It is here that the division between liturgy "proper" and the liturgy in construction breaks down. This setting out would certainly have been a ritual act in which the geometries were understood in a way only known to those practised in geometrical constructions. The "self-created" and creative nature of the geometrical constructions would have been writ large to ensure appropriate forming and construction of the Gothic cathedral, without the use of written documents.

The hands of the mason on the stone, and the use of masonry tools developed craft skill within each worker. These manual skills were acquired over the course of a lifetime, and over the course of generations the skills developed, changed, and were ever more appropriate for the material at hand. In this acknowledgment of accumulated skill would the guild and social organization of masons be accepted within western Christian society. The materials, manual techniques, and work previously completed by separate teams of masons would have determined the self-evident nature of the work at hand.[266] These preconditions and the craftsmanship of the masons are essential for understanding the cathedral within medieval cosmology, for through these preconditions it is possible for the mason to act sacrificially and charitably. Within the Christian cosmology and tradition is the foundation of knowing and acting masons as the originators of Gothic form. The act of making allows for the mason to know the stone material, and to form it

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[265] Illig, L. R., Roninson, A., Adderley, J., & Briers, J. (2003). *Chartres Cathedral a sacred geometry*. [Harrington Park, N.J.], Janson Media. This film demonstrates the use of plaster and compass to create geometrical constructions. Featuring Keith Critchlow and Malcom Miller. http://www.youtube.com/watch?v=sQB_P6ECvE8&feature=related

[266] James, J. (1981). *The Contractors of Chartres*. Wyong, Mandorla. John James argues from archaeological evidence that the stones of Chartres cathedral were laid sequentially by different teams of travelling masons, and each new team of masons continued the work previously established even if the building conventions were different from team to team. See also footnote 75.

accordingly. Understanding the Gothic cathedral requires an understanding of the material that accounts for the value added through man's action.

Unlike contemporary use of material where natural stone is sliced into thin panels and polished to display its surface effects, the medieval mason understood all of the qualities of stone that are available from hand crafting. The weight, texture, and the behaviour of material becomes part of knowing the material during the course of lifting, sawing, scraping, and carving. For the contemporary architect, stone is a material similar to other materials as any can be easily selected and interchanged. Today stone, steel, and glass are all set into a building to be gazed upon and utilised, unlike the medieval master mason that used stone as constructive and understood its constructive properties because he too lifted, cut, and carved the stone during an extensive apprenticeship within the construction and guild hierarchy.

4.11 Creation without Construction Documents

As was shown above, it was unnecessary to create construction documents, and medieval craftsmen could have easily built without them. The earliest known example of a drawing of a medieval building is given as the plan, (which is more of a diagram than a construction documents), for a new monastery at St. Gall in Switzerland (circa 819-26), which was never built. Further examples of construction documents are not available until at least the 14th century.[267] The creation of the "Gothic style" took place without construction documents, or even written instructions.

The medieval master mason as a member of the Church would have understood the organising principles that flowed from God, for it was part of the Christian tradition, as exemplified by Saint Maximus the Confessor, that it was God's energy which sacralised. The being of the material and created order ultimately relied upon God's divine being, and the created multiplicity assembled around Christ the Logos without separation between divine and human. As the Confessor reminds us, the organization of creation is possible through imitation and participation in tradition, as recognition of common humanity is necessary for recognizing the ultimate Cause and Goal. It is thus possible for creation of the medieval cathedrals without construction documents through the medieval mystical Church.

The structure of the workforce was influenced by the religious tradition, for the masonry tradition passed on prescribed actions in a similar way to religious ritual, and this organized workforce could accomplish predestined goals without written or drawn construction documents. Construction documents as they exist today are a collection of technical drawings that communicate dimension of building elements among other specifications and instructions to the

[267] Addis, W. (2007). Building: 3000 years of design engineering and construction. London, Phaidon Press.

contractors or builders. Technical drawings of the twenty first century are the instructions that allow for realizing ideas in material form. In contrast to this notion of building construction, the medieval process relied upon a cosmology that emphasised the synthesis of idea and form. The form was the idea for the medieval craftsman, and action upon material allowed for knowing the material in a religious manner. This was accomplished through the religious synthesis of knowledge and work. The masons were employed in doing the work of God, and as such were creating in a manner similar to God. Therefore, the masons had knowledge of what was to be accomplished before the work was begun, and through working saw that knowledge come to fruition. Construction documents were necessarily absent from the medieval mason's repertoire of tools, for in his religious tradition and craft tradition were the skills and understanding available for participation in creating and revealing God's divine presence. Man understood himself in relation to God, and master masons were no different. The thought of the period sought to see as God sees, and work as God works. Because each worker was created in the image of God, and thus with a mind somehow participating in God's divine ideas, it was possible for each worker to know what was required in his work. The authenticity of being with which the craftsman created something beautiful and well-crafted would have been the guiding standard for the workforce as it is obvious and evident for all to see when something is well made.

4.12 Fabrication

As Birkett and Jurgenson argue, *"*The fabrication of any artefact requires three conceptually distinct processes: establishing the design by specifying the general form and the relationships between its parts; storage of design parameters for future reference; and transfer of the design to the actual objects being made. A proper reconstruction of the working practices of an historical builder must accommodate and explain how each one of these three processes was accomplished within the context of the period.*"* [268] Here it can be definitively stated that, 1) the general form and relationship of the parts was accomplished by drawing full scale geometries on the floor of the cathedral, 2) the design parameters were stored by shaping wooden or canvas templates to match the stone profiles, 3) the design parameters were transferred to actual stones as the templates gave the masons the profiles needed to outline the shape and begin drafting the stone. This all occurred, of course, in a society that venerated Creation.

Despite the aforementioned lack of documentation, it is possible to confirm the use of constructive geometry in forming the mass of stone and determining how each hewn stone relates to other hewn stones.

[268] Birkett, S., & Jurgenson, W. (2001). Why Didn't Historical Makers Need Drawings? Part I - Practical Geometry and Proportion. *The Galpin Society Journal*. 54, 242-284., p. 244.

Furthermore, geometry was utilised to determine the shape of individual masonry units by relating established architectural elements to the element in question. The storage of design parameters was accomplished through the use of wooden templates by which profiles and shapes of stones were transmitted to masons at the quarry and across the building site. The designed templates were placed directly onto the raw ashlar until, through the efforts of the mason with chisel, the stone matched the template exactly.

Coldstream suggests that, "other misconceptions are that medieval buildings were the work of monks, inspired amateurs driven by faith; or that so sophisticated a building as a Gothic cathedral could not have been designed by an anonymous, uneducated stonemason, but must have been the work of the scholarly clerical patrons."[269]

Behind Coldstream's observation on misconceptions lay the modern notion of architect as educated designer, whose task is to create blueprints then pass them onto an engineer and

[Figure 4-1 Geometry as creation (McCague, 2003)]

builder for execution. This one consequence of the modern misapprehension of medieval cosmology is the source of misconceptions about the builders of medieval cathedrals. What is assumed by many modern scholars is the separation of religion from practical matters such as

[269] Coldstream, N. (1991). *Masons and sculptors*. Toronto, University of Toronto Press. p. 5.

construction, and the absence of cosmological considerations in rendering material habitable. Furthermore, depictions of God as architect are lost on prominent scholars and dismissed by suggesting masons were less than God and therefore had no relation to God,[270] despite the obvious importance of master masons given their depiction in places like Reims Cathedral labyrinth, or their busts and tombs present within the cathedral.[271] The importance of religion was important for all aspects of medieval society; masonry included. Not only is the modern exclusion of religious cosmology from an interpretation of the past problematic, but excluding a religious or metaphysical understanding from the practical realities of construction is problematic as well. It is through work, tradition, and a practical understanding of the task at hand that construction was understood to have religious and metaphysical importance for medieval Europe.

The notable absence of structural theory from medieval design and construction processes is not to say that there was no manner of understanding structure. What the medieval master mason utilised was a sense of the sacred, and the accompanying Christian metaphysic in order to understand structure. The essence, nature, and being of the material was understood as necessarily important, and creating in accordance with the nature of weight and material was essential for constructional rigidity. A number of meetings or councils occurred during the medieval period in which advice and consensus was sought on new constructions. One of these meetings, or Expertise, was held at Siena Cathedral in 1322. The final conclusion of the participant Lorenzo Maitani discloses the values of the master masons: '...that it [new church] should not proceed further for the old church is so well proportioned and its parts agree so well in breadth, length, and height that if anything were added to any part, it would be better instead to destroy the said church completely, wishing to bring it to the right measure for a church'.[272]

The notion of 'right measure' appears in other places, and in such instances as the Milan Expertise circa 1400, 'right measure' was explicitly linked to structural stability. There can be no question of the importance of the often taken for granted and unstated metaphysic which underlay the mason's design decisions. The Christian metaphysic of uncreated and self-creating being presents itself as foundational for the values of craftsmanship and masonry in this example from 1322. It is not completely absurd to suggest such metaphysic existed before the Siena expertise in 1322 as well.[273] Right measure was essentially a measuring of all things as related or proportional to God.

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[270] Ibid., p. 5.
[271] Ibid., p. 16. Hugues Libergier was buried at St. Nicaise at Reims in 1263, and Peter Parler's bust is in the choir of Prague Cathedral c 1390.
[272] White, J. (2006). Art and architecture in Italy 1250-1400. New Haven, Yale University Press, p.235.
[273] Illig, L. R., Robinson, A., Adderley, J., & Briers, J. (2003). *Chartres Cathedral a sacred geometry*. [Harrington Park, N.J.], Janson Media. Keith Critchlow on the vaults of Chartres cathedral, which are the widest and at the time the tallest: "*Nothing of this span had ever been done before. Where did they*

The metaphysic not only presents itself in the design schemes for the cathedral as a whole, but also in the comprehension of structural rigidity. The Milan Expertise of circa 1400 provides us with a record of the structural thought of the time in that 'the weight of a buttress should follow its due order through a straight line'. This 'due order' is none other than the metaphysical underpinning whereby the nature of the buttress is conceived as having an inherent nature and order, and this inherent nature of the buttress is to uphold the weight as directly as possible, as determined by the mason's plumb line. The design of all aspects of medieval buildings sought to realise the true nature of the constituent parts, and to realise those parts into a constituent whole, and geometry was the means with which to realise the true nature. The suggestion here is that the characteristic linearity and verticality of Gothic construction is due to the underlying metaphysic whereby gravity is best accounted for with straight and vertical lines.

In order to explore the geometrical constructions, the design process must have incorporated some manner of drawing, even if limited. The absence of historical drawings from before the late medieval period, (see Mathes Roriczer, 1486), is explained as a result of expensive parchment which was reused many times in effect erasing any previous drawings committed. Furthermore, the bulk of existing drawings that exist are of elevations and details of later stage construction.[274]

The use of compass, divider, and straight edge is not debated, as any angle can be described using these tools. Evidence that medieval masons used geometrical squares for drawing include their inclusion in many pictorial representations of master masons, whilst evidence against their use for drawing include their absence from full scale tracings such as those at Wells Cathedral. What is not debated is the use of mason's squares for ensuring stones were set and cut square, after the geometrical design process was completed.[275] It follows that any pictorial representations of master masons would reasonably have included the mason's square. In fact, many pictorial representations depict the crafting of stone material as well as creating the templates and geometries from which the stone's shape would be guided.

But why would the side and diagonal of a square might have been used in the first place? Given the propensity of medieval thought to paint the world in a Christian light, the use of a square and its diagonal meet the requirement of self-generation. The influence of medieval cosmology upon medieval masons is evident in the proliferation of √2 relations in medieval buildings. The existing

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[masons] get the courage from? Where did they get the knowledge from? Where did they get the confidence from? Well, they probably got it from a source, which today, wouldn't be understood or recognised. And that is by direct, what we would call revelation. The confidence was based on praying for knowledge, and being given it...the whole of their faith came through sacred geometry"

[274] Hiscock, N. (2000). *The wise master builder: Platonic geometry in plans of medieval abbeys and cathedrals*. Aldershot, Ashgate, p. 174.

[275] Ibid., p. 177.

weight of examples of √2 relations in medieval building span from c.330 A.D. to c.1500 A.D., and there is consensus among medieval scholarship of the unbroken tradition of the use of irrational relations within medieval constructions.

Even though master masons on at least one occasion quarrelled over the use of √2 relation as opposed to √3 relations[276], the use of geometry did follow one general rule. It must be generative, or "self-creating" as required by the underlying metaphysics. All of the geometric systems, such as those based on √2, √3, √5, and the golden proportion, met this requirement, hence the disagreement when disparate masons with heuristic rules met in one location. We should not assume that the systems were practiced separately according to region because we find a mix of the systems in many architectural examples, but there seem to be inclination and propensity for some systems over others by master masons, probably due to familiarity and traditional introduction.

How the systems were used is determined by the metaphysic of "self-creation" or genesis, and an example is given in a treatise written circa 1516 by Lorenz Lechler. In it we see the basic premise for designing a medieval cathedral; from an initial length can a square be derived whose division and multiplication determine all other dimensions within the building. By geometrically manipulating the initial square in rotation can the floor plan, building height, window mullions, and every other practical necessity be given place. Everything was given being through the use of geometry as a practical tool that provided a useful heuristic.[277]

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[276] Courtenay, L. T. (2000). The Engineering of Medieval Cathedrals. Aldershot, Hants; Brookfield, VT: Ashgate, p. 230. "Having invoked the Expertise [of Milan], we should perhaps turn to it at this point. Consisting of records of consultations between the Milanese Council responsible for the construction of the cathedral and various outside experts called in for advice on the vaults they were about to construct, it is a rich source of contemporary opinion as to how a Gothic building should best be erected and cannot easily be ignored in any survey of Gothic structure in Italy…If this last is indeed what the Milanese were saying – that pointed arches have less thrust – then they were right in principle, not only about the general properties of arches but also of vaults, regardless of whether they were right about the particular arches and vaults planned for their cathedral." The Milan *Expertise* of circa 1400 is probably the best example whereby the Milanese sought advice from northern master masons in which no consensus could be reached between the competing ideas about the correct measure.

[277] Shelby, L. R. (1972). *The geometrical knowledge of medieval master masons*. Engineering of Medieval Cathedrals / Ed. by Lynn T. Courtenay, p. 52. It is the ritual of construction that has been neglected in discourse concerning Gothic architecture. Even when ritual is obvious given the religious character of the craft, it is ignored. To quote L.R. Shelby: "The constructive geometry of mediaeval masons was prescriptive in that it consisted of carefully prescribed steps which the masons were taught to follow. But since they were scarcely concerned with mathematical preciseness or correctness, those steps could be altered at will. That is to say, there were no logical or mathematical rules which they were obligated to follow; they were restricted only by their own skill and inventiveness in manipulating geometrical forms with the tools at their disposal, and by their willingness, or unwillingness, to change the prescriptions which had been handed down to them through the craft traditions." Shelby simultaneously demonstrates how the geometry of the medieval master masons was unlike Euclidean geometry, and ultimately prescriptive. Although the prescriptive and didactic nature of the geometrical treatises in question are stated, their ritualistic nature is not.

It should not be forgotten that the design process occurred simultaneously with the building process, and only the initial geometrical outline would need be determined in order to establish the ground plan and elevation. Subsequent details would be created as needed, as opposed to a contemporary method of design in which every detail is submitted to scrutiny before construction begins. Not only were the details not completed until later, but it is likely that construction would have stopped due to lack of funds or extensive curing times for lime cement. In such an instance, there was no guarantee that the same master mason would continue to work at the building site in the future, and a new geometrical design would shape the building in such an example.[278]

4.13 Masonry Construction

The requirements of stone masonry construction exist today just as they did during the medieval time period. Important structural and rigidity requirements are met with one material as opposed to a composite structure of different materials. Wooden roof structures and irregularities in stone notwithstanding, the cathedrals were constructed predominately with quarried ashlar stone. Workmanship is of critical importance in the singular use of one material, for weight bearing capacity and structural rigidity is determined by quality of work.[279] The requirements of high quality work include composing and mixing consistent and strong lime mortars, and trowelling wet lime mortar into place. Mortar should always be spread over the entire bed joint, as the adhesion of the two masonry surfaces determines the uniform transfer of compressive, tensile, and shear forces through adhesion and friction.[280] The intricate and skilful task of laying heavy stone upon beds of mortar was accomplished through craftsmanship that was learned through an oral tradition that existed within the guild and craft institutions as well as religious institutions. Not only did the craft institutions share in oral traditions, but also in ritual traditions. The skill of masonry would thus have been a ritual, for lest we forget the Church was influential in shaping the attitudes of medieval people at every level of society.

The laying of individual masonry units is best understood as participating in the medieval cosmos through crafting material into a form. The wall, for instance, relies upon the rightful composition and laying into place of mortar, which is necessary for the stability of the wall. The crafting of the wall participates in realising the forms and geometries as defined by the master mason through templates, and the form of the finished wall pulls the construction forward by directing the

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[278] James, J. (1981). *The contractors of Chartres*. Wyong, Australia, Mandorla, p. 556.
[279] Pfeifer, G. (2001). *Masonry construction manual*. Basel, Birkhauser, p. 144.
[280] Pfeifer, G. (2001). *Masonry construction manual*. Basel, Birkhauser, p. 146. Masonry is not generally recognized as good at transferring tensile forces, but these forces can be accounted for by compressing the masonry material. The principle can be observed in modern construction technology where post-tensioning cables of a concrete foundation create large enough compressive forces that strengthen the concrete, and effect an increase in tensile resistance. If enough cable pressure is squeezing the concrete foundation, or gravitational pressure is squeezing the lower courses of a medieval cathedral, the effect will be the same: the resistance of tensile forces.

actions of the mason. Ultimately the finished form is a realization of the potentials of material so determined by a divinely created cosmos. The generative and teleological nature of the Gothic form is realized at all levels, including the actions of the mason laying individual blocks. This implies a skill in using the tools at hand in realising the forms through ritual. The task of crafting and creating the Gothic cathedral was also a meditation: the likes of which allowed for a heightened awareness of what was needed.

The splitting and cutting of stone is one example by which ritual and mindfulness was utilised during work. By intimate acquaintance with stone the mason is able to identify natural fault lines within the stone, and these fault lines determine the position of sequentially aligned holes bored into the stone. Into these aligned holes an iron wedge is inserted, and the underside of the stone opposite the line of holes is placed upon a fulcrum. The hammering upon the iron wedges in the stone cause the stone to cleave along a straight line. Where the stone cleaves cleanly it can be considered a high-quality stone which is used for finished surfaces like ashlar, whilst low quality stone is used for fill or unobservable supporting roles. In all aspects of craftsmanship, the "self-creating" nature is ever present, (as craftsmanship participates in creation, and ultimately in God's creative act), as in this instance where the inherent quality of the stone begins to shape the understanding and action of the masons.[281]

Cleaving larger blocks into smaller blocks requires a skill learned through verbal instruction from other masons, and following those instructions whilst attempting to complete the task of dividing the stone into smaller manageable sizes. A series of tools is used, such as a wooden hammer and chisels of different sizes. The precise blows of hammer on chisel on rock produces different tones

[281] Knoop, D., & Jones, G. P. (1938). The English Medieval Quarry. *Economic History Review.* 9, pp. 17-37. "The stone from the Roche, or top bed [of the quarry], is coarse, tough and cavernous, and, though suitable for constructive engineering work, is not well adapted for fine architectural decoration. Whereas it was probably stone from the Roche Bed which was used at London Bridge, it was doubtless stone from the Base and Whit Beds, suitable for ornamental and general purposes, which was so largely used in London in the seventeenth century," p. 23. "Some twenty miles to the east of Portland in the county of Dorset lies the Isle of Purbeck, the site of quarries which where particularly famous in the Middle Ages," p. 24. "Probably nearly every English church of any size built between 1170 and 1350 incorporated polished dressings of Purbeck marble," p. 24. "We are disposed to think that where stone was found fairly close to the sites of building operations,…the common arrangement was for the quarrying of stone and the erection of the building to be under the same control,…Of the men who worked in the quarries, some were undoubtedly masons. At Vale Royal Abbey in 1278, three masons, with their fellows and laborers, were paid for 1,000 stones which they dug out of the quarry, cut, prepared and finished," p. 33. "Of the various tools mentioned, the shovels, spades, mattocks and trowels were presumably used for uncovering stone, and the picks, wedges, crows and the various types of hammers for breaking and splitting stones. In the course of work at the quarry, tools were very rapidly blunted and the services of a smith were frequently required to sharpen them", p. 36. "Apart from the use of explosives to break up rock, and of pumps to remove surplus water, the actual methods of quarrying in the Middle Ages cannot have been very different from what they are today", p. 36. The descriptions here of the English medieval quarry are helpful because they paint a picture of the work of the mason, and because Knoop and Jones repeat what other scholars have said about medieval masonry: the actual methods are not very different from what they are today. What is absent from the description of the medieval quarry is the cosmological context and ontological understanding of the stone.

when striking a weak vein in the rock, compared to homogenous rock. Consistently hitting the vein in the rock will cause it to cleave along it, and through practice and experience the mason learns to locate the vein and know the rock in an intimate way through the tone of the iron chisel hitting the stone. Through craftsmanship and skilful handwork, the mason comes to know the material in a direct way, and this knowledge of the material guides the work of the mason. The inherent quality of the material decides what size it wants to be, and what form it will eventually beget, and in this fundamental truth of masonry can aspects of medieval cosmology be discerned.

The durability and appropriateness for different stone sourced from various quarries would have been part of the building tradition just as geometry was. The selection of stone is of great importance because it was known through trial and error the qualities of different types of stone. Hard stone requires more time to craft and carve, yet soft stone is porous and susceptible to long term water damage. The master mason would have had to decide upon which stone to use, and its appropriateness given the concerns for good workmanship. The decision on which stone to use would be made through observing the stone at the quarry source, and through direct touching and working of the stone. In instances where the stone was used for construction, its properties of wear and construction could be observed. Past success or failure certainly guided new construction. The importance of obtaining stone from particular strata within the quarry would guide the construction process, for compactness and quality varies within any one quarry.[282]

The stone taken directly from the quarry often is saturated with water, and this 'sap' evaporates once the stone is cleaved from the bed. During the drying or curing process the stone is easily crafted and formed into desirable shapes. However, many types of stone harden during the curing process, and are much harder after completely dried. The protection of the stone is very important during the curing process, for all excess water must be allowed to escape the rock before setting into place. No new water such as rainwater is permitted, and the stone must be

[282] Purchase, W. R. (2009). *Practical masonry*. Shaftesbury, Donhead, p. 160. Such knowledge is irreplaceable, and no scientific or measurable alternative to the skilled mason's eye was available as recently as 1904. Since W.R. Purchase first published his guide to practical masonry there have been scientific methods developed for determining stone durability, but the question remains if the scientific method is superior. "Chemical tests and analyses, to determine the quality of a building stone for durability, are admitted by practical men to be somewhat unreliable. The processes which are successful in the laboratory of the chemist are generally of little value when brought into practical use; for chemical analysis will only give the constituents, and microscopical analysis the physical construction of a stone; and neither has as yet been proved to have any direct relation to its weathering quality. And although stones have been subjected to severe tests in the laboratory such as being dissolved in various acids, saturated with salts, ground into semi-transparent discs, disintegrated, pulverized, baked and boiled, and treated in various other fashions yet none of these processes have as yet furnished sufficient data by which a correct judgment or estimate can be formed as to the weathering properties of any stone." Contemporary (c. 2010) methods determine physical properties such as density, compressive strength, and porosity in order to determine its durability.

elevated from the ground to allow for equal evaporation on all sides. The side of the stone placed directly upon soft ground would retain water, and the stone would have unequal saturation. During this process defects can present themselves, and corrupt stones can be denied. The curing process could take several months, and stones often change colour during this time. Knowledge of the curing process would have certainly been passed to successive generations, and would certainly provide an adequate foundation for any mason to reach the status of master mason. The stone that changes its colour too drastically is thought to be unreliable and unsuitable for construction. It is also true that stones quarried should be fixed according to their position within the bed before quarrying. The stone's position while in the ground should also reflect their position above the ground. That recent archaeological studies of Gothic cathedrals prove that stones within the constructional fabric reflect their original position in the bedrock attest to the unchanging nature of stone masonry and its requirements over thousands of years. Similarly, the fact that different structural and architectural elements share the same stone suggests the medieval mason's knowledge about the necessity of fixing like stones with like.[283] Furthermore contemporary masonry principles dictate that strata or grain within any one stone in an arch should lay perpendicular to the thrust. Within medieval rib vaults and pointed arches, we see this principle as well. It follows that medieval stone masonry is not fundamentally different from contemporary stone masonry.

Ultimately the medieval stone mason would have worked according to the nature and being of the stone. In this manner of action, it is possible to see the direct influence of the medieval cosmology upon the design and construction of the Gothic cathedral. The multitude of properties that were present and observable were simultaneously directing the construction process, and through a meditative prayer the necessary awareness of the creative properties of the stone could be discerned. The stone would have spoken what it wanted to be to the stone mason.

The different types of stone would have been understood in terms of their qualities, such as hardness. Stone such as sandstone are very soft, while limestone is harder, and granite harder still. Through direct working the stone was understood and revealed its inner essence, and the

[283] James, J. (1981). *The contractors of Chartres*. Wyong, Mandorla, p. 84. "The working methods in the quarry are intimately reflected in the finished cathedral. The quality of the limestone itself, its density, homogeneity and so on vary from one place to another in the building. Halfway up the stairs to the eastern towers the inside face of the masonry has a greenish tinge where lichen has grown on the slightly damp material. The adjoining surface is white, unaffected by any growth: it is clean and dry. The two adjacent areas of wall come from different parts of the quarry, one being more porous and susceptible to growth than the other. In the southern transept stairs near the rose window there are patches of walling built of perfect stones without blemishes of any kind; and next to it is a large expanse of work where every stone has irregular veins running through it, or is covered with a multitude of pock holes. Each change in stone quality shows that the quarriers had moved to a different face. It is not necessarily an indication that the crew has changed as one face in the quarry could have been worked out in the middle of a program, when the same quarries would have had to move to another area."

tools of the medieval mason would have been part of that process. Dressing stone and producing a finished ashlar block as seen in the medieval cathedral would have been possible, using chisels and hammers delivering force upon those chisels. From using long iron bars to pry, wedge, and lever apart large stone blocks along their natural strata the masons were able to break heavy stone from the quarry bed. The cleaved stone would have been hewn into smaller units using plug and feathers, saws, axes, and picks. The holes necessary for the plug and feather technique would have been drilled with a hammer and spike.[284] Copper, bronze, and hardened iron would have made up the tools, and would have been highly valued.

Unlike ashlar stone, irregular stone construction follows from the rough and irregular surface of the stone used, and the shape of the stone as found determines the form of the wall. While dressed and ashlar stone share to some extent in determining the construction process of the wall, and certain stones are selectively placed in a certain order, the square ashlar stone conforms to the forms established by the master mason. The hewing and crafting of each individual dressed stone is done so in accordance with the template given by the master mason, and hence in accordance with the geometrical precedence of established construction.

The regular wall is defined in a precise manner; cutting, crafting, placing within the wall is completed in accord with immutable rules. The master mason establishes the geometry, and all work should proceed in accordance with that geometry. The Gothic cathedral was built one stone at a time by following the natural logic established by the master mason. The size and shape of the stones, though mostly regular, have slight differences. As he proceeds to lay the stone he does so in accordance with those stones already laid. The skill of the mason is developed over time through acquiring an eye for good and rightful construction. It should be remembered that the importance of the "self-creating" and generative nature of geometry was emphasised, and through the skill of the master mason the work of individual masons laying the ashlar would drive the initial conception. Because the master mason himself had done the job of laying ashlar blocks earlier in his career, his conception of form and work would have been determined through his own activity.

In this manner it is possible for the Gothic cathedral to be teleologically determined, for the finished form drew the daily work of laying ashlar forward, but it can't be forgotten that the daily work of laying ashlar determined the form. Only through teleologically understanding the building process is it possible to reveal the medieval Christian cosmology at work, and only through a teleological understanding is it possible to see the work as creating as God creates. Because God creates eternally, man is able to participate in that eternal creation through

[284] (2007). *The worst jobs in history*. Sydney, N.S.W., ABC. http://www.youtube.com/watch?v=jpuPFJvKBLg

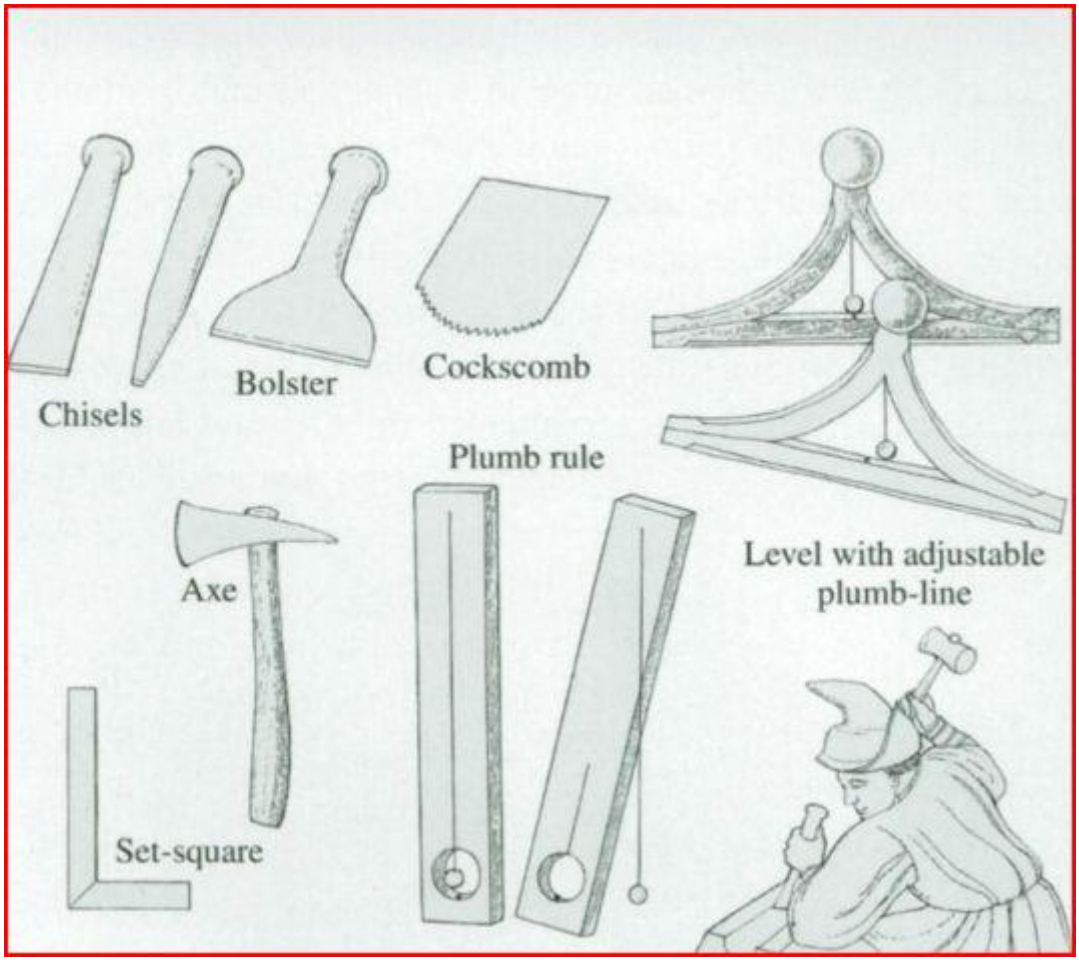
masonry, for the end must exist to pull forward the work while the work determines the end. The laying of each stone takes into account what was laid before, yet is also determined by what will be laid afterwards. The position and character of the stone being laid must be done in accordance with what will be laid, for creating mortar veins that travel vertically across more than one masonry course allows for structural weakness. Cracks could form if too much mortar is used to mitigate against bad masonry unit positioning. What has been placed and what is to be placed next must be taken into account, therefore a "self-creating" and teleological awareness must be cultivated in the act of masonry construction.

4.14 Tools of the Medieval Master Mason

The tools of masonry vary according to the task at hand, and the nature of the stone. The craft of stone masonry relies upon the tools of the trade to hew and chisel the rough stone into the shape required. The tools are the string, plumb bob, trowel, level, set square, triangle, compass, and straight-edge.

Compasses for laying out geometrical constructions were used extensively throughout the designing and building process. The different sizes of compass would range from small hand-held compasses to large waist high compasses for laying out masonry complete and at full scale on a

[Figure 4-2 Medieval mason's tools.(McCague, 2003)]



plaster of Paris rendered floor. The square was often made of wood, and rarely of metal or iron. It was a tool that allowed for crafting and laying stones according to right angles. The traditional medieval masonry square is also accompanied by squares whose arms are not square, nor straight. As contemporary scholars have pointed out, some squares would have been used for laying out voussoirs in an arch, and therefore would have needed to describe the inside arc of the intrados. [285]

Remembering that medieval nature is created by God and therefore shared his characteristics, we can begin to understand the tools of masonry within the medieval cosmology. The natural world and its self-evident nature was understood through the tools of the mason, and tools such as the level and plumb rule relied upon the creative potential of nature to craft stone masonry. The level and plumb rule rely upon gravity, which was accounted for with straight lines. The vertical and straight line was considered the most appropriate for construction within God's cosmos, and the tools ensured the work and construction were completed truthfully. The levelling of horizontal stone beds, or plumbing a horizontal wall were both accomplished using tools that accounted for the undeniable truth of action over a distance.[286] A string or line attached to a heavy weight that comes to a point accurately describes gravity, and the wall or course is constructed in accordance with gravity. Placing the level on the top course of the horizontal masonry bed to check for levelness was possible because the plumb bob hanging from the top edge of the level would hang directly over the mid-point of the straight edge. If one end of the level was higher than the other, then the course was not level, and adjustments would have to be made before the lime mortar was set. The same principle was used for vertical surfaces, and a plumb line was hung vertically along the length of the straight edge. When the plumb line which demonstrated the action of the cosmos was accurately aligned with the mark on the

[285] Shelby, L. R. (1965). Medieval Masons' Tools. II. Compass and Square. *Technology and Culture.* 6, p. 236-248. The relationship between practicality and sacred understanding are once again at play, for we see the creative disposition shaping not only the construction form, but the tools of the tradition as well. Everything including the tools of traditional masonry must be fit and appropriate for action, and action within the medieval Christian cosmology is charity. Action in accordance with what calls to be accomplished is the determination of the mason's tools, including squares that are not necessarily square. The love and charity with which the medieval masons crafted their tools is often interpreted as simplicity and ingenuity, but ultimately the source of their solutions is to be found in the pervasive cosmology of the time. The understanding of Gothic architecture is not complete without giving credit to the masons who built the cathedrals, and their skill in doing so. Their skill is dependent upon their tools, so a right understanding of their tools will provide an idea of how their work would have been considered religious.

[286] Medieval action over a distance would much later come to be known as gravity, and all motion was either circular or linear. Heavenly bodies travelled along circular paths, while earthly bodies always travelled in a straight path. Claudius Ptolemy (circa 90-128) articulated these ideas within a geo-centric model where earth is the heaviest element, hence it is at the centre of the cosmos. The spheres of the cosmos and the celestial orbs were concentrically nested with the heaviest at the centre being the Earth, and every element had a sphere, such as water, air, and fire.

straight edge, the wall could be said to be vertical. Ultimately the "self-creating" and generative drive of the natural world accounted for the charitable craft of masonry, as the heavens and celestial orbs were responsible for the heaviness of the earth. Without the heavens placing the earth at the centre, objects could not fall towards the earth. The earth is the effect of cosmological placement, not the cause. It follows that the mason's tools that would have relied upon gravity would have been seen as realising celestial and cosmological forces, and using those cosmological forces in the act of creating the cathedral.[287] In other words, the actions of the master masons were the effects of divine cause, for like the celestial bodies such as the moon and sun which cause effects here on earth, other such heavenly entities could cause effects too. Platonic doctrine dominates medieval astronomical thinking, and the essential notion of changes in earthly elements resulting from changes in heavenly bodies participates in the realisation of the practical aspects of masonry construction. The essential point to be taken from the masons' plumb and level is that each used gravity for the task at hand, even though a water level could have been used as easily. That the preferred choice was a plumb bob for both tasks suggests the importance of astronomical thinking was apparent within the mason's tools. The tools were necessary for realising the heavens on earth in a cosmogonic act, and the division of nature according to an ontological hierarchy also applied to visible nature. The ultimate spiritual source was also the source of the weight and order of the elements which could be observed, such as earth, water, air, fire, and the celestial deities which were described by Plato. The uniform movements of the Platonic celestial deities were held to be accountable for movement at a distance, including falling bodies, but the specific relationship between actions at a distance due to the celestial deities was unanswered and would be a subject of enquiry for medieval astronomers and astrologers.[288] The plumb bob would have been seen within this celestial and spiritual hierarchy, and made visible the effects of the heavens.[289] The chisels and hammers used

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[287] *Chartres Cathedral a sacred geometry* (2003) [DVD] Directed by Illig, L. R., Robinson, A., Adderley, J., & Briers, J. [Harrington Park, N.J.], Janson Media, [9m:39s]. Keith Critchlow recounts how the placement of medieval cathedrals in medieval France corresponds to the stars within the constellation Virgo. As Mary the Virgin mother was important for medieval France, it is not unthinkable to build cathedrals at those locations where the constellation corresponds to points on the surface of the earth.

[288] Tarnas, R. (2010). The passion of the Western mind: understanding the ideas that have shaped our world view. London, Pimlico, p. 52. Celestial deities move uniformly in perfect circles about the earth, but the planets exhibit retrograde motion. Plato thus framed the question as "What are the uniform and ordered movements by the assumption of which the apparent movements of the planets can be accounted for?"

[289] The movement of an object falling was ultimately due to the prime mover initiating movement of the concentric spheres. However, it was not until the introduction of Aristotelian science and the equating of the Ptolemaic prime mover as the same as the Christian God, that motion, like being, was thought to be transferred from sphere to sphere, and ultimately motion as observed on earth was God's action. Instead the Ptolemaic system attributed the motion of falling objects to movement towards the heavy earth at the centre of the cosmos, but it was not until Scholastic philosophy equated Ptolemy's prime mover with God that action was clearly stated to be God's action. Prior to Scholasticism the most that could be said was that the heavens had a relationship to action on the earth, and that realising the heavens on earth was a sacred act. In any case it is unquestioned that astrology, the stars, and the harmony of the sky were important for medieval life.

at the quarry and the mason's lodge are included within contemporaneous discussion on medieval cosmology. The stone's character is intimately understood by the mason, and the chisels allow for this. The process of carving and working upon the stone can be understood as the work of God, or liturgical in that the self-creating nature of the stone determines the action. For instance, the hewing and carving of stone cannot be accomplished through brute force, as even the largest and strongest human cannot simply smash large stones into smaller stones without suffering fatigue and repetitive stress injuries. The stone cannot be overcome in such a manner, nor was the stone fought against. Instead small hammers

[Figure 4-3 Masonry Construction (Shelby, 196)]

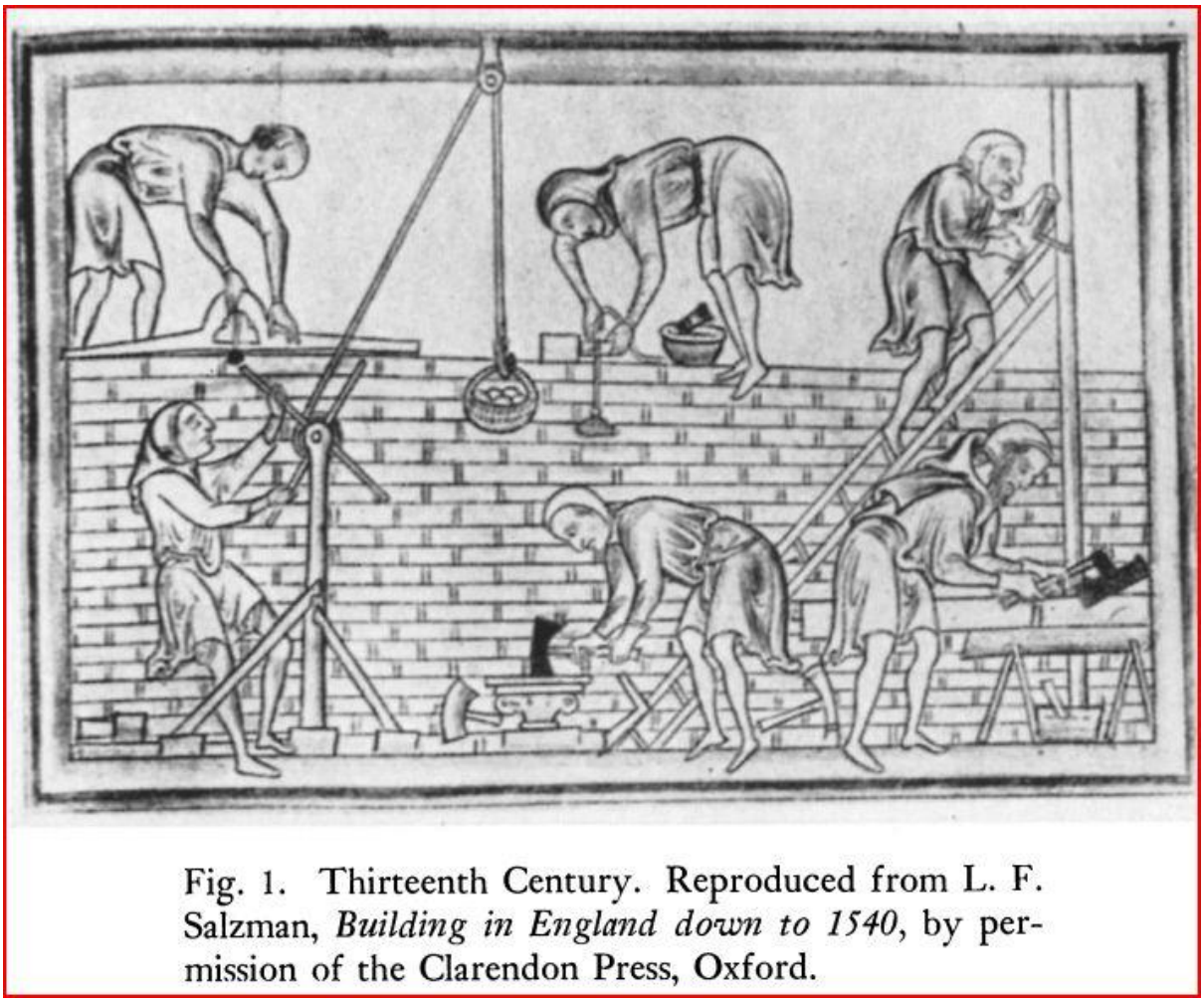


Fig. 1. Thirteenth Century. Reproduced from L. F. Salzman, *Building in England down to 1540*, by permission of the Clarendon Press, Oxford.

and sharp, well maintained chisels are, and would have been, more effective for hewing and sculpting stone. Small hammers are lighter and easier to lift, and a series of well-placed strikes cause less damage and stress to the human body whilst breaking up the stone more efficiently. The use of smaller hammers is not determined by human wilfulness, but instead by the stone. Medieval masonry construction should not be thought of in terms of force upon rock, but instead in terms of lifting the hammer and allowing divine action, "gravity", to accomplish the work. The hammer is not smashing through the material, but instead the hammer is lifted and allowed to fall according to a natural law whilst being skilfully guided to precise points on the stone or chisel by

the mason. Again, there is not so much wilfulness, but instead a finesse and acknowledgment of *essentials*. Furthermore, the chisel as it strikes and meets the stone is dictated by the stone as well. Strikes of the chisel upon the stone at perpendicular inclinations can even out the stone face if randomly applied, while strikes of the chisel upon the stone at steeper inclinations move the chisel along the face. If the chisel is too steep the point of the chisel bites deep into the stone, but at lower inclinations the chisel can move along the stone. The differences can be heard and felt during the hewing and carving process. It follows that the most efficient inclination of the chisel is determined by the quality of the stone, for harder stone requires a steeper inclination for efficient chiselling than a softer stone. The inclination, speed, direction, and force applied upon the stone is determined by the stone, and it follows that all actions of the stone masons are determined by the stone's being as well.

4.15 An Authentic Example of Stone Masonry

To validate the notion that stone carves itself, the author undertook a brief three-day session of stone masonry at Canterbury cathedral. The master mason and head of stone conservation at Canterbury cathedral was willing to allow participation by an untrained novice. Steve Manuel, the master mason at Canterbury cathedral, was happy to oversee the author's instruction. The task was to carve a profile moulding into a block of Caen stone using hand tools not dissimilar to medieval hand tools. Photographs of the three-day session are included in this thesis, as well as general confirmation of the self-creating nature of the work of stone masonry. It has been confirmed through brief testing that stone masonry can be conceived of as self-creating. There is logic, order, and truth to the work of stone masonry that is independent of subjective perception. The truth and beauty of stone masonry is objective and exists independently of isolated thinking.

The procedure of cutting the profile moulding followed generally the outline as provided in the "bible" of stone masonry, *Modern Practical Masonry*.[290] Working the surface of operation with hand tools is taught as a procedure, for discovering the properties of stone without guidance of a procedure would take much longer. The corners of the stone are the starting points, followed by a "marginal draft", then another marginal draft, then the enclosed surface is "pointed", then the entire surface is "clawed" and "boasted". The final surface should be smooth.

[290] Warland, E. G. (1953). *Modern Practical Masonry.* London, Pitman, pp. 81-85. Despite informally being known as the "bible" of stone masonry, it should be noted that this manual of stone masonry is practical and a-religious. It is presented here to describe stone masonry, and conclusions about the religious nature of masonry work are foreign to the objectives of *Modern practical masonry.*

[Figure 4-4 Master mason Steve Manuel demonstrating the inscribing of a line on stone. Photo by the author.]

[Figure 4-5 The technique of stone cutting with a chisel requires working away from the corners. Photo by the author.]

Converting a rough stone into a stone that fits into a building requires chiselling on the surface of operation. The author's first task was to remove one half inch of stone from the surface of operation, and render the surface as smooth as possible without twists or deformations, so that any surface may be squared true from it. A guiding line on each side of the stone is drawn using a "scribe", and the groove created by the scribe is filled with graphite from a pencil to render it

more visible to the eye. Beginning with the corners of the stone, and a "drafting chisel", a marginal draft is created along the longest edge. Careful attention must be paid to the inscribed line, and the drafting chisel must not remove too much stone, and allow the chisel cut to drift below the inscribed line.

[Figure 4-6 The marginal draft created by the drafting chisel. Photo by the author.]

Cutting a corner into the stone requires the chisel to cut into the stone, rather than away. The chisel cutting edge should travel towards the mass of the stone when cutting a corner, rather than away because the stone will gouge out otherwise. After the first two corners are cut, then the draft between the corners is cut, then a visual inspection is required. The marginal draft is checked for straightness using a straight edge, and visually inspecting the contact between the straight edge and the stone. It is evident where the high and low points are, and the extra stone should be carefully removed using the drafting chisel.

[Figure 4-7 The marginal draft being checked for straightness. Photo by the author.]

After the initial marginal draft is completed, another corner should be cut. Following the corner cut another marginal draft joins the two corners, and the entire procedure is repeated until the entire surface of operation is enclosed by a marginal draft. All marginal drafts were checked with a straight edge.

[Figure 4-8 A marginal draft encloses the entire surface of operation. Photo by the author.]

To prevent surface twisting, it is important to sight in the marginal drafts using two straight edges, and visually confirming they are parallel whilst resting on the marginal draft surfaces. The chisels can be a convenient item for holding the straight edge in place.

[Figure 4-9 Sighting through the marginal drafts with straight edges held in place by a chisel. Photo by the author.]

To remove the superfluous stone enclosed by the marginal drafts, a series of furrows are worked through using a "punch". The extra stone is knocked off, and careful attention is required so as to not drift below the final required surface. Each punched furrow should be checked with a straight edge, and should be level before continuing.

[Figure 4-10 The furrows created by the punch. Photo by the author.]

The surface is then "clawed" in parallel drafts using a mallet and claw chisel. These drafts should be worked in the same direction as the furrows, and tested by applying the straight edge. A series

of drafts is now worked with a mallet and bolster. These should be worked parallel to the initial marginal draft, and each one tested and worked until it is correct before the next draft is boasted. Each draft is a guide for the working of the next, and so on across the surface. The straight edge should be applied diagonally across the surface. If the stone is round in one direction and hollow in another direction, it is proof the surface is twisting. It is then necessary to rework the marginal drafts, and repeat the processes.

[Figure 4-11 A draft begun using the claw chisel. Photo by the author.]

[Figure 4-12 A draft using the bolster. Photo by the author.]

After the surface of operation has been worked true, the templates or moulds should be applied to the stone, the outline of the mould being scribed or marked on the surface by means of a scriber, after which pencil may be used to define the lines clearly. The various surfaces may be worked square from the surface of operation, in stages.

[Figure 4-13 A scribe and acrylic template sit atop the stone with profile inscribed. Photo by the author.]

The procedure did not vary during the various stages of cutting a moulding profile. First the corners are cut, then a draft between them using a drafting chisel, followed by the claw chisel, followed by the bolster.

[Figure 4-14 A corner cut into the stone before a draft was cut to reveal the moulding lip. Photo by the author.]

After the moulding lip was cut with the bolster and mallet, the large amounts of excess stone were removed using a pitching tool. This tool is very good at splitting the stone and sending large pieces into the air. It can be a precarious tool if not used properly as large unwanted cracks could develop.

[Figure 4-15 The pitching tool which easily removes large quantities of stone. Photo by the author.]

The corners are again cut using a drafting chisel, but are joined by carefully following the curved moulding profile. Again, this is followed by furrowing through the excess stone with a punch, then a clawed chisel, then a boaster.

[Figure 4-16 The drafting chisel was used to cut along the curved moulding profile. Photo by the author.]

[Figure 4-17 The curved moulding profile with marginal drafts defining the edge of the moulding curve. Photo by the author.]

[Figure 4-18 A claw chisel removing excess stone after the punch tool was used. Photo by the author.]

After the curve was finished the author wanted to cut the stone in half because it was very heavy. As the author wanted to keep it, this was the best option. The experience of cutting the stone was a welcome activity, as he was not able to quarry and rough cut the stone from the beginning.

[Figure 4-19 A tungsten saw blade used to cut the stone. Photo by the author.]

[Figure 4-20 The finished stone. Photo by the author.]

What did the author learn from this exercise?

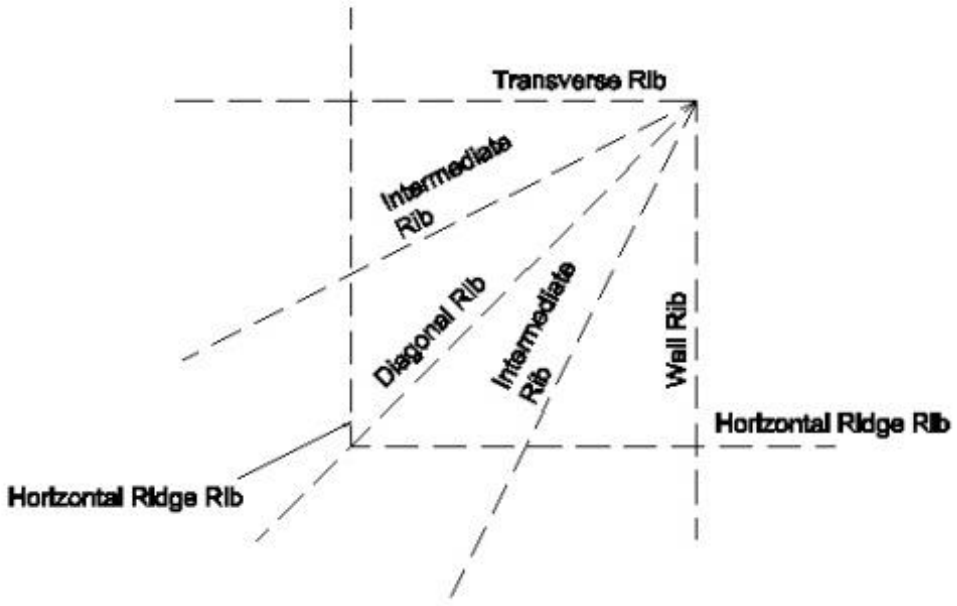
Apart from the meditative and enjoyable nature of the work, the importance of progression from one step to the next is readily apparent. Each step should be completed with full attention before continuing onto the next. If the mind drifts, then mistakes are made. The skill and method of working emphasises a series of steps, and each step depends greatly upon the step prior. Stone masonry is an unfolding of sequences as determined by the stone itself, and the skill of using tools on stone demonstrate the essential qualities of stone otherwise unknown. It is

from this essential and ultimately religious understanding of stone that guided the medieval master masons in designing and constructing the Gothic cathedrals.

4.16 An Example of Rib Vault Design

The process of designing a rib vault is an example of self-organisation. The spontaneous order that arrises from the laying out of a rib vault would have been very appealing to a medieval master mason who saw the cosmos as Christian. As Christ particiapted in Divinity through his being, so too did the medieval master mason participate in Divinity by realising something of God's nature in stone.

The following step by step process is recreated from the "bible" of modern stone masonry.[291] It is the most complete set of instructions available to us today. Unfortunately the master masons of eight hundred years ago did not leave complete written instructions, so what is presented here is a reasonable fascimile. What we do have is the possibility of creating with stone material, as the medieval mason did. While some differences may exist between the process of rib vault design of today and yesterday, we can accept the recent design process because it relies upon the same tools as the medieval masons. Furthermore masonry, as a skilled trade, relies upon hands on



[Figure 4-21 Centre line diagram of ribs, drawn by author.]

[291] Warland, E. G. (1953). *Modern practical masonry*. London, Pitman, p. 225.

instruction, so there is some lineage of accepted practice that Warland is relaying to us, however altered it may be after hundreds of years.[292]

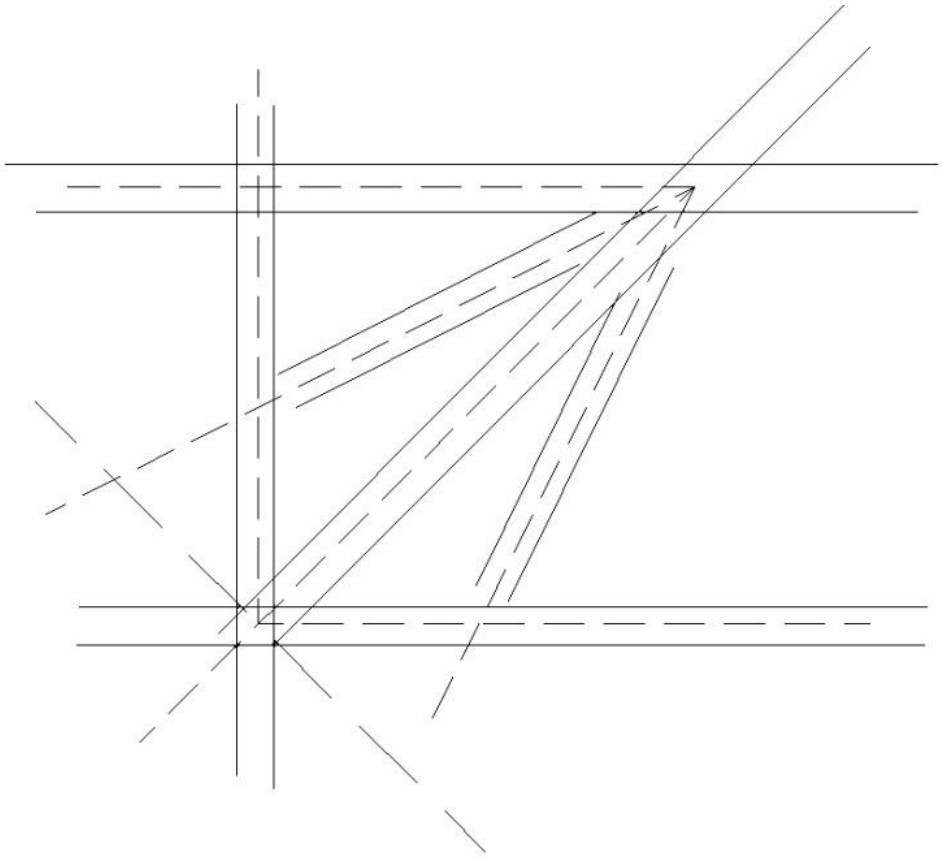
The stone requires a certain design process whereby describing each shape of individual stones in an arch or rib vault follows from stone shapes previously described. The stone and arch form operate together in that the form is generated from the stone material, yet the stone cannot stand without the form. With this in mind, the design process is an unfolding of potential into fuller being. Often medieval masons would begin with foundations, or other established constructions in place. For instance Notre Dame du Chartres was built upon Fulbert's foundations, and Canterbury Cathedral was rebuilt upon the burned ruins of the old cathedral in 1174-1180. Therefore the width of the nave, (and later in the building process), the rib vaults, would have been established. From the width can the elevation be developed, and from the elevation can all the stones be described in a rib vault.

To arrive at the elevation of the diagonal rib is a multi-step process that begins with plotting the centre line diagram.

1. Decide on the general form of the vault, and plot the centre line diagram of the ribs in plan.

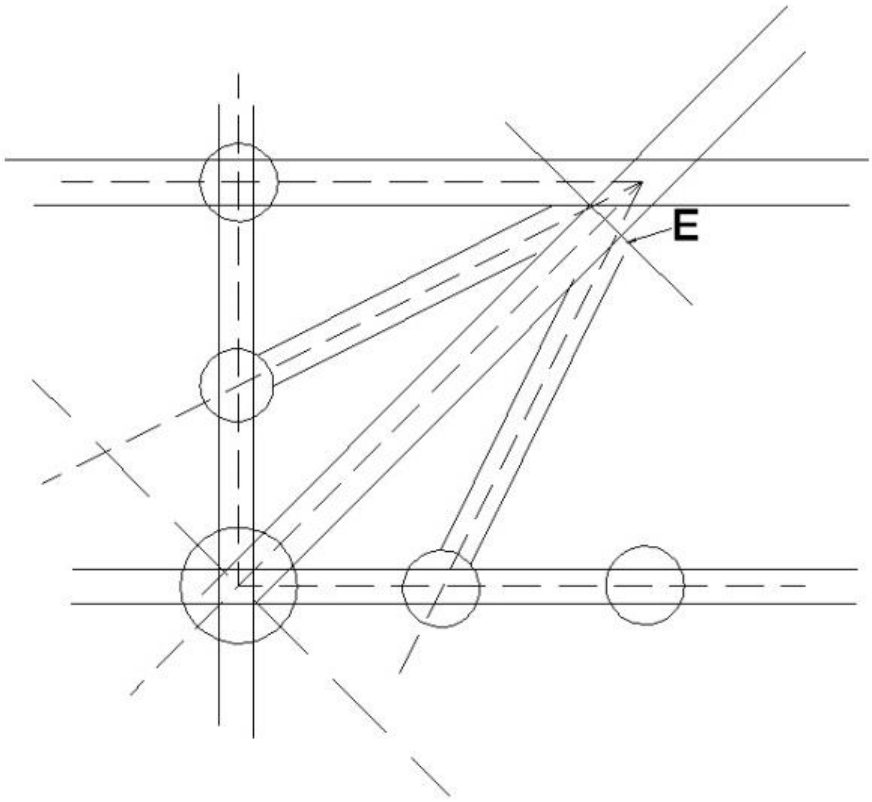
2. Add the thickness for the various ribs, making the diagonal and transverse ribs wider than the intermediate and ridge ribs.

[292] If contemporary and medieval masons share so much in common, do the former also see their work as liturgical? Not necessarily as society is no longer organized by Christian thought. Even if contemporary masons may or may not see inherent order or religious sentiment in their work, for the modern idea of work is void of the rich medieval rendering. Workers that identify with traditional and religious sentiments can be said to be "not living in the modern world".



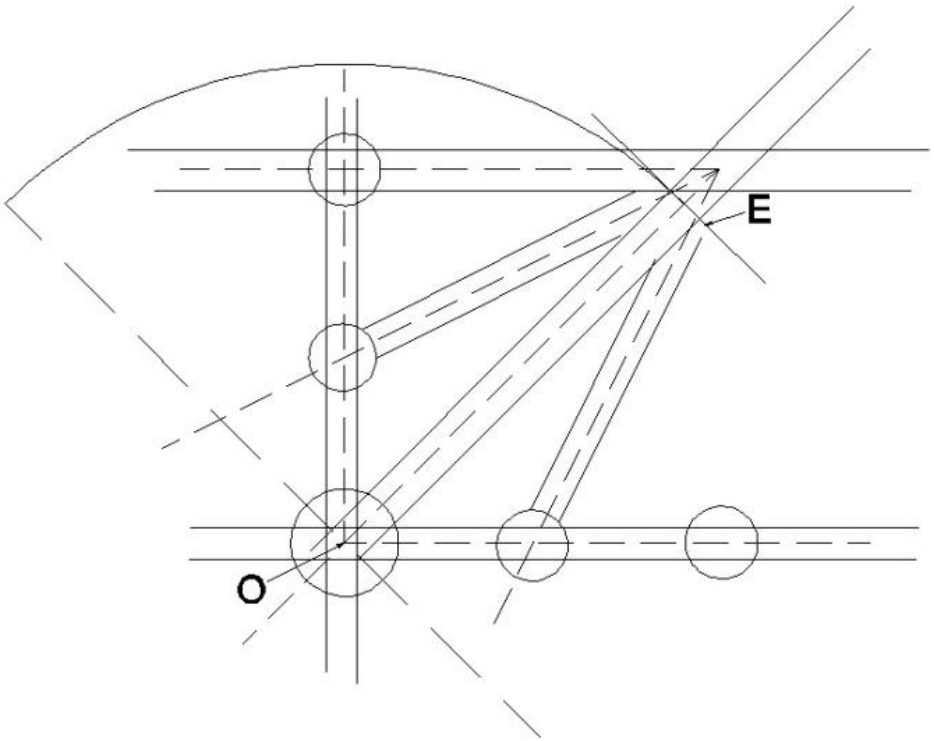
[Figure 4-22]

3. Draw in the plan of the boss stones at the intersection of the ribs as shown, and decide upon the position for the springing points of the ribs on the nosing line, as at “E” on the plan of the diagonal rib.



[Figure 4-23]

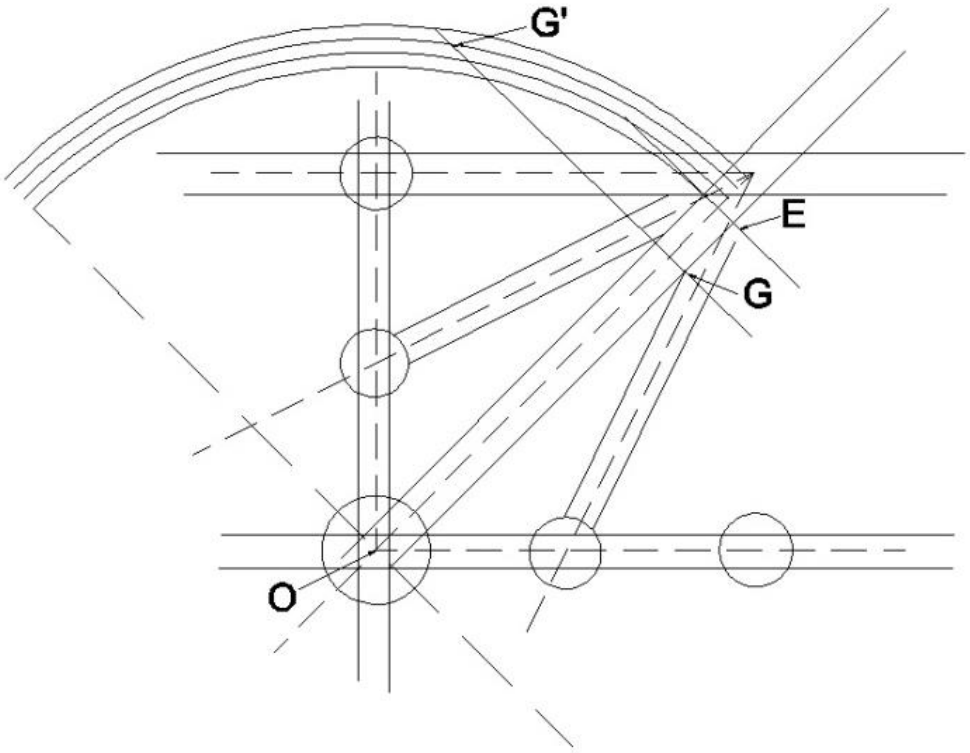
4. Now determine the elevation of the ribs, commencing with the diagonal rib, this rib having the largest span. In the example given, the diagonal curve of the rib is at the centre of the vault in point O. Draw a line from this striking centre perpedicular to the centre line of the rib in plan, and draw the curve from point “E”.



[Figure 4-24]

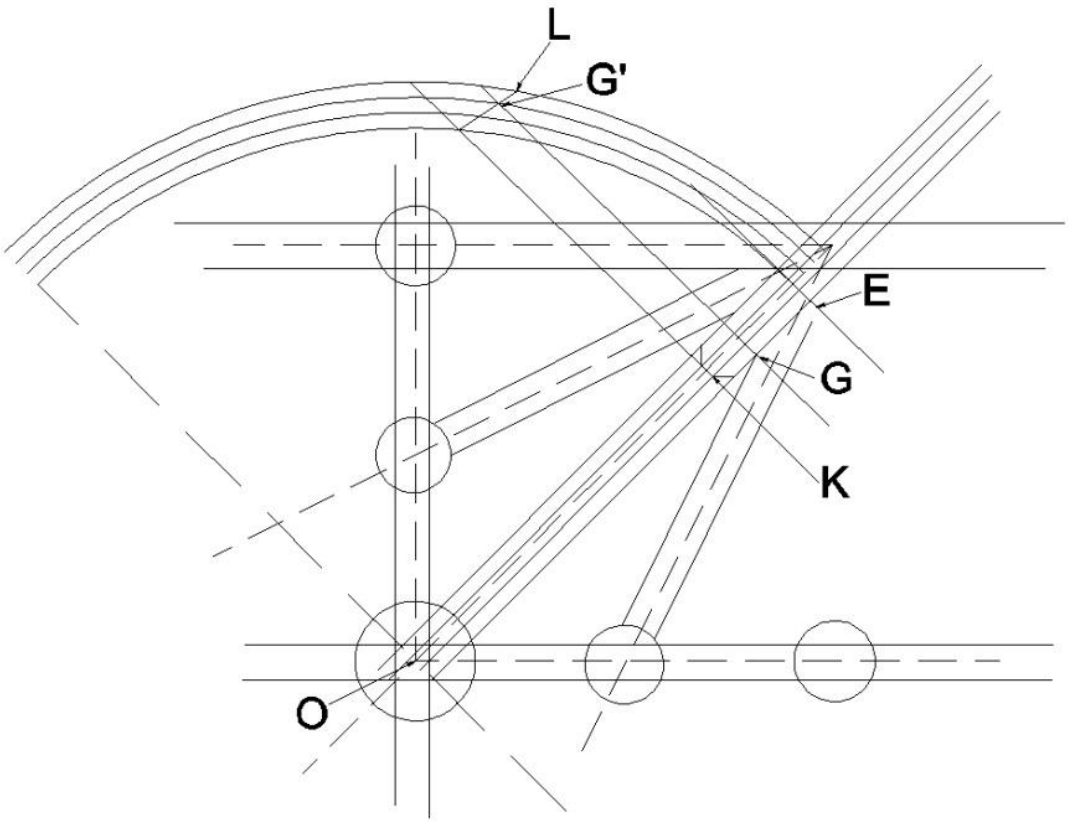
5. Where this curve cuts the perpindicular line from point O, determines the height of the vault, if the ridges are horizontal, as in the example given. Next proceed to erect elevations of the other ribs. To do this, it is necessary to decide upon the form required for the curve of the ribs, owing to the ribs being the same height, but of unequal span.

6. These curves may be composed of a combination of arcs, or obtained by ordinates, thereby producing elliptical curves. In the example, the curve of the ribs is struck from two centres, the radius of the lower curve being common to all the ribs.



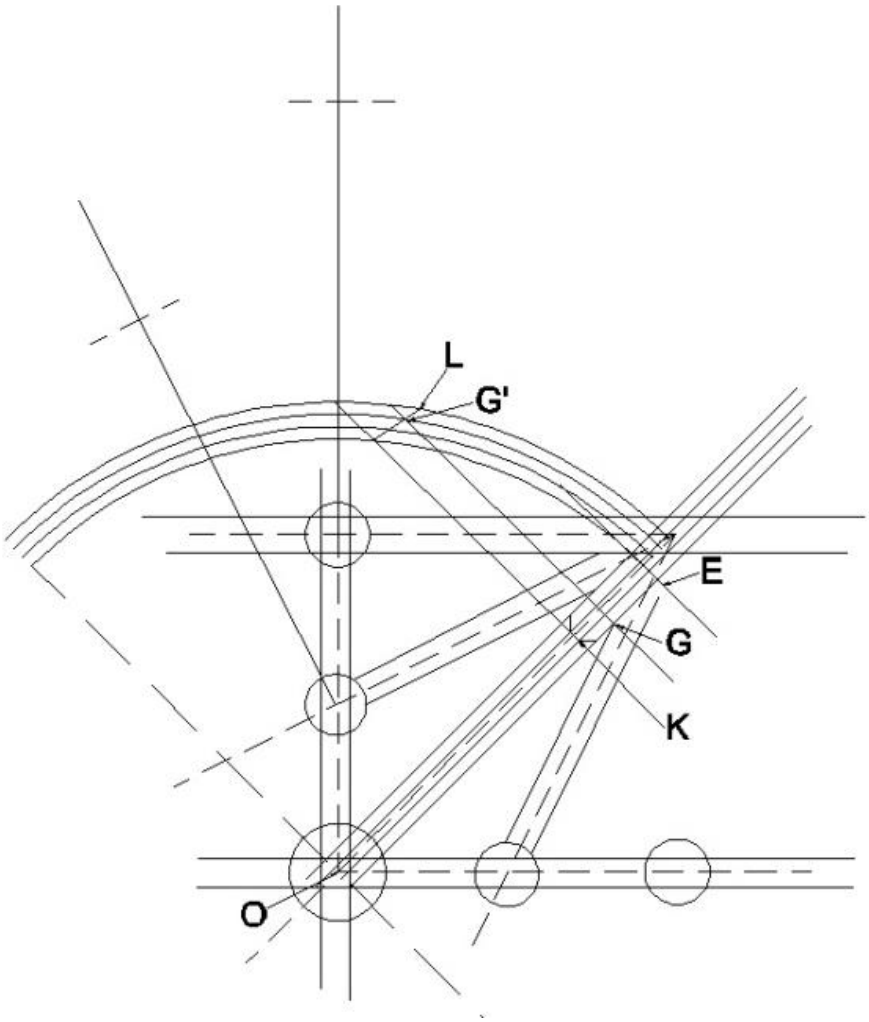
[Figure 4-25]

7. Determine in plan the highest point at which the ribs are seperated, as at G, and project this point up to point G' in the elevation of the diagonal rib, on the soffit line of the in-filling.
8. Through G' draw a normal joint line cutting the nosing of the diagonal rib in point K.
9. Produce the joint line through G' to the curve representing the extrados of the rib in point L. This determines the top height for the horizontal bed line of the springers.



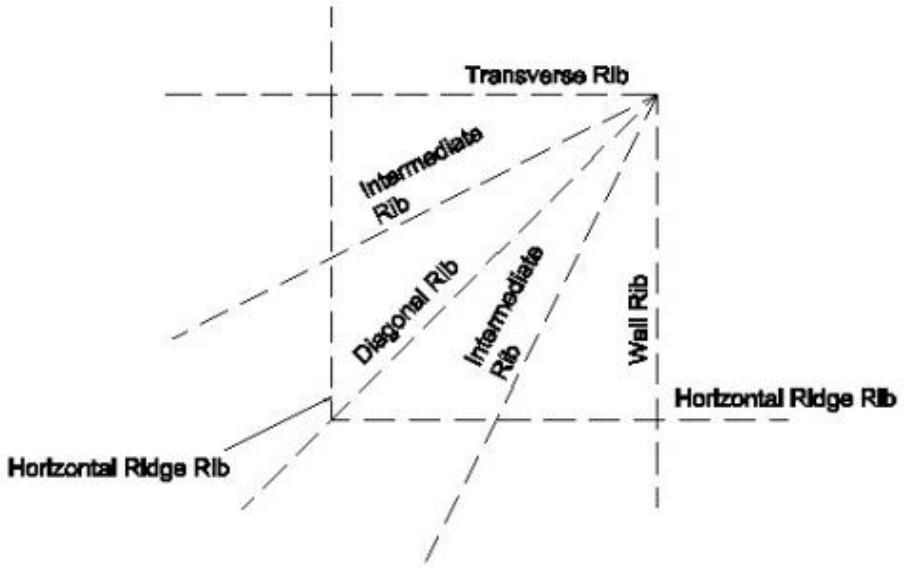
[Figure 4-26]

10. Now draw lines from the centre of each boss stone perpindicular to the centre line of the rib in plan, and mark on these perpindicular lines the vertical height of the vault, this height being taken from the centre height of the diagonal rib, thus determining the centers for striking the lower curves in elevation.



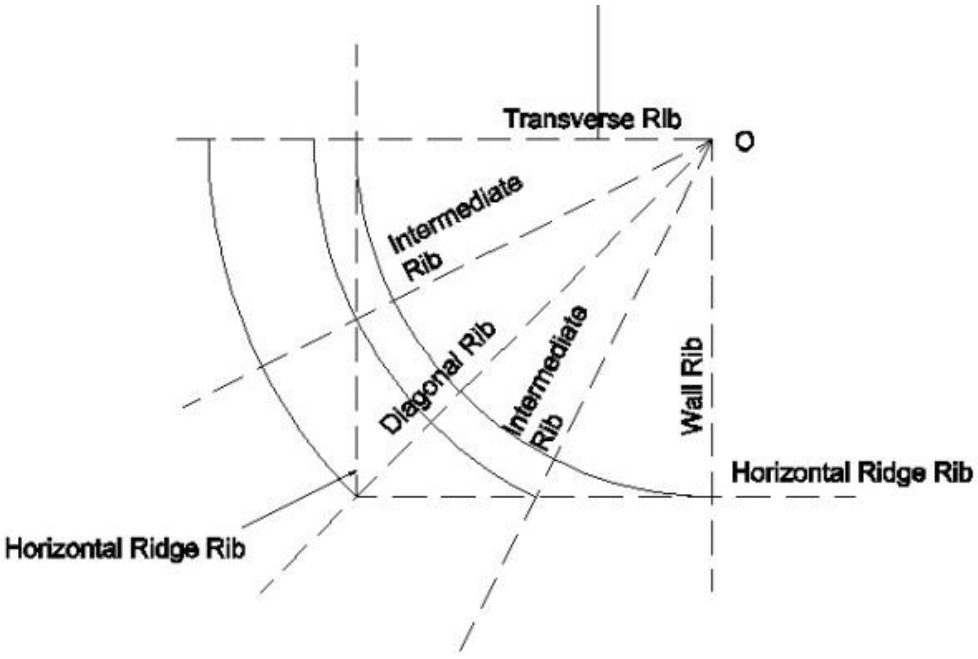
[Figure 4-27]

11. Determine the curvature of the ribs by drawing a centre line plan of the ribs. Determine the point D, which is where the ribs separate. This point in the setting out is taken on the soffit line of the in-filling.



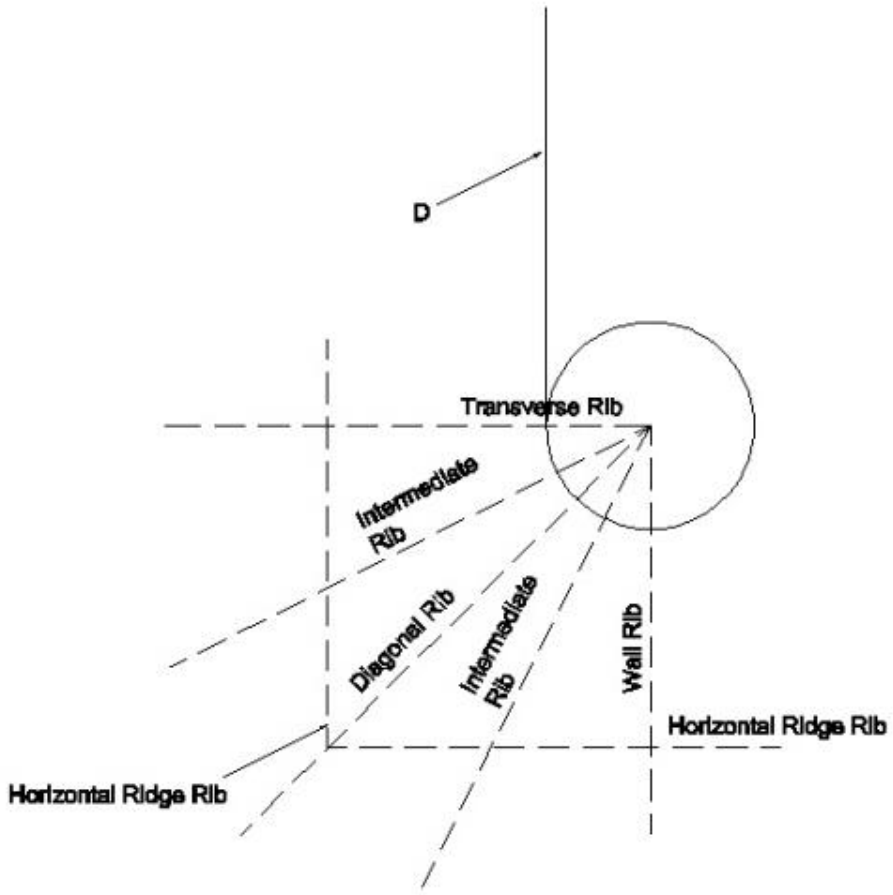
[Figure 4-28]

12. With O as centre, swing all the ribs into the vertical plane, which in the diagram is parallel to the plan of the transverse rib.



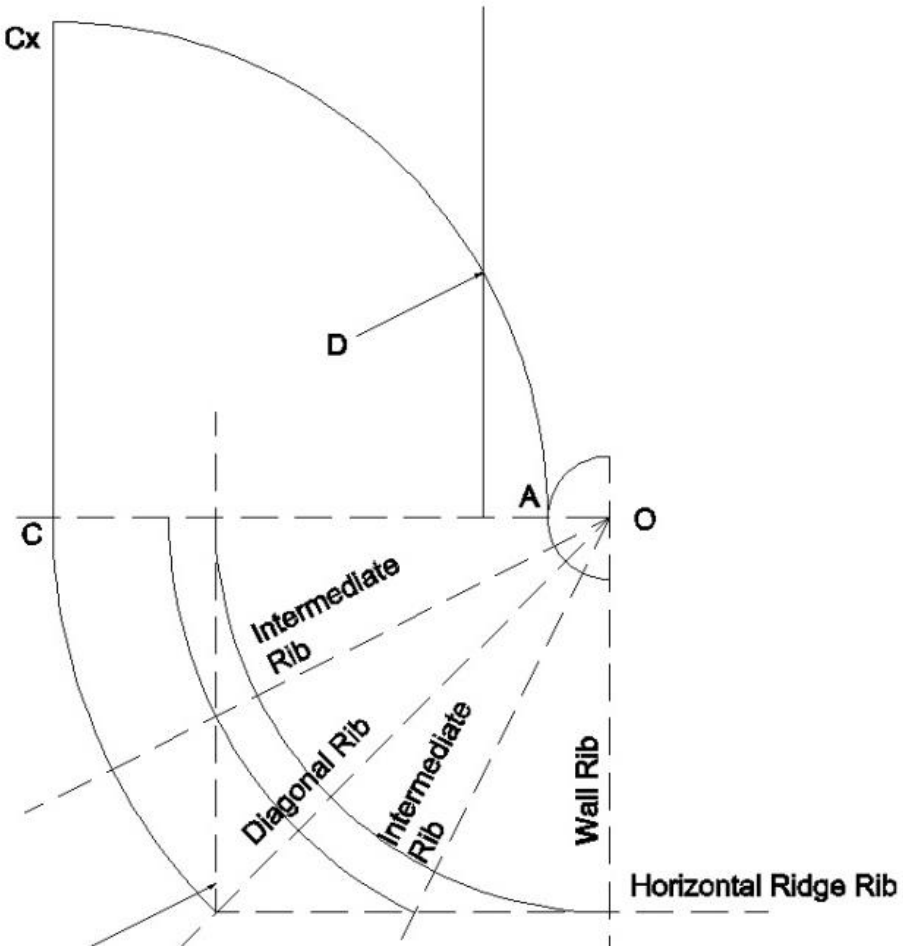
[Figure 4-29]

13. Determine the line D, which is the point where the ribs separate.



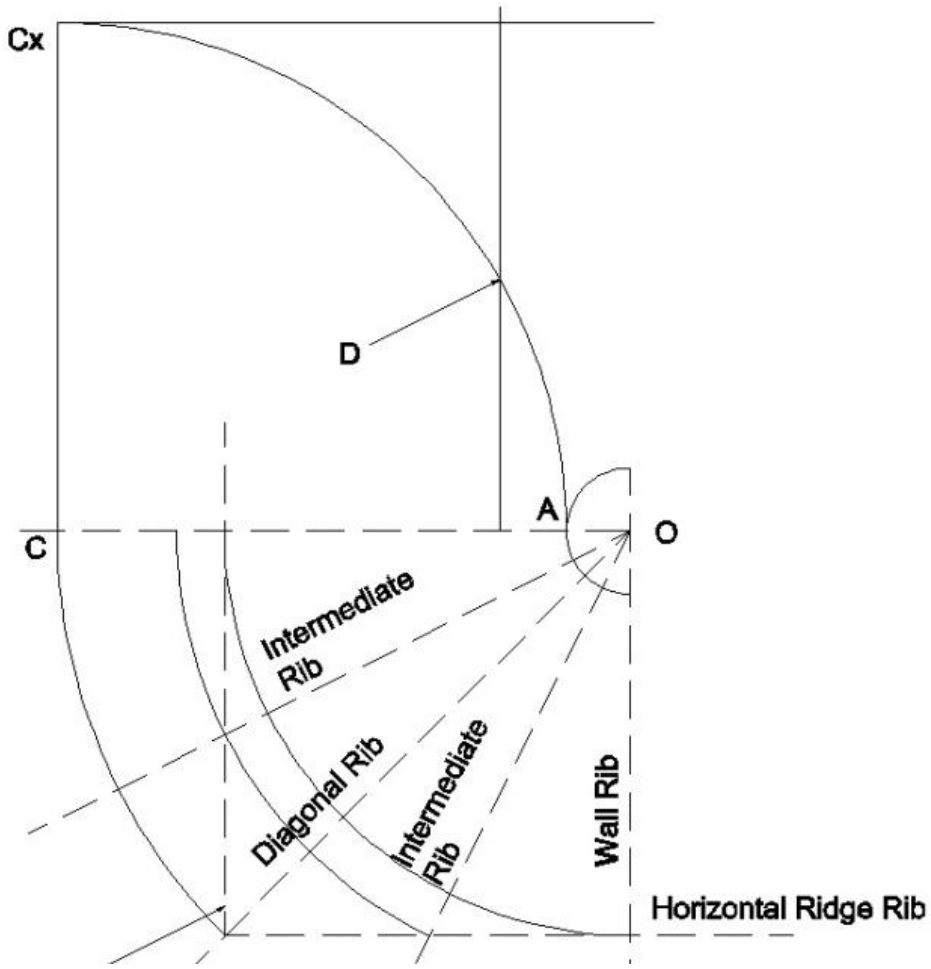
[Figure 4-30]

14. From point C and radius C A, draw the elevation curve of the diagonal rib, to cut a perpindicular line drawn from C in point Cx. This determines the height of the vault.



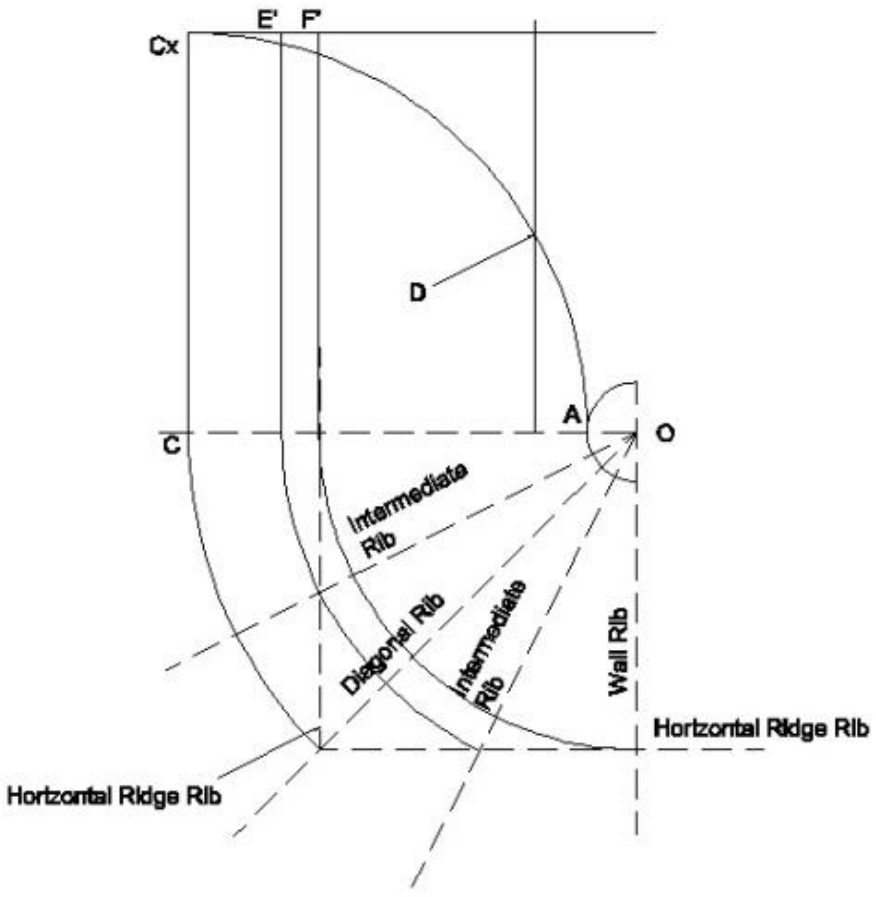
[Figure 4-31]

15. Now draw a horizontal line from Cx, representing the elevation of the horizontal ridge rib.



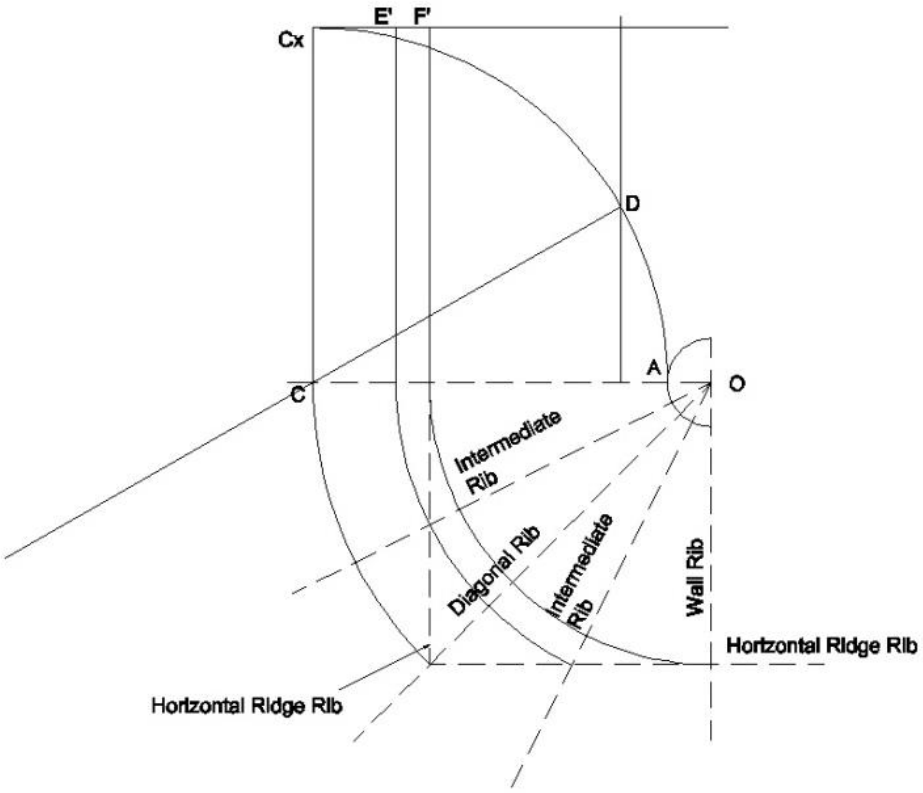
[Figure 4-32]

16. Erect perpindicular lines from the points E and F, where the other ribs are rotated into the line O C, to cut the elevation line of the ridge rib in points E’ and F’.



[Figure 4-33]

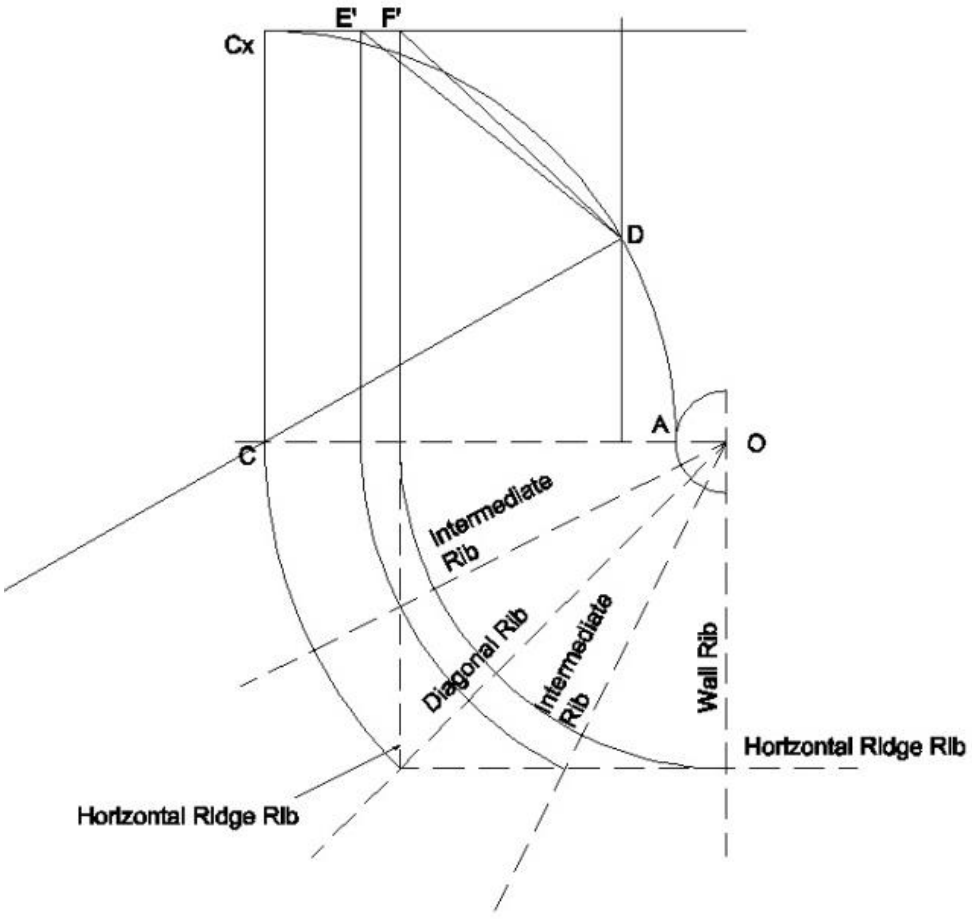
17. Draw a normal line from point D through point C, producing it infinitely beyond C.

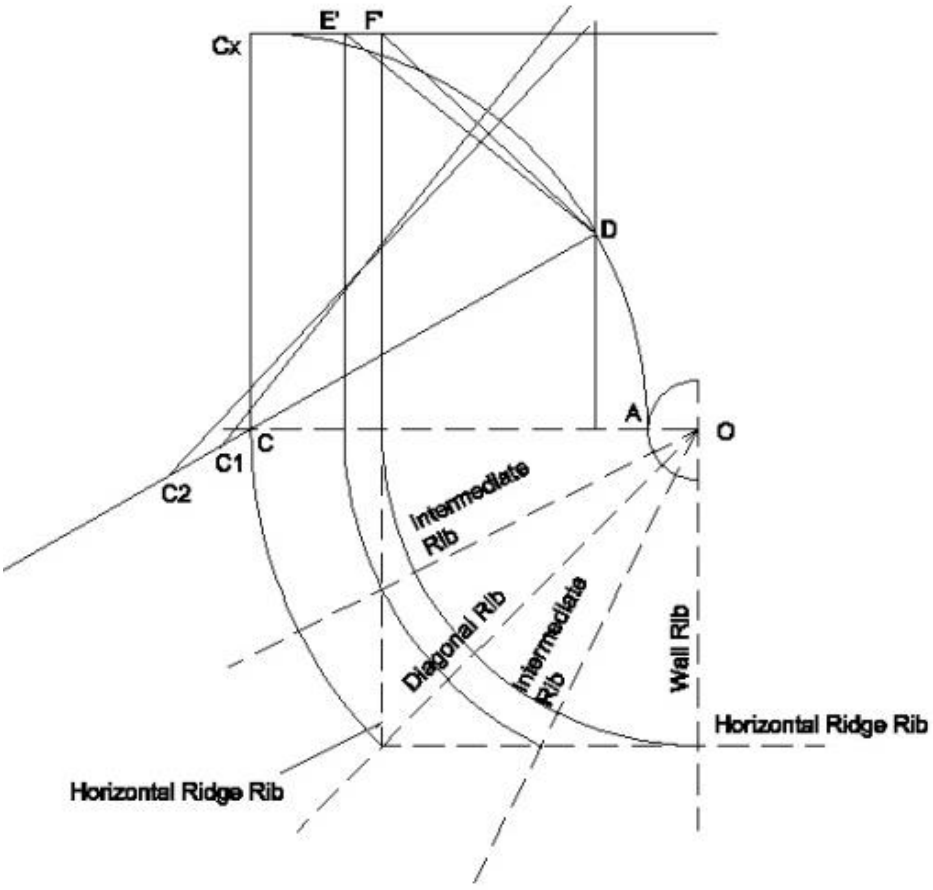

E'
F'
Cx
D
A
O
C
Intermediate Rib
Diagonal Rib
Intermediate Rib
Wall Rib
Hortzontal Ridge Rib
Hortzontal Ridge Rib

[Figure 4-34]

18. Now draw lines bisecting D E’ and D F’, to cut the normal line D C, produced in points C1 and C2.

[Figure 4-35]





[Figure 4-36]

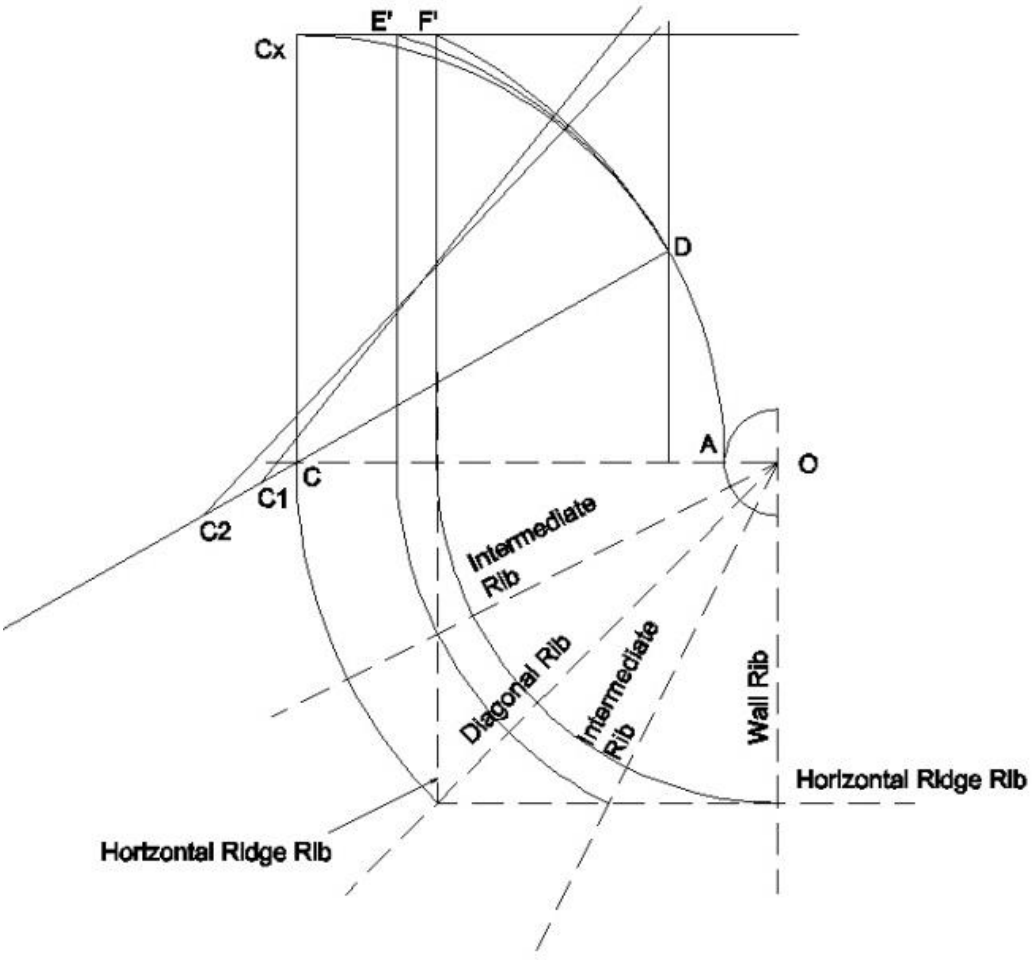
19. These are the centres for drawing the upper portion of the ribs from point D.

20. Project the plan of the boss stones up to the elevation, and place in the normal joints in the diagonal rib elevation, thus determining the bevel for working the normal joints.

The process of determining the stone profiles results from previously determined points, as described. Each stone can be described in plan and elevation from the process, and a more detailed procedure is described by Warland.[293] Through the work of laying out the rib vault can

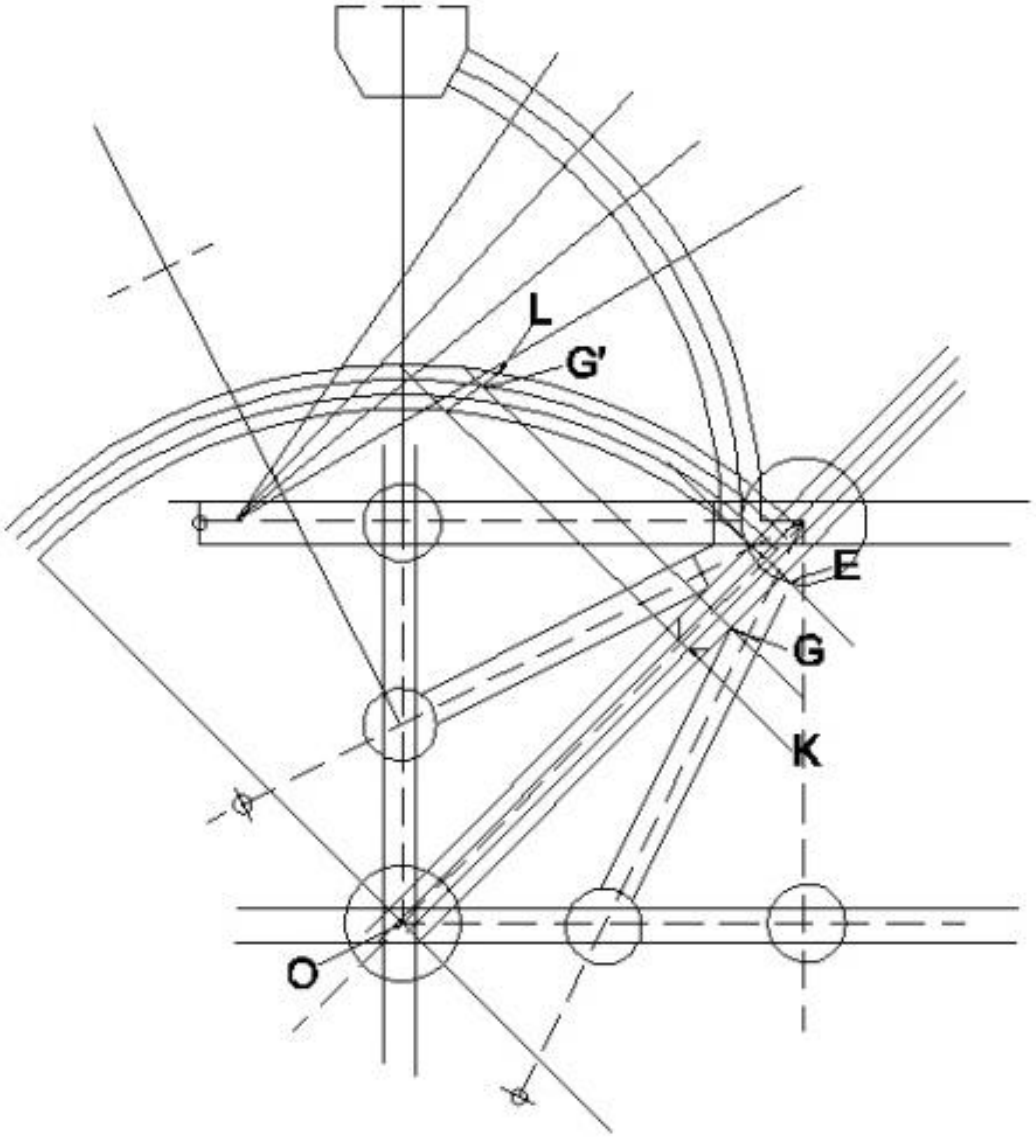
[293] Warland, E. G. (1953). *Modern practical masonry*. London, Pitman.

the master mason be understood to participate in a Christian ritual that actualises the presence of Divinity.



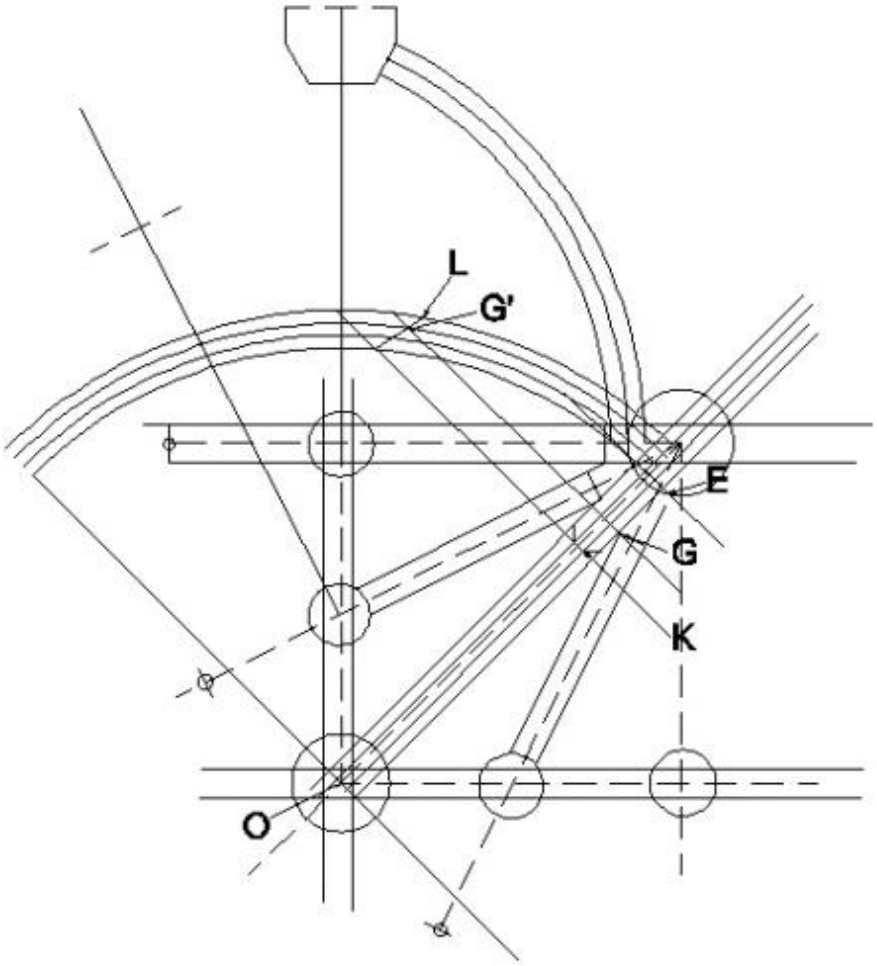
[Figure 4-37]

This thesis has thus far demonstrated the unique tapestry of medieval Christian cosmology, and how that cosmology influenced the organization of the workforce, the tools and drafting of stone, practical geometry, and the laying out of a rib vault. At each instance, we can see self-creation and genesis because the cosmos and everything in it was understood to be divinely created by a God who is uncreated being.



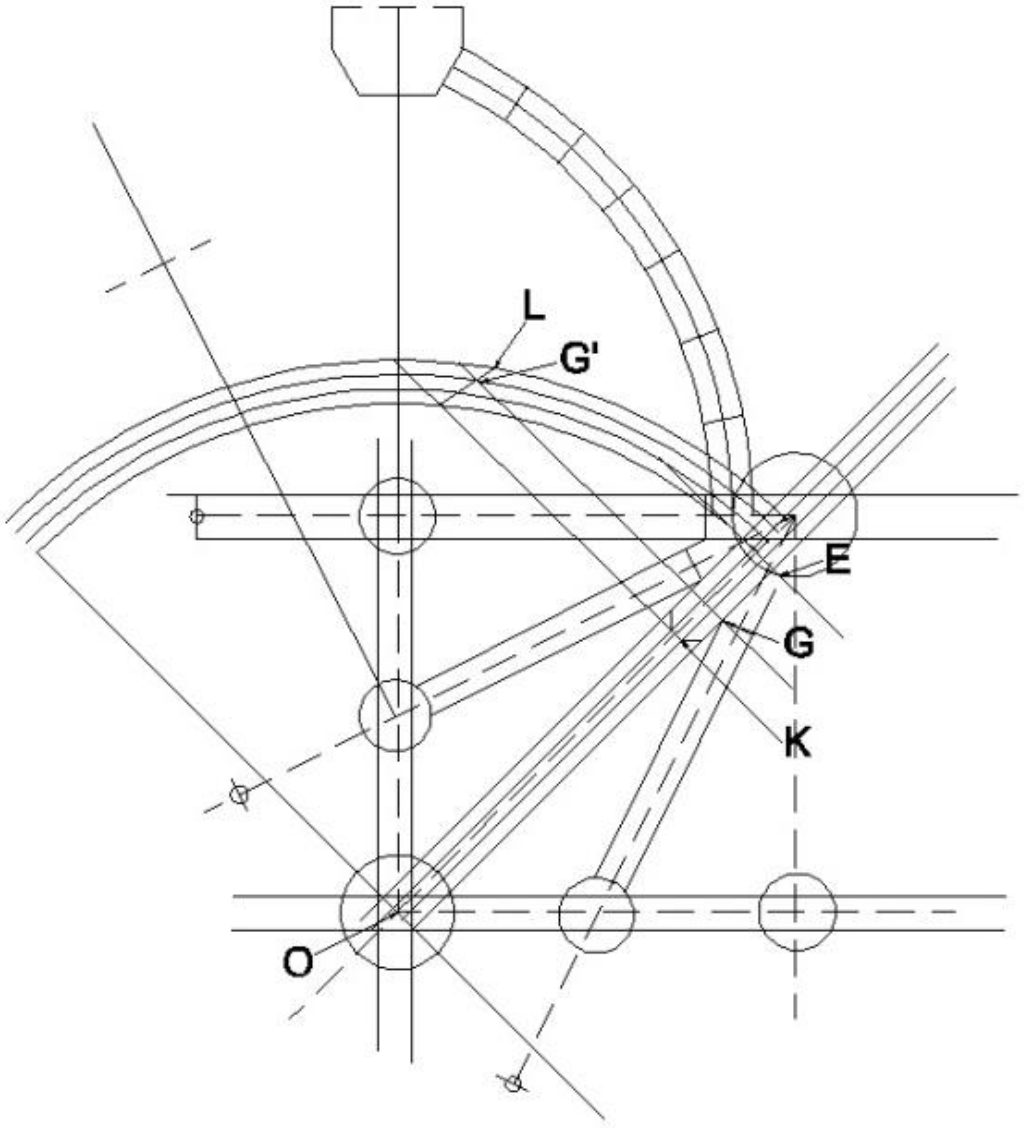
[Figure 4-38]

The difficulty with demonstrating the nature of stone masonry in a written account can be mitigated to some extent with video and moving images. The cutting of stone from the quarry, creating practical geometry, and hewing stone can be better understood by seeing others engaged in the task, or even participating in stone masonry directly. Ultimately direct knowledge



[Figure 4-39]

of the craft and material is possible through human action, and the study of Gothic architecture is incomplete without such participatory knowledge. [294]



[Figure 4-40]

[294] The author has spoken publicly about this thesis at an academic conference in 2015, and the video can be viewed online at this address:< https://youtu.be/fP5rlKxFrWc>. The video depicts the actions of the stone masons.

5 Gothic Style

The previous chapter articulated how the self-creating nature of medieval cosmology influenced the craft of the stone masons. Applied geometry and stone drafting fit within the religious understanding of the medieval mind. This chapter will continue the investigation into the creation of Gothic architecture, and will present the architectural elements of Gothic architecture as religious as well. Rib vaults, pointed arches, and the stones of their construction can be understood within the Gothic narrative.

The rib vault has been of universal importance to medieval architectural historians, and acknowledged as the essential generating feature of Gothic architecture.[295] As a result of their structural specifications, pointed arches represent the greatest innovation in Gothic architecture, for they greatly diminish horizontal thrust on the reins.[296] Despite recognizing the importance of the rib vault for Gothic architecture, contemporary thought has yet to arrive at the significance of the rib vault and its choice above other forms for Gothic cathedrals. While the rib vault was certainly advantageous, it has yet to be described what those advantages were for medieval society. The advantages have unsatisfactorily been suggested as aesthetic, structural, or even economic. None of these modern suggestions take into account the medieval religious worldview, nor do they accept Abbot Suger's chronicle of the first construction of the Gothic style in describing the rib vault as virtuous.[297] Since the Church was beyond any doubt the largest and most intricate institutional structure in medieval society, its cosmological speculations were immensely influential in shaping the attitudes and dictating the actions and attitudes of medieval people at every level of society. The advantage then for medieval society focused on phenomenal widespread building campaigns of Cathedrals to the Christ, was that the rib vault virtuously participated in God's being more fully than previous forms.

5.1 Pointed Arch and Uncreated Being

Ultimately the uncreated being and self-communication of God underpinned all cosmology, and therefore the pointed arch was seen to participate more closely in the mind of God because it was the cause of its own being. The pointed arch was believed to exert thrust along its due course of a straighter line, and therefore was not dependent upon any other source. Furthermore, the construction of a pointed arch, as the first step in constructing a rib vault, is teleologically determined as previously constructed elements serve as centring for subsequent elements. It creates and unfolds itself. This independence of being would have been thought to participate in God's cosmos, and its structural rigidity would have been seen as a miracle of God's presence.

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[295] Porter, A. K. (1911). *The construction of Lombard and Gothic vaults*. New Haven, Yale University Press.
[296] Acocella, A. (2006). *Stone architecture: ancient and modern construction skills*. Lucca, Lucense, p. 349.
[297] This understanding of the rib vault is presented in this thesis, and it is suggested here that Abbot Suger would have agreed with such an understanding.

Furthermore, the construction of the pointed arch above the nave of the cathedral was structurally unnecessary when considering the entire structure. The buttresses and wooden roof structure was constructed prior to the stone rib vaults, and windlass' often remain as proof that heavy stones for the vaults were moved using the wooden roof structure as support. The rib vaults were the crowning decoration of a masonry system that made no distinction between structure and decoration. The stone material was skilfully crafted to display its inner form, and implicitly the thoughts of God. The practice of hands-on construction and instruction has important implications for how the pointed arch, and rib vault were understood. The direct, skilful, and ontological understanding of ashlar stone influenced an understanding of structural stability that utilised the weight of the material.

"*The assumption of a Christian experience of God's presence in all devout believers persisted in the West well into the thirteenth century and in the East much longer. This experience, though differentiated in degree, was held to be qualitatively identical for the "mystic" (a term that was not used as a noun until the sixteenth century!) and for the ordinary believer*. **"**[298] Reading the texts of medieval theologians and devotees suggest unity with a transcendent God, and a fundamental change in being. The communion of every person with Christ as God was a template, or fundamental symbol of the possibility of knowing God in a direct manner. It is important to remember that medieval religious texts always depicted an act of cosmogony, or creating whilst in relationship with God. In an analogous manner, the construction of the cathedrals was seen as an act of God's creation, for the divine manifestation illuminates all of creation including material.

The framework from which medieval man understood himself and his role of crafting material is unquestionably Platonic.[299] The influence of Platonic cosmology can be seen in the design, construction, and organization of labour. Teleological and hierarchical considerations as emphasised by Platonic cosmology travels a great distance in explaining the design, construction,

[298] Dupré, L. (1989). The Christian Experience of Mystical Union. *The Journal of Religion*. 69, 1-13, p. 2.
[299] Somfai, A. (2002). The Eleventh-Century Shift in the Reception of Plato's Timaeus and Calcidius's Commentary. *Journal of the Warburg and Courtauld Institutes.* 65, 1. p.6. "The Platonic foundation of medieval Christian cosmology is confirmed in the medieval manuscripts in which Latin translations were passed onto successive generations. Not only was Plato's Timaeus available in a language accessible to medieval theologians, but it was interpreted by two sources; Cicero (first century) and Calcidius (third century). In addition to the translation, Calcidius included his commentary which allowed readers to access the Timeaus. During the eleventh century, however, focus was redirected upon the Timaeus itself and began to circulate without Calcidius' commentary. This ensured a wider audience, and a Christian interpretation of the Greek cosmology as polytheistic notions were erased through changing words like plural *dei* to singular *dues*. In addition, the word *gignere* (to come into being) was replaced with *creare* (to create) in order to make the account of creation from pre-existing matter more acceptable. Critical of the anthropomorphic tendencies in Plato's creation myth the description of the universe as a 'Living Creature' is omitted."

and organization of the work force. Seeing the cosmos as teleological allowed for construction of the tallest structures up to that time without written or drawn documents, for instance.

It is therefore apparent that human endeavours take on a new divine dimension. The rendering of human activity and construction was explicitly given place within the Church, and as such human activity was understood as the work of God. The salvific potential of the Christian narrative not only applied to material, but to the activities accompanying material as well. Human endeavours therefore realised and contributed to the systematic and ordered Christian cosmology.[300] The integration of material and crafting of material into an understanding of the divine cosmos was also apparent in the sacramental cycles, such as yearly planting cycles, and the daily cycles. Such sacramental cycles were readily apparent in construction of the Gothic cathedrals, as archaeological evidence suggests the teams of masons completed cyclical building campaigns over a series of years.[301] The sacred nature of medieval life was readily apparent not only in the social organization, but in the construction sequence as well.

5.2 Carolingian and Capetian Glosses before Authorised Translations

Despite the planting of the canon by Origen, (circa 2nd century AD), later medieval Christians found religious inspiration in various sources.[302] The absence of one exclusive written source for theological doctrine contributed to a liberal acceptance of divine presence. There was no single condensed source of written scripture or theological thought, but instead many separate texts were transcribed and circulated for archiving at cathedral libraries. The texts were the primary means of transmitting philosophy and theology to successive generations, and marginal notes often accompanied the original, often fragmentary, texts. These marginal notes or annotations, known as “glosses”, contained explanatory information, and is etymologically the source of our

[300] Eliade, M., & Trask, W. R. (1959). *The sacred and the profane: the nature of religion*. New York, Harcourt, Brace, p. 14. Such an understanding of human activity was noted by Eliade and his exploration of the nature of religion: “the consecration of human life itself, the sacrality...[of] man's vital functions (food, sex, work, and so on)."

[301] James, J. (1981). *The contractors of Chartres.* Wyong, Australia, Mandorla.

[302] McDonald, L.M., (2017). *The formation of the biblical canon*, Volume 2. London, Bloomsbury. Origen, (185-253), decided canon and established biblical typology, but was condemned in 543 A.D. “As noted, it is possible and even likely that Origen produced his own list of NT books that he believed were sacred Scripture, but it was not until the end of the fourth century that there was broad agreement on most of the twenty-seven books that make up our present NT…Exactly when lists of *Christian writings* began to emerge has been a hotly contested issue for years among scholars who debate whether the Muratorian Fragment (MF) should be dated near the end of the second century or in the middle to late third century, or finally from the middle to late fourth century. There was a shift of opinion after several years from broad agreement on the second-century dating of this document with several scholars favoring a fourth century date. More recently, however, a middle point for dating the MF has been suggested, namely that the author of the MF was dependent on Origen and it was written sometime after him, possibly by Victorinus of Pettau.”

word "glossary".[303] These marginal annotations took up more and more space as time and tradition carried on, and would have provided exegetical guidance to those reading on how to participate in the Church and make the text one's own. The Latin Vulgate was the scriptural source translated circa 400 A.D., and would have been the primary source of scriptural doctrine. However, it was not until historical events such as the Council of Trent in 1545-1563, and the translations into vernacular languages during the thirteenth and fourteenth century that the potential sources of inspired scripture were solidified. The identification and isolation of a few select sources along with the eventual authorized versions would eventually remove the tendency to seek divine inspiration in not only multiple written sources, but material and non-literary sources as well. The point to be made here is that because textual sources were not accessible, other sources deserving of veneration were given a status that later eras would dismiss.

Furthermore, the importance of Chartres cathedral and the school there, in seeking sources of Divinity, is explored by Peter Ellard. Ellard argues that the school there presented "*an optimistic view of the cosmos as a place where humans can encounter the divine presence; a clear sense of the singularity, order, and goodness of the cosmos; an understanding that the act of creation was done by a God who is at once wholly other and unknowable, who is present at creation, and knowledge of whom is available to those who love wisdom...[and] the idea that there exist many layers[hierarchy] to things, words, and experiences and that these layers must be pulled back to reveal hidden meaning."*[304] According to Ball, the school at Chartres advocated an acceptance of all sources of Divinity, including the cosmos, and material reality. The ability of Chartrians to see God's divine presence everywhere has led authors such as Philip Ball to conclude that at Chartres a proto-science was developed that would much later evolve into a modern science that

[303] Network for the Study of Glossing/Alderik Blom, Franck Cinato. 2015. Register of Researchers. [ONLINE] Available at: http://www.glossing.org/. [Accessed 1 April 2018]. "Glossing was a widespread cultural practice wherever books were being read, studied and taught, from western Europe to East Asia. Glossing fulfilled a variety of functions, including translation, guided reading, textual interpretation, education, and transmission of knowledge. Glosses—whether words or symbols—also reflect complex interactions between a wide variety of languages, from local vernaculars to international languages of high prestige. Despite the huge number of glossed manuscripts that survive and their rich evidence for cultural and linguistic traditions, the field of glossing research remains underdeveloped. Much of the primary evidence has never been properly studied; we lack good interpretative frameworks; and exchange between different scholarly disciplines remains at a very early stage. The purpose of this network is to promote more and better collaboration between specialists in the field. We aim to share information about new resources and events, to exchange ideas, to identify research opportunities, and to explore areas of mutual interest. Our central focus is on manuscripts of the medieval period (c. 5th to 15th centuries), and embraces not only glossing as narrowly defined but also closely related genres such as collected glosses (glossae collectae), glossaries, and commentaries. We welcome participation from any researcher with an interest in glossing and related practices—regardless of language, region, or period."

[304] Ellard, P. (2007). *The sacred cosmos: theological, philosophical, and scientific conversations in the early twelfth century school of Chartres*. Scranton, University of Scranton Press, p. 43.

emphasises material to the exclusion of God.[305] Ultimately it was this optimistic view of the cosmos where every source of divinity was seen as valid[306], that previously forbidden or unacknowledged forms such as material, masonry craft, and new architectural elements like the pointed arch, were granted a new status as they were seen to participate in the mind of God.

5.3 The Miracles of Relics and Rib Vaults

The miraculous ribbed vault would have been understood in the same manner as the other elements of the cathedral. Religious artefacts and miraculous relics were placed within the radiating chapels of the chevet; the chevet of course a notable element developed during a period of intense pilgrimage and throngs of devoted pilgrims seeking miracles in the presence of relics.[307] Not only was the plan of the Gothic cathedral facilitative of access to sacred relics, but the architectural elements too would have been seen as miraculous. The stained glass in colours unavailable to the multitudes would have been held as sacred in their own right as crafted elements, but we should not forget the importance of glass for depicting biblical scripture to illiterate masses. It follows along with the innovative chevet design and heretofore unattainable amounts of stained glass, that the ribbed vault would have been seen as miraculous as well. In league with sacred relics, the ribbed vaults would have been objects for devotion and direct access to Divinity. Their unique adoption and widespread dissemination by medieval Christianity

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[305] Ball, P. (2008). *Universe of stone: a biography of Chartres Cathedral*. New York, Harper, p. 115. "To that extent, it was genuine proto-science and not pseudo-science that was incubated at Chartres. But one could hardly study Plato without embracing some of his mysticism. We shall see that the Neo-Platonic notion of divine light might have played a role in shaping a new cathedral. And it seems that the Chartrian scholars regarded the natural universe not so much as a machine but as a creative entity: a central belief of later Neo-Platonism, in which the universe is seen, in the words of the twelfth-century theologian Gerhock of Reichersberg, as 'this great factory, this great workshop'. William of Conches drew a parallel between the artisan and God: 'All work is the work of the Creator, the work of nature, or of man-the-artisan imitating nature'."

[306] Ball, P. (2008). *Universe of stone: a biography of Chartres Cathedral*. New York, Harper, p. 290. "How does one account for these simultaneous changes in two seemingly disparate disciplines – in architecture and philosophy? Since we cannot be sure that there was much genuine intercourse between the two activities, we should not simply wave our hands as though to suggest that 'something was in the air'. No, we can do rather better than that. First and foremost, Christian theology was the bedrock on which all of cultural life was constructed, and it is eminently clear that builders were mindful of that just as were logicians, grammarians and proto-scientists. Church schools and abbeys were the repositories of the technical as well as the metaphysical literature of the ancient world, and those books often recognized no boundaries between the two spheres of thought. Moreover, these conceptual links were particularly explicit in the Platonic tradition, which apotheosized geometry and geometrized theology. And Platonism was a remarkably versatile glue, binding together the ideas of men as theologically distinct as Suger, Bernard of Clairvaux and William of Conches. We will probably never know whether architects had much understanding of Plato's ideas on order, but it seems unlikely that they were wholly ignorant of them in some form, however debased, and we have seen some of the channels along which these ideas might have spread."

[307] Doig, A. (2008). *Liturgy and architecture from the early church to the Middle Ages*. Aldershot, England, Ashgate, p. 99. Relics were a physical connection between the pilgrim and the reality of the Holy Scripture and the continuing presence of the holy in more recent people of faith. Pilgrimage had been a growing part of private devotion since the time of Constantine.

attest to the miraculous and transcendent value placed upon the unique, and heretofore unachieved, combination of masonry forms achieved by masons.[308]

The notion that an immaterial order existed beyond that of material in which number, form, and geometry dwelled was implicit for the medieval mason. The immaterial was also sacred as number, form, and geometry existed within the mind of God. Everything was sacred, or at least potentially sacred, including material. The character and personality of Jesus Christ most personifies the medieval mind because the unique relationship between immaterial and material was presented in this supreme example. Christianity as it presented the cosmos was most influential in how the medieval masons ordered their traditions, guilds, design, and construction.[309]

It is important to recognize the unique cosmology within the Christian gospels.[310] The gospels that demonstrated the mystery, validity, and Divinity of Christ were conspicuously absent of any presentation of the surrounding world, unlike Greek or Hebrew religious texts.[311] This cosmological absence of the gospels left a void that was filled by medieval thinkers with pagan and ancient philosophies, and by medieval masons that presented a Christian tradition of material reality. The compatibility of these ancient sources with Christian scriptures emphasised a metaphysical understanding of the cosmos which provided the setting for the integration of Platonism with Christianity.

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[308] Suger, & Panofsky, E. (1946). *Abbot Suger on the abbey church of St.-Denis and its art treasures*. Princeton, N.J., Princeton University Press, p. 101. Quote: "Divine action had bestowed upon the ancient consecration of the church by the extension of Christ's own hand -- to respect the very stones, sacred as they are, as though they were relics".

[309] Doig, A. (2008). *Liturgy and architecture from the early church to the Middle Ages*. Aldershot, England, Ashgate, p. 152. The Christian presentation of the cosmos is as follows: "At Santa Maria Maggiore and the other great basilicas of Rome, procession through atrium and narthex, down the nave and toward the apse, was the culmination of a richly contextualised ritual of procession through the city, particularly at times such as Christmas when this basilica was the centre of papal liturgy."

[310] The prologue in John chapter 1 is great example of Christian cosmology which describes how all things were made by God.

[311] Wright, J. E. (2002). *The early history of heaven.* Oxford, Oxford University Press, p. 201. "In the course of the Second Temple Period Jews, and eventually Christians, began to describe the universe in new terms. The model of the universe inherited from the Hebrew Bible and the Ancient Near East of a flat earth completely surrounded by water with a heavenly realm of the gods arching above from horizon to horizon became obsolete. In the past the heavenly realm was for gods only. It was the place where all events on earth were determined by the gods, and their decisions were irrevocable. The gulf between the gods and humans could not have been greater. The evolution of Jewish cosmography in the course of the Second Temple Period followed developments in Hellenistic astronomy. Rather than there being a single flat heaven suspended above a flat earth, Hellenistic astronomers began to image the cosmos in terms of several concentric spheres surrounding the earth. The earth was the center of the universe, and everything revolved around it. The divine resided in the farthest heavenly realms, far beyond human sight or imagination."

Contemporary understanding of the Gothic Cathedral has been most influenced by the treatise of Otto von Simson (1912-1993) in which the Gothic cathedral was explained in terms of the medieval concept of order.[312] This framework was essentially correct, for understanding the material artefacts of the medieval period requires acknowledging the blindingly obvious character of the period as *religious*.[313] The direction pointed by Simson has influenced subsequent investigations, for to what extent theology influenced the cathedrals has remained an open and as yet unanswerable question.

However, Simson's hypothesis about Abbot Suger being the creator of the Abbey at St. Denis, and therefore the creator of Gothic style, is ultimately incorrect.

For the first time in history did the elements of Gothic architecture present themselves in one location at St. Denis; pointed arch, rib vault, and flying buttress. Subsequent criticisms emphasised the lack of evidence of design or technical knowledge by Abbot Suger, and the Abbot's involvement in construction has been called into question. Written evidence does not support the Abbot as a builder, but only as a theologian and a helping hand. It has not been shown that Abbot Suger participated in the building tradition, nor knew how to erect masonry or wood structures. Despite correctly rooting Gothic architecture in the religion, criticisms remained about the relationship between medieval religion and medieval architecture. This thesis approaches Gothic architecture in a manner similar to Otto von Simson in recognizing the importance of metaphysics and theology for medieval architecture. However, the emphasis is not placed upon describing the metaphysic of one single medieval theologian and seeking any relationship to the built form as Simson did, but instead attempting to emphasise the character of the period as depending on a cosmology rooted in Christian transcendent presence and a subsequent understanding of material presence in the same manner. Describing how God was present in the Gothic cathedral provides a hermeneutical key to understanding the cathedrals and

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[312] Simson, O. G. V. (1962). *The Gothic cathedral; origins of Gothic architecture and the medieval concept of order*. Bollingen series, 48. New York, Pantheon Books.

[313]Wildiers, N. M. (1982). *The Theologian and His Universe: Theology and Cosmology from the Middle Ages to the Present*. New York: Seabury Press, p. 58. & p. 367. "Dionysius, the Areopagite, had also taught that it was a law of divinity to connect the lower with the higher by means of intermediaries. The principle of hierarchy is therefore to be found everywhere -- not only in the Church, but in the choirs of angels and even in God. Moreover, it is precisely because everything has been arranged in hierarchical order that theology can erect a ladder from earth to heaven." "The more one becomes absorbed in the study of medieval culture, the more one realizes that the intellectual life of the period was... entirely governed by a unanimously accepted view (of) the general structure of the universe and of the place of man ... the great spiritual unity and harmony ... (of) medieval culture was predominantly derived from this ultimate cosmology, leaving its mark ..on philosophy and theology, on literature, plastic arts, and even on the sociopolitical life ... Medieval man lived in the quiet certainty that his picture of the universe ... corresponded completely with reality ... It was inconceivable that one would doubt ... (its) correctness."

their relationship with medieval culture, and it follows that construction of the cathedral plays an important role in the manifestation of Divinity.

A similar attempt by Erwin Panofsky in *Gothic Architecture and Scholasticism* found itself unable to answer similar questions of architecture and religion, despite the emphasis upon theological development and the rise of Scholasticism. The culmination of Scholastic thought was recorded in St. Thomas Aquinas' *Summa Theologica*, but the problem with seeing a direct relationship between theology and architecture in this instance lay with dates of construction. The Abbey of St-Denis, as the origin of Gothic style, was dedicated in 1144 whilst it was over one hundred years later that the *Summa Theologica* was written. It follows that even though the emergence of Gothic architecture and Scholastic theology occurred sequentially in place and time, it cannot be taken that one directly influenced the other.

It was as if contemporary architectural historians were aware of the importance of religious context in understanding medieval architecture and the rib vault, but were unable to formulate that context in words. To adequately contextualize the Gothic cathedrals, one theologian or theological treatise was obviously not enough, but given the distance from past religious thought to the twentieth century, a wider contextual base would seem incomprehensible or inaccessible. Not only was a familiarity with past religious thought absent, but any method for accessing past religious thought was absent as well. Comparative religious studies and analytical analysis of medieval religious texts yielded few results that were consonant with medieval religious thought, nor accounted for the rib vault.

What we are certain of is that God was mysteriously present in the medieval Gothic cathedral. It has yet to be determined exactly how He was present, and how transcendental truth is related to medieval building. Both Panofsky and Simson were not as convincing as could be because they treated medieval theology as a theory. Panofsky did so by transposing the hierarchical structure of Scholasticism onto the Gothic cathedral, and Simson did so by suggesting the metaphysical speculations of medieval theology were expressed in aesthetic decisions such as increasing the area of glass thereby illuminating the cathedral. What Panofsky and Simson demonstrate is a distance from the theology, and a treatment of theology not in accord with the medieval cosmology. The presupposed idea that masons had an existing theory about the world, and built in accordance is false. Medieval metaphysics was not concerned with theory, or with the speculations of man. Instead understanding the Divinity of creation was most important, and demonstrating God's order presupposed any activity. Order was primary for the medieval man, and it was his job to discover it, unlike contemporary views of theorizing prior to action.

Despite the emphasis of Panofsky and Simson on the symbolisation of the cathedral as heavenly Jerusalem, celestial city, and ineffable truth, neither approached an appropriate closeness with the theology to allow for direct connections between architectural elements and metaphysical speculation. The characteristic of medieval Christianity to emphasise the source of being as transcendent is lost upon contemporary scholars as well as to see how the transcendent source of being manifested in geometry, and the elements of Gothic architecture. While Eriugena is acknowledged by Panofsky and Simson, neither discusses the importance of Eriugena's treatment of uncreated being and God. The absence of God in discussions about medieval architecture is symptomatic of the inappropriate treatment of Gothic architecture, for it was the most important topic of medieval thought. Not only was it the most important, but in the medieval understanding of God lay the understanding of geometry and Gothic architecture. As God is uncreated being and source of all being, we can see God's uncreated nature in created being. That uncreated nature is witnessed in geometry and the pointed arch.

While geometry has been acknowledged by all contemporary scholars of medieval architecture to play an important role in the design and construction of the cathedral, why it was important and how it was used has not been stated. What contemporary scholars missed was the "uncreated" and generative nature of geometry, thereby placing it within the medieval cosmology. The elements of geometry determine themselves, and geometrical constructions do not rely upon outside sources for their being. From an initial determination of distance and place, any geometrical construction can be accomplished through swinging an arc from previously known points. The being and definition of point and distance determine subsequent configurations, and it follows that the pointed arch was thought to be appropriate for the same reason. As the pointed arch was believed to exert its thrust in due order along a straighter line, it too participates in uncreated being, for in lacking the necessity of buttresses it could stand of its own accord.[314] Its being was not dependent upon another element, but instead was rigid due to its own internal being, form, virtue, and essence. Because the pointed arch and subsequent ribbed vault participated in uncreated being more fully than previous architectural elements, they were held to be superior and subsequently positioned at ever higher distances from the ground, hence the need for buttressing. The miracle of God's presence was celebrated by the lofty positioning of the ribbed vault within the highest reaches of the cathedral.

Furthermore, such use of the pointed arch and geometry was not decided by one person, but as has been shown by more recent scholarship the tradition of craftsmanship played an important part in Gothic architecture. The tradition passed on the rituals of construction, and enabled the

[314] Buttresses reinforce the nave walls of the Gothic cathedral, as their height predisposes them to failure. The pointed arch sits atop the nave wall, but it is not reinforced directly by the buttress. See footnote 276 of this thesis which acknowledges how a pointed arch exerts less outward thrust than a hemispherical arch.

mason to discover Divinity through his work. The metaphysics and cosmology of the medieval period was not a theory by one person, or a group of people but was instead a manner of looking at the world and seeing in it the presence of God. Therefore, there was no part of society that was not theologically inclined, and even if Abbots and Bishops did not design the cathedrals, the masons who certainly did would have understood themselves as a priesthood insofar as they were performing sacred work.[315] Ultimately it was a co-incident, corresponding, and analogous metaphysic that underpinned medieval theology and medieval masonry. It was accepted as theologically desirable, insofar as masonry forms participated in self-created being through the given-ness of material, form, and craftsmanship. The tradition and ritual of craftsmanship, then, allowed for the transmission of revealed material knowledge to successive generations.

5.4 What are Relics?

For medieval man, the most prized and sought-after relics were remains of saints. These physical objects, like bone or clothing, were venerated and understood to have divine characteristics. Liturgical ceremonies often grew and developed around these relics. The popularity of relics, and of pilgrimage to holy places where these relics lived, motivated Abbot Suger in recognising the very stones of the religious building as relics. His committing to writing the story of consecrating the Abbey of St-Denis, and the myth of Christ's presence at St. Denis, allow for the stones of Gothic architecture to be seen as presenting divinity.

The Church today does not see all work as liturgical, but instead sees liturgy as official ceremonies of the Church. The argument presented here is that the medieval master mason would have been Christian, and therefore would be inclined to not only private devotions, but to also organising his work methods and workforce according to Church precedent. It is in this sense that the work of the medieval mason was "liturgical", or of a ritual-liturgical sense, and we can see how the masonry stones, as co-extensive with relics, were the centre of a liturgy in construction. Even though the liturgy in construction is not a separate and discrete liturgy from the Eucharist, it benefits our understanding today to see the work of the mason as sharing in the higher, ritual-liturgical sense.[316]

[315] See footnote 343. "That is why, as René Guénon suggests, every occupation is considered a priesthood in traditional cultures." We must not forget that medieval society divided those who prayed from those who worked, and that we shouldn't conflate the roles and responsibilities of mason and priest.

[316] It could be said that not all stones were relics, and that St. Denis was a special case. Not only was St. Denis unique in it's formal masonry, but it was dedicated in the presence of many Christian leaders, and was given "theological support". The current thesis has not surveyed all medieval Christian cathedrals, and can't conclude about the extent to which specific medieval building stones were seen, or not seen, as relics. The answer to this question, if St. Denis is a special case or not, is hypothesised to be in the affirmative. St. Denis is a special case, but medieval cathedrals generally would have been understood hierarchically. Where each medieval cathedral sat within the Christian cosmology is indeterminate in the current thesis.

Saint Denis came to be an important figure for medieval Christians through the myth of his martyrdom. Circa 250 A.D. he was decapitated as part of the Roman persecution of Christians, and according to Christian tradition, St. Denis, then Bishop of Paris, walked ten miles with head in hand while preaching a sermon, to come to the final resting place where he wished to be laid to rest. Over the years this Bishop of Paris came to be confused with another Dionysius, as the name Denis derives from Dionysius. When Abbot Suger wrote of St. Denis, the latter was wrongly assumed to have met the apostle Paul, became the Bishop of Athens, wrote a number of important treatises, then later became Bishop of Paris. The complex web of myths that became attributed to St. Denis during the Gothic episode has been used by contemporary scholars to explain the church building of the time. Abbot Suger thought St. Denis wrote treatises on light, so according to contemporary scholars, metaphysics of light must have influenced the building of the Abbey of St-Denis. The argument presented in this thesis disagrees with this thinking and is thus: it is more accurate to see Gothic architecture as the result of a "liturgy in construction", rather than the result of applying a specific theological treatise to the design decisions of the master masons.

Thirteen bishops and five archbishops were present when the Abbey of St-Denis was consecrated. Such an extensive presence of Christian leadership is witness to the veracity of the work of Abbot Suger. His assertion that the masonry stones were relics is not contrary to Christian tradition, as the presence of Christian leadership implies some consensus, if not also *at least* the absence of heresy. Furthermore, legends of Christ's presence at the abbey also indicate the extent to which the stones are considered relics. Christ's presence and consecration of the church is relayed in the legend of the leper, who was sleeping in the church the night before the planned consecration. The leper was woken by the presence of Christ's light, angels, and St. Denis himself, and all of which participated in consecrating the newly built abbey. Christ simultaneously healed the leper and removed his skin malady to reveal perfection underneath. The scene is attested to by a distorted area on a marble column within the new abbey. Christ affixed the leper's former skin to the marble column, and thereby created stone masonry that was accepted by medieval man as a relic.[317]

We can therefore see the work of the mason as "minor-liturgical" because historical evidence suggests that the stone material was potentially a relic, and the development of a collective and charitable Christian action within the building tradition, would have been necessary for the stone to reach its potential of being worthy of veneration. The heights of Christian achievement could

[317] Doig, A. (2008). *Liturgy and Architecture from the Early Church to the Middle Ages*. Aldershot, Hants: Ashgate, p. 178.

not have been reached without recognizing in raw stone the teleology, at least in part, of the venerable quality present prior to the Christian act of construction. The Divine Cosmos which the stone was part of, prior to construction and human activity, imbued the quarry with some spiritual significance.

5.5 Abbot Suger & the Abbey at St. Denis

The importance of God and miracles for medieval man cannot be emphasised enough. Through God and miracles did he understand his surroundings, and in the specific instance of the chronicles by Abbot Suger at the Abbey of St-Denis can we see evidence of architectural elements described as miraculous. The scene of the miracle in question involves not necessarily a miraculous architectural element, but a miraculous rigidity in the face of a terrible gale. The importance of this example for contemporary medieval scholarship is established in its use by many authors, and the general and widespread consensus of the birth of Gothic style at St. Denis as overseen by Abbot Suger. In every instance, the miraculous has been ignored, and no understanding of Gothic architecture or its elements in a miraculous context has been allowed. Instead every author cites the example of the miraculous arch to describe a point in the building process in which the ribs are constructed prior to the web between the ribs. While such a point is noteworthy, the thinkers of the medieval period would have held the miraculous conception of far more consequence. As such it is presented here as an example of how it was understood God could manifest through material, and that indeed architectural elements were actually understood as miraculous.[318]

The miracle is extremely important because it is a moment where the presence of God is brought to attention. In the example of Abbot Suger and the miracle of the Abbey at St. Denis it is clear that God is manifest through the immanent structure of the arch. The miracle is not possible because of a violation of nature, but instead is possible because of a fulfilment of nature as a virtuous example; the arch was near its archetype. The nature of the arch is more truthfully expressed through the miracle because its virtuousness shines forth and it has more arch-ness than otherwise. While immanence is generally associated with pantheism and mysticism, Christianity addresses both transcendence and immanence and devotes considerable attention to understanding the relationship between the two. It follows that such considerations would not

[318]Doig, A. (2008). *Liturgy and architecture from the early church to the Middle Ages*. Aldershot, England, Ashgate, p. 171. Quote: "Throughout his writings, Suger laced the text with biblical quotations and references, and by playing on words dissolved the boundaries between biblical metaphor and sanctuaries built with and without hands, and hard labour and hard stone. There could hardly be a better defence against his critics than to say it was a direct response to the richness of God's Providence, sometimes through miraculous assistance and divine intervention."

have been foreign to an understanding of the built environment, and through Abbot Suger do we have written evidence of knowing architectural structure as immanent.[319]

Abbot Suger was terribly interested in building in accord with God's created order, and he looked east for direction.[320] The capital of Christian Rome had been Constantinople since A.D. 324, and the unique culture of icon veneration was uninterrupted until the civil war of 723. The argument over the use of icons contributed to the civil war of 723, and it was over one hundred years later in 843 when religious icons were re-established as allowable and even necessary. Constantinople was known for its bronze and gold opulence, and to this example did Abbot Suger look. The religious icon allowed for an intimacy and assimilation with God through art. This was not lost on Abbot Suger for he relished tales of travel to Constantinople, and the splendour and ornament of Hagia Sophia in the celebration of mass.[321] Rebuilding the Abbey of St-Denis to accommodate larger Masses invited Abbot Suger to celebrate God's presence, and Hagia Sophia became an example for emulation, even if he had drawn images. His goal was to create vessels worthy of carrying God, and he did so by emphasising the importance of craftsmanship.[322]

5.6 Common Interpretation

Interpretations of Abbot Suger and the chronicles he left us regarding the reconstruction of the Abbey of St-Denis generally fall into one of two camps. The first camp is populated by scholars such as Erwin Panofsky whose attempt to see in the work and writing of Abbot Suger the influence of Dionysius the Areopagite's *Celestial Hierarchy.* The second camp is populated by scholars such as Lindy Grant who interpret the work and writing of Abbot Suger from a secular standpoint, and seek to include facts about political and monetary contexts in order to attempt an accurate representation or biography. The inappropriateness of the second camp can be seen in that it dismisses the religious awareness of all medieval thinkers when attempting to understand Abbot Suger. The inappropriateness of the first camp is slightly subtler in that Dionysius the Areopagite's theology is utilized as a sort of theory in order to explain the innovations at the Abbey of St-Denis. Though Abbot Suger would have little influence on the skilled tasks such as

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[319]Doig, A. (2008). *Liturgy and architecture from the early church to the Middle Ages*. Aldershot, England, Ashgate, p. 172. Quote: "It [Abbey of St-Denis] was clearly carefully designed to accommodate the action of the liturgy, and the whole intention was to create in the worship in this world an intimation and parallel of the next."

[320]Suger, Abbot. *De Admin.* XXVii, p. 47. Quote: "The dull mind rises to truth through that which is material, and seeing this light, is resurrected from its former submersion." Here is evidence for how Abbot Suger understood material to exist within the Christian cosmos.

[321] Suger, & Panofsky, E. (1946). *Abbot Suger on the abbey church of St.-Denis and its art treasures. by Erwin Panofsky*. Princeton, N.J., Princeton University Press, p. 65. "I used to confer with Jerusalemites, and I was eager to learn from those who had seen the treasures of Constantinople and decorations of Hagia Sophia whether these here were worth anything in comparison."

[322]Doig, A. (2008). *Liturgy and architecture from the early church to the Middle Ages*. Aldershot, England, Ashgate, p. 173. "St. Augustine describes...the basilica as an image of heaven and goes on to relate the manual labour of its construction to the spiritual process of edification. For Augustine, as for Suger, the two are inseparable."

creating templates, his chronicles are useful for illustrating attitudes and values about building and construction.

Addressing the work of Abbot Suger outside of a religious context, and instead inside a context of power struggle between the position of religious leader and religious devotee which Suger was both, is problematic. The issue presents itself when we consider disregarding the immense place religion had in the lives and cultures of the time. That every text left to us is of a religious character, or deals with a religious subject, or operates within a religious worldview is of great consequence and should be well considered before being discarded. The very character of the Middle Ages is religious, and the Middle Ages cannot be considered without it.

How man saw himself, the cosmos, and God are indicative of how the worldview was permeated with a religious and sacred character. Through faith in Christ man saw himself as Christ-like, and sought in all actions the grace of God. Through the Christian mystery not only was man saved, but also the entire creation became invested with the presence of God through miracles. The understanding of God as human allowed for the presence of Divinity in everyday human activity. In all things was this synthesis between man, the cosmos, and God ever present to the minds of men. As Max Wildiers points out, "*One cannot really understand the medieval mind, characterized by its pursuit of a perfect hierarchical order, if one does not take into account the underlying cosmology.*"[323]

The first camp of scholars, such as Panofsky, whose interpretation of Abbot Suger as if he is applying a theory, is inappropriate as well. The connection between material and spirit is lost when a theoretical evaluation is applied to the writings and works of Abbot Suger, for theoretical speculation assumes a distance between observers and observed. There is no such distinction for Abbot Suger. Despite a familiarity and sincere acceptance of Dionysian light metaphysics, we cannot accept that Abbot Suger utilized theology as a theory in which to guide design decisions about how many windows to include.

Furthermore, the fundamental medieval synthesis between the Word and God is severed if we attempt to see theology as theory. In the same manner that Christ was the incarnation of God, so too is the Word the incarnation of God. The synthesis and wholeness of the related parts cannot be separated if we are to understand the writings and work of Abbot Suger. That certain terminologies are disregarded is indicative of interpreter's presuppositions when approaching the text. Abbot Suger repeatedly speaks of miracles throughout his chronicle of the construction of the Abbey of St-Denis, yet neither of the aforementioned scholarly camps addresses the

[323] Wildiers, N. M. (1982). *The theologian and his universe: theology and cosmology from the Middle Ages to the present*. New York, Seabury Press, p.9.

importance of miracle when addressing the text left to us by Abbot Suger. The miracle is an incredibly important word and event not only within the Christian tradition, but also within the chronicle in question. The miracle is integral to any appropriate understanding of Abbot Suger, or St-Denis.

Furthermore, still other scholars find little of Abbot Suger worth considering. Certain passages within Abbot Suger's chronicle attract more attention than others, as the most cited passage is the relaying of a storm which threatened the rebuilding of St. Denis. The danger to the building work is expressed vividly, and the gale force wind frightened all concerned. The half-completed constructiom existed as rib arches without stone webbing or scaffolding between them, and the force of the wind caused them to sway. That they did not fall is evidence for Abbot Suger of the power of God.[324] What has been taken from this passage is the acknowledgment that the arches within a rib vault will stand without exterior support, and the process of construction is recorded. No mention of the importance of miracles is present, nor is the presence of miracles seen to have any relation to the process of construction.

A further example of Panofsky's influence upon contemporary understanding of Gothic architecture can be seen in authors whose intent is to demonstrate the importance of religion for the medieval cathedral. Panofsky's translation of Abbot Suger's *Chronicles*, as well as his analysis of the Gothic form and sources of inspiration at St. Denis continue to find currency. Not only was Panofsky unaware of the importance of the liturgy in construction, but the emphasis placed upon aesthetics and subjective contemplation to the detriment of a medieval cosmology whose essential principle held Beauty to be an objective principle of things, is apparent. The subjectivism is apparent in authors such as Steven Schloeder whose repetition of Panofsky's arguments betrays an emphasis upon the thinking subject over and above the material realm. It should be noted such Enlightenment era philosophical tenets, such as the division between *noumenon and phenomenon,* were not developed until centuries later.[325] For instance, the entrance to the sanctuary of the Abbey of St-Denis is described as "a gateway through which men's minds are brought to the truth of the gospel", and that the visitor is encouraged to, "marvel not at the gold and expense" of the doors, but to realise that the doors, "being notably bright...should brighten the mind, so that they may travel through the true light to the True Light (per lumina vera...ad verum lumen), where Christ is the True Door."[326]

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[324] Suger, & Panofsky, E. (1946). *Abbot Suger on the abbey church of St.-Denis and its art treasures*. Princeton, NJ, Princeton Univ. Press, p. 109.
[325] Panofsky was influenced by neo-Kantian Ernst Cassirer.
[326] Schloeder, S. J. (1998). *Architecture in communion: implementing the Second Vatican Council through liturgy and architecture*. San Francisco, Ignatius Press, p. 204.

The problem lay with Panofsky's translation effort, and with Schloeder's editing effort. What Schloeder eliminated from the quotation is not an emphasis upon subjective contemplation of visual aesthetics, but instead an emphasis upon craftsmanship, work, and material.[327] The exclusion of these themes when discussing Abbot Suger is an inauthentic retelling of the birth of the Gothic cathedral, and an inauthentic retelling of the entire medieval cosmology that sought to place material within divine creation, which encompassed humanity as well.

While physical light as one aspect of the material realm was an important symbol within Christian Platonism, it has taken precedence for contemporary thinkers when discussing the Gothic cathedral. The modern emphasis upon aesthetics and the visual impact of architecture ignores the medieval emphasis upon the potential of all material. As Peter Ellard reminds us, the medieval mind sought a comprehensive understanding of the cosmos and allowed for divine inspiration to show itself in material manifestations.[328] The emphasis of contemporary medieval studies upon visual sensibilities and the aesthetics of the Gothic cathedral should be replaced by an emphasis upon all of the materials at hand, and the sacred cycles that informed the construction process.

The issues of resource and technology have been treated as the most important considerations in contemporary medieval discussion. The instances in which theology is given appropriate attention and due, credit stops short when resource, material, and technology issues are raised.[329] Alternatively, when attention is upon medieval construction, theological underpinnings are disregarded, and the theological importance of work is ignored.[330] Furthermore the third position of seeking "spiritual" and a-religious interpretations ignores the importance of the

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[327] The full passage as translated by Panofsky reads: "Suger, Panofsky, E., and Panofsky-Soergel, G., (1979). *Abbot Suger on the Abbey Church of St.-Denis and its Art Treasures*. Princeton, N.J.: Princeton University Press, p. 47. "Whoever thou art, if thou seekest to extol the glory of these doors, Marvel not at the gold and the expense but at the craftsmanship of the work. Bright is the noble work; but, being nobly bright, the work Should brighten the minds, so that they may travel, through the true lights, To the True Light where Christ is the true door. In what manner it be inherent in this world the golden door defines: The dull mind rises to truth through that which is material And, in seeing this light, is resurrected from its former submersion. Portarum quisquis attollere quæris honorem, / Aurum nec sumptus, operis mirare laborem, / Nobile claret opus, sed opus quod nobile clarete / Clarificet mentes ut eant per lumina vera / Ad verum lumen, ubi Christus janua vera. / Quale sit intus in his determinat aurea porta. / Mens hebes ad verum per materialia surgit, / Et demersa prius, hac visa luce resurgit."

[328] Ellard, P. (2007). *The sacred cosmos: theological, philosophical, and scientific conversations in the early twelfth century school of Chartres*. Scranton, University of Scranton Press, p. 64. "It might be fairest to say that the 'theoretical framework' encoded in a building like Chartres is in fact that of a new way of thinking that developed in France in the twelfth century. It is a pattern of thought that influenced practical men as well as scholars and theologians, and it laid the foundations for the modern age."

[329] Schloeder, S. J. (1998). *Architecture in communion: implementing the Second Vatican Council through liturgy and architecture*. San Francisco, Ignatius Press, p. 208.

[330] Andrews, F. B. (1974). *The mediaeval builder and his methods*. East Ardsley, Eng, EP Publishing. This very good description of the medieval builder makes no mention of theology, and the only instances of "God" occur in quotes and references. There is no link between theology and masonry.

Church and the spiritual tradition it was continuing. Acknowledging the importance of the cosmic Church for medieval society implies that resources, material, and technology were given a sacred and miraculous character.[331] Not only was finding a new quarry miraculous, but the quality of the stone contained was superior to other possibilities, which facilitated the construction of more virtuous constructions. Resources, and how to skilfully use those resources, were vitally important to the medieval thinker whose ultimate source was God.

5.7 The Translation of the Chronicles of Abbot Suger

Despite the valiant effort present in Panofsky's translation of Abbot Suger's Medieval Latin into contemporary English, there are subtle distinctions within the text that are needed for the current thesis.[332] For the purposes at hand, only the translation of the passage dealing explicitly with the miracle will be considered. Placed upon the Latin text is a religious worldview, for the intent is to approach what would have been apparent to the medieval thinker.

The Latin in question reads: "*Quorum quidem operturarumque impulsionem cum episcopus expavesceret, saepe manum benedictionis in ea parte extendebat et brachium sancti senis Simeonis signando instanter opponebat, ut manifeste nulla sut constantia, sed sola Dei pietate et Sanctorum merito ruinam evadere appareret. Sicque cum multis in locis firmissimis, ut putabatur, aedificiis multa ruinarum incommoda intulisset, virtute repulsa divina, titubantibus in alto solis et recentibus arcubus, nihil proferre praevaluit incommodi."*[333]

Erwin Panofsky's translation: "*The Bishop, alarmed by the strong vibration of these [arches] and the roofing, frequently extended his blessing hand in the direction of that part and urgently held out toward it, while making the sign of the cross, the arm of the aged St. Simeon; so that he escaped disaster, manifestly not through his own strength of mind but by the grace of God and the merit of the Saints. Thus [the tempest], while it brought calamitous ruin in many places to buildings thought to be firm, was unable to damage these isolated and newly made arches, tottering in mid-air, because it was repulsed by the power of God*."[334]

The interpretation by Erwin Panofsky illustrates a relegation of the purpose of blessing. Throughout Christian history blessing has been a ritual acknowledging the foundation of the world in God, and a dedication of the blessed into participation of God's divine order. As the

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[331] Suger, & Panofsky, E. (1946). *Abbot Suger on the abbey church of St.-Denis and its art treasures*. Princeton, NJ, Princeton Univ. Press, p. 90. Abbot Suger reminds us that finding a new quarry is a gift of God: "Through the gift of God, a new quarry, yielding very strong stone, was discovered as in such quality and quantity had never been found in these regions."

[332] Panofsky's translation into English from Latin is not in question in the current thesis.

[333] Suger, Panofsky, E., & Panofsky-Soergel, G. (1979). *Abbot Suger on the Abbey Church of St.-Denis and its art treasures*. Princeton, N.J., Princeton University Press, p. 108. An alternative source is available here : *De Consecratione*, ed. A. Lecoy de la Marche, Euvres completes de Suger. Paris, Renouard, 1867. 8vo., p. 230.

[334] Suger, Panofsky, E., & Panofsky-Soergel, G. (1979). *Abbot Suger on the Abbey Church of St.-Denis and its art treasures*. Princeton, N.J., Princeton University Press, p. 109.

Bishop was performing the rite it was an acknowledgment of the arch in God's cosmos, and Abbot Suger's Latin tells us that the arch will not fall because of the participation in God's immovableness. Erwin Panofsky presents a very different picture of the blessing rite as if it is a violation of the laws of nature sought by the Bishop, but enabled by the intervention of Divinity. The translation as "strength of mind" by Panofsky is unwarranted because the blessing rite did not concern a violation of the laws of nature by the Bishop, nor a violation by Divinity or saints. Instead it was the participation of the Bishop's blessing as well as the arch in God's cosmos that saved it from ruin, not a violation on any part. It was a revelatory and miraculous occurrence that revealed the rib arch as participatory in God's creation. Ultimately it was the virtue of the vault that allowed for its stability, and that virtue's ultimate source is in God.[335] The virtue of the arch is what allows for a fuller participation in the medieval cosmos; Abbot Suger's chronicle establishes the virtuousness of the ribbed vault and favourable view bestowed upon it by medieval thinkers. It is through virtue and its relationship to onto-theological philosophy of medieval Europe that we are to understand the rib vault, and not through isolating Pseudo-Dionysian light metaphysics as was suggested by Simson.

A medieval theory of structure is suggested by Abbot Suger in placing value upon the structure that resists wind. Unlike contemporary structural theory, what is suggested is that structures were designed to only account for external forces, and it would have been assumed that structural failure is the result of wind. Any formal solution that is capable of resisting wind more adequately than the nearby semi-circular structures, which proved inadequate in the gale, would have certainly been more virtuous, and participates in God's created order more effectively. It follows that new structural innovation has a place within the medieval Christian cosmos, and the pointed arch is an example of that place.[336]

5.8 Alternative Interpretation of Abbot Suger's Chronicle

The etymology of "*miracle*" tells us that the origin of the word can be found in the Latin word "*miraculum*", which means "*object of wonder*". Furthermore, the Greek texts used for translation in the English bible give us "*semeion" (sign), "teras" (wonder), and "dynamis" (power)* as appropriate for translation into "*miracle*" in English.

Seeing miracle as sign, wonder, and power when describing the inexplicable events of the night of the gale force winds that threatened to topple the incomplete rib vault is more appropriate than

[335] A straight line is more unified than a bent line, and the action of *virtus* is greater along a straight line. Such precepts were established by Aristotle in book V of *Physics*, and book V of *Metaphysics*, and in Boethius' *Arithmetic*. While a full translation of Aristotle was not available to Abbot Suger, the Abbot knew of Aristotle indirectly though other sources.

[336] Suger, Abbot. *De Consec.* V. p. 105, quoting Ephesians 2:19-22. "In Whom we, too, are taught to be builded together for an habitation of God through the Holy Spirit by ourselves in a spiritual way, the more loftily and fitly we strive to build in a material way."

ignoring the term altogether. Furthermore, we can begin to see how miracles held an important place within the medieval religious worldview, and the importance miracles had for St-Denis.

Before addressing the miracle in more detail, it is important to safeguard against popular notions of miracles, specifically the use of miracle when describing the interfering of God with the material laws of modern science, as if God existed exclusively outside nature. (Medieval Christianity found God to be transcendent and immanent.) Such conception, (the interventionist God), has no place here, and is detrimental to understanding how the medieval mind understood God to be ever present. Furthermore, the notion that a miracle is an improbable event that has occurred, despite the unlikelihood, is foreign to the medieval world view. Such presuppositions must be suspended for a time, and the text must be allowed to speak for itself. Within the structure of the arch is it possible, and medieval thinkers would say necessary, to see a transcendent source.

We can begin to see not only the importance of miracle, but also the importance of a sacred understanding of the Abbey of St-Denis when considering the chronicle left to us by Abbot Suger. The specific instance of the miracle and the participation of man in this miracle demonstrate an understanding of miracle that is neither God acting outside the laws of nature, nor a coincidence.

Recognizing the immanent structure and essence of the arch is only possible through the acknowledgement of transcendence.[337] As will be addressed later, the construction process is dependent upon the immanent structures of stone material, and similar to the presence of Christ as man, so too was material seen as participating in God's uncreated being. Abbot Suger acknowledged a sacred character in the unification and "*stitching*" of parts in "*firmness and steadfastness".* The inherent nature of the material as crafted and made by human hands to withstand the forces of wind and weather is spoken of *almost* in a pantheistic manner.

Abbot Suger avoids such a heresy however, and implores us not to forget it was "*God's goodness and God's action*" that was the ultimate source. Again, the immanent structure of being an arch is acknowledged, yet ultimately that ontology is only possible through admitting a transcendent source. The actions of Bishop Geoffroy should not be confused with the actions of the masons. While the masons understood and created in accord with the immanent structures of stone through hands on craftsmanship, the Bishop was bestowing upon the arch a grace or divine presence in order to reinforce the immanent structures previously established. That the arch was dedicated to divine service could not have been questioned given Bishop Geoffroy's blessing, therefore the arch could not have failed. The arch and its virtuous nature as a meritorious arch is

[337] Ibid., p. 70.

ultimately only possible through a completely over-and-above God whose action and being are inseparable.

The medieval worldview which held an inseparable synthesis between man, the cosmos, and God presents itself in the understanding of Abbot Suger. Man's active participation in transfiguring the cosmos through the ritual act of realizing God's creation is evident from Suger's text. Bishop Geoffroy was actively participating in transfiguring the cosmos. The very being of the unfinished abbey was realized through the ritual act of Bishop Geoffroy. In this sense, the miracle is not unnatural, but instead natural when realizing providence. That the unfinished arch achieved a new sense of being during the tempest and subsequent ritual act is to see miracle within the medieval worldview.

Furthermore, we can begin to understand the *sign, wonder,* and *power* of the miracle when we consider this example from the medieval worldview. *Sign* is an appeal to the final purpose or teleology of the miracle. It is a direction towards the realization of the arch as it is in essence, and that essence or being is a manifestation of God. *Wonder* presents itself in that something was revealed unexpectedly. The sudden and unexpected manifestation of God despite other structures suffering collapse during the terrible tempest is a source of wonder in the miracle of St-Denis. *Power* is demonstrated in that Bishop Geoffroy was performing a ritual act, but that act did not entail constructing support or ensuring the structural action in the same way a modern builder would have. The strength of support came from God, the source of all action.

The critical translation here involves the Latin "virtute". Where Panofsky translates Latin "virtutes" into English "power", a more appropriate translation would account for the medieval cosmology. Where everything acts according to its uncreated being, the "virtue" of something would mean the quality appropriate for it. In English, we would use the expression "by virtue of". Therefore, Panofsky's English "power" unintentionally ascribes will to an acting agent, God, but English "virtue" does not. Other synonyms would include "capacity", where the pointed arches had the capacity to accommodate God, the source of being, and therefore participated in the created order more fully than other arches. It is in this sense that the arches were miraculous.

This explanation is not an unnatural explanation of miracle, such as presented by Hume. Instead this understanding of miracle is a more natural than natural, or supra-natural explanation. The revelation or apocalyptic revealing of God's presence signalled a new order of being with divine and cosmic attributes. These cosmic attributes were not understood as a circumventing of nature, but instead a revelation of the order with which it was predestined from God's first act of creation. The miracle here is through creation, and the power of creation allowed for a new being superior than previously witnessed through seeing as God sees, and working as God works.

It follows that explaining the architectural innovations at St-Denis is not easily accomplished. The inadequacy of treating theology as a theory or concept that drove the design decisions at St-Denis is obvious. Seeing the presence of God in every aspect of the surrounding world's immanent structure has little in common with theorizing. Furthermore, we can make no conclusion with regards to Abbot Suger's contributions to St-Denis, for he does not claim authorship for any architectural elements. We know that he did have experience with military fortifications, and that he did construct at least one wooden structure, but ultimately, we do not know what architectural features he contributed to St-Denis.

However, we can begin to see the influence of the medieval worldview upon the construction of cathedrals. If the innovations at St-Denis existed within a religious medieval worldview, we can suggest that those material innovations were somehow more spiritually rewarding than its predecessors. We are beginning to see that the innovations of St-Denis held a special place within a culture that saw Divine presence everywhere, and those material innovations were copied extensively and to the point of changing the architectural tradition.

Despite inconclusiveness about the author of the architectural innovations at St-Denis, we can begin to conclude about the importance of the architectural innovations within the religious worldview. The west front of St-Denis, with its triple portal, twin towers, column figures, rose window, ring of radiating chapels, double ambulatory, columnar pier, and large windows, are a list of innovations that seek to be placed within a medieval religious worldview. What we can be certain of, thanks to Abbot Suger, is that material buildings and construction were not excluded from the medieval attention on grounds that it was "ordinary work".

The notion of encountering God through material and craftsmanship is given explicit endorsement by the Abbot at whose abbey we credit for establishing the Gothic style. "*Whoever thou art, if thou seekest to extol the glory of these doors, Marvel not at the gold and the expense but at the craftsmanship of the work. Bright is the noble work; but, being nobly bright, the work Should brighten the minds, so that they may travel, through the true lights, To the True Light where Christ is the true door. In what manner it be inherent in this world the golden door defines: The dull mind rises to truth through that which is material And, in seeing this light, is resurrected from its former submersion*."

5.9 Cult of Carts

The "cult of carts" is often discussed by contemporary medieval scholarship, and it certainly was important for medieval thinkers. The stories which could be considered as a "cult of carts" is of a small number of disabled men and boys who voluntarily cart heavy stones in the rain, which was miraculous because the handful lifted what would have taken ten times as many men. While the circulation of miracle stories between medieval builders has been established by contemporary

scholars, the interpretations of the stories have been dismissive.[338] The cult of carts was a theme of medieval oral tradition, and the first Gothic written instance was authored by Abbot Suger of St. Denis.[339] The transport and labour of materials such as stone or recently felled trees by willing participants of the local community in order to accomplish the task at hand was often regarded as a miracle. Spontaneous communal action and work was an important theme for medieval man, but too often its importance is disregarded as rhetorical.[340]

Social consensus and subordination were not concerns of the medieval thinker, and if we are to approach an authentic understanding of Gothic architecture it is important to interpret the miracle stories as transmitted by Abbot Suger on their own terms. Volunteers harnessing themselves to carts and manually labouring under the weight of stone or wood were important because such episodes were an example of the mystical Church. It was a retelling of a specific instance in which God revealed himself, and the consequent order was important for understanding the cosmos. The medieval period did not have technology, but instead relied upon miracle.[341] While the miraculous is normally assumed to depict a violation or aberration of nature, here the miracle stories are seen as a fulfilment of nature. The full potential is realised at one moment within the miracle story, and as such denotes the medieval cosmology. Instead contemporary thought flatly denies the miracle stories as propaganda, for miracles are not understood as the medieval writers understood miracles.[342]

Instead we can see the miracle stories, such as those chronicled by Abbot Suger, for what they were. Within the medieval cosmology where God is the source of creation, and man's realisation of his place within God's creation is known as the Church, the work of men has salvific and miraculous character. Accomplishing more than would have been possible otherwise through

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[338] Raguin, V. C., Brush, K., & Draper, P. (1995). *Artistic integration in Gothic buildings*. Toronto, University of Toronto Press, p. 221. "Compare the letter circulated by the Archbishop of Rouen with the almost contemporary version by Abbot Haimon in Mortet and Deschamps, *Recueil de texts*, p. 63-7, trans. Teresa Frisch, *Gothic Art 1140-c.1450: Sources and Documents* (Englewood Cliffs, NJ, 1971; repr. Toronto, 1987), p. 25-6. The author discussed these briefly in "Urban Setting," p. 18-19."

[339] Ball, P. (2008). Universe of Stone: Chartres Cathedral and the Triumph of the Medieval Mind. London: Bodley Head, p. 259. "But the idea that the cathedrals were constructed from crypt to spire by the ecstatic efforts of untrained zealots from the local community is absurd. Episodes like these do indeed seem to have taken place – there are a dozen such instances recorded for churches built between 1066 and 1308 – but they would have been sporadic at best, and they were not the spontaneous outbursts of 'mystic fervour' that the churchmen portrayed."

[340] Raguin, V. C., Brush, K., & Draper, P. (1995). *Artistic integration in Gothic buildings*. Toronto, University of Toronto Press, p. 221.

[341] Technology is here understood as the application of modern scientific knowledge of the physical world gained through sense observation and experimentation: "applied science". Observation and experimentation of the physical world was certainly part of the actions of the medieval masons, but the physical world was understood hierarchically within the Christian cosmos, and therefore seeing the pointed arch as "miraculous" is more accurate.

[342] Raguin, V. C., Brush, K., & Draper, P. (1995). *Artistic integration in Gothic buildings*. Toronto, University of Toronto Press, p. 222.

acknowledging and celebrating the natural and sacred order of God's creation is the lesson to be learned from the miracle stories. Man acquires a God-like capacity for creation through his work, and through his communion with the sacred order, and the spontaneity of the action is vitally important for the story. Were it not spontaneous, it would not have been a matter of course and authenticity, and if it were not a matter of course and authenticity, then it would have fallen short of the requirement that man's action must be like God's action; "self-creating". Ultimately the miracle story is a celebration of humanities potential for communal action and realising God's presence within the potentiality of the created cosmos.

5.10 Gothic Form & Tradition

Various generations have given narration to the forms of Gothic cathedrals in an effort to give a reason for their existence. For Victorian enthusiasts, the Gothic structures are the optimal forms for carrying loads, and no further removal of material is possible. The cathedrals are functional and minimal. The counter argument to a narrative of machine-like efficiency is presented by "illusionists" who suggest the Gothic cathedrals are purely aesthetic and symbolic with little consideration for structural honesty.[343] While the discussion about Gothic cathedrals is no longer understood in terms of either exclusively function or aesthetics, it sometimes influences contemporary discussion. Scholars have attributed such things as endorsement of French nationalism and knowledge of structural forces to the builders of the cathedrals when none of these are appropriate for medieval thought.[344] When considering the Gothic cathedral, popular notions about form, function, and their relationship are inappropriate given what we know about medieval cosmology and religion. While this is true, contemporary treatises on Gothic art and architecture locate the origins of Gothic characteristics within the social organization of the time and tend to ignore the religious understanding.[345] Medieval technology and science were a consequence of the religious organization and cosmology whereby it was possible to have a

[343] Gottfried Semper (1803-1879) as an architect and historian attempted to interpret the past in terms of self-evident form and material. In his view material was annihilated through using the material in order to allow for a joyful appreciation of the form. Ultimately material was totally mastered then forgotten in service of an aesthetic ideal in which the viewer is allowed to enjoy the act of enjoyment divorced from any purpose. Despite the importance Semper placed on material and techniques, he found the Gothic cathedrals unfriendly and analysed past architectures in terms of its aesthetic and sensual effects.

[344] Turnbull, D. (1993). The Ad Hoc Collective Work of Building Gothic Cathedrals with Templates, String, and Geometry. *Science, Technology, and Human Values.* 18, 315-340, p. 325. "Is the structural form of the Gothic cathedrals dictated by the requirements of high stone buildings? The rationalists, like Viollet-le-Duc, who were responsible for much of the restoration of the French cathedrals in the mid-19th century, argued that such characteristic Gothic features as flying buttresses, ribbed vaulting, and pointed arches are the consequence of functionalist minimal-ism, that they are the optimal structural bones. The illusionists, on the other hand, would have it that they are dictated by stylistic considerations rather than by necessity. Recent evaluation of Gothic structures suggests that neither of these understandings hold true but that a degree of rational functionalism is employed in the service of a higher aesthetic."

[345] Ibid. p. 325. "Thus, in the case of the Gothic cathedrals, the idea that form follows function only has cogency when abstracted from the interests of the builders and from the "techno-science world" in which it is embedded."

"sacred science" where Beauty and function, (the latter a term foreign to medieval thinkers), were unified.

Robert Mark and David Billington argue that a tradition, and the knowledge of past success and failures as part of that tradition, is necessary and essential for structural success.[346] The innovation and development of the Gothic forms of pointed arch, flying buttress, and ribbed vaulting grew from this building tradition of multiple contractors, and ultimately from the medieval Christian metaphysic of uncreated being.[347] Ultimately it is the essence of being that determines activity, and it follows that the creation of the pointed arch, flying buttress, and ribbed vaulting was, for the Medievals, determined by the uncreated essence of being. The latent possibilities of craftsman and material are realised in the innovative Gothic forms, and through the multiple contractor tradition, the act of construction becomes a source of knowledge. It follows that work shares an intimate connection with true human nature.

Ultimately any definition of Christian tradition must account for the position the transcendent source is given within the medieval period, and no attempt to reduce tradition to merely human and consensual terms is appropriate for the current thesis. That is why, as René Guénon suggests, every occupation is considered a priesthood in traditional cultures[348], and why various

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[346] Mark, Robert, and David P. Billington. 1989. Structural imperative and the new form. *Technology and Culture.* 30:300-29, pp. 310 & 311 & 329. "Consider first the salient structural feature of Gothic vaulting: the "focusing" of the distributed forces within the vaults at the points of vault support along the clerestory wall. There are three components of this focused force resultant at the springing: (1) a downward, vertical component equal to the weight of the ribbed vaulting supported by the clerestory wall, which is in turn carried by the piers of the main arcade; (2) a lateral outward, horizontal component tending to overturn the clerestory wall but resisted in the mature Gothic church by flying buttresses; and (3) a longitudinal, horizontal component aginast the adjacent bay along the axis of the church. This last force is ordinarily stabilized by the adjacent bay of vaulting whose longitudinal component acts in the opposite direction to that of its neighbour and eventually by the rounded apse with radial flying buttresses at one end of the vessel and by the pair of massive towers at the other end. In effect, the completed bays of vaulting all 'lean' against one another." "The modelling of Bourges sexpartite vaulting indicated a longitudinal force component of 19,000 kg, whereas, for the even slightly larger bays of Cologne cathedral's quadripartite vaulting, the longitudinal thrust was found to be only 9,000 kg, more than a 50 percent force reduction for the quadripartite compared with the equivalent, but lighter, sexpartite vaulting. The constructional problems presented by the intensity of these forces do not appear to have been acute in the early Gothic churches, where the vault springing was anchored in the typically massive wall below the clerestory. Countering this force became a major problem only with the demand for larger windows and the accompanying greater clerestory height. Hence, the later Gothic builders needed a vaulting system that generated considerably less longitudinal force; that is, quadripartite vaulting." "Our research and studies by many others show convincingly, we believe, that outstanding modern engineers have succeeded in expressing the highest aspirations of our society by designing buildings with that "indissoluble unity of structure and form" in the same general way as did the Gothic master builders.

[347] James, John. 1979. The contractors of Chartres. 2 vols. Wyong: Mandorla, p. 65. John James describes the building tradition of multiple contractors and uses the archaeological evidence of the masonry work. "The different doorways show that there are at least two crews". See also footnote 75 of the current thesis.

[348] Guénon, R. (2001). *The reign of quantity & the signs of the times*. Ghent, NY, Sophia Perennis, p. 253.

craft guilds such as masons, glaziers, and bakers were represented in the stained glass of medieval cathedrals.

The guild was an organization of skilled craftsmen, and membership was granted upon learning the skills of the craft through apprenticeship or through patrimony. While the guild system did not exist during the early medieval period, its importance for the middle and late medieval periods has been emphasised in recent medieval scholarship.[349] The guilds were responsible for the quality of workmanship and maintaining the building tradition. Extensive travelling of these skilled men reinforced a general shared tradition even if differences were noticeable. The agreement among the organizations upon principles such as the importance of duty to God, fellow men, and honesty are attested to by the quality of the built work.[350] Contrary to explorations of medieval craft guilds in an economic context whose emphasis is placed upon the monopolizing of economic markets[351], the guilds as explained here existed within a cosmological understanding in which the work of God was institutionalized.[352]

The medieval importance placed upon a divine understanding of the world, and the design of Gothic art, relied upon the manifestation of the mind of God. The realization of God's thoughts in stone and ultimately in architecture would certainly ensure true measure. That the cathedrals remain in constant use after eight hundred years attests to some extent to the validity of medieval cosmology and the manner in which they ordered their material resources.

To what extent medieval masons were influenced by theology can be established by placing the artefacts of the past within their religious context. The debate among contemporary scholars over the possibility of monks or abbots designing the cathedrals, or master masons designing them without concern for theology can be answered as well. While monks did often lend their hand to construction in building small parish churches where craftsmen were not available[353],

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[349] 1). Harvey, J. (1950). The Gothic world, 1100-1600; a survey of architecture and art. London, Batsford. & 2.) James, J*. (1981). The Contractors of Chartres.* Wyong, New South Wales, Australia; London: Mandorla; Croom Helm*.* Here both are made reference to in their entirety.

[350] Harvey, J. (1950). *The Gothic world, 1100-1600; a survey of architecture and art*. London, Batsford, p. 20.

[351] Richardson, G. (2001). A Tale of Two Theories: Monopolies and Craft Guilds in Medieval England and Modern Imagination. *Journal of the History of Economic Thought.* 23, pp. 217-242.

[352] Binde, P. (2001). Nature in Roman Catholic Tradition. *Anthropological Quarterly.* 74, pp. 15-27. "*Conceptions of nature are understood to be embedded in a broader cosmology and to reflect features of social organisation...in every society there is a structural similarity between the treatment of nature and the way in which people treat each other*."

[353] Andrews, F. (1999). *The Mediaeval Builder and His Methods*. Mineola, NY: Dover Publications, pp. 19-20. Gervase of Canterbury acted as assistant to master mason William of Sens in constructing Canterbury Cathedral after the master mason fell from scaffolding and could not continue. From his stricken condition William of Sens passed instructions along via the monk Gervase. "Being badly injured by the fall, and bruised by stones and rubble, he was rendered helpless to go on with the work. No one else was in any way harmed. On the master craftsman alone fell the stern wrath of God—or the machinations of the devil. The master was badly injured, and though lying in bed with the ministrations of doctors to facilitate a speedy

other instances of monks and abbots involvement with very large construction projects is limited.[354] We can also be assured of the obvious importance of Christianity, and of the cosmology that Christianity brought with it. The habitual attendance of Church services and sermons as well as the orientation of yearly cycles and activities around the Christian religion can be used to establish the knowledge populations would have had of Christian theology. Despite the reclusiveness of medieval monks and general lay illiteracy, the celebration of Christian holidays would have certainly cemented general theological ideas for medieval man. Furthermore, sermons were not only given in Latin, but sometimes in native tongue as well; the *prône* during Mass.[355] Establishing the link between master mason and theology is as easy as placing the mason within the only way of conceiving the world at the time.

It is not enough to state the nature of the medieval cosmology but to establish how it influenced the innovations of the Gothic style. The pointed arch, ribbed vault, and flying buttress are unique to the period, and found widespread use within a period of fifty years. The importance of their use at St. Denis cannot be underestimated as leading bishops and abbots were present at the consecration. The spread of Gothic elements was quickly established because the financiers of new construction mimicked what was accomplished at St. Denis.

What was it about the pointed arch and subsequent rib vault and flying buttress that compelled the gothic mind to utilize it, and find it appropriate in so many instances?

5.11 Tacit Understanding

In understanding the pointed arch by describing the religious context in which it was conceived it must be re-iterated that products of human making were not assumed to be a private and

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recovery, his hopes were shattered and his health did not improve. And so, as winter was setting in and the completion of the upper arch was urgently necessary, he entrusted this to a skilful and hard working monk, then in charge of the masons. This procedure aroused much envy and strife among them—this man being, though young, held to be wiser than older and more influential men. But the master though still in bed gave directions as to what should be done first, and what next. . . . And finally since the master realized that by no doctor's skill and care could he be cured, he gave up the charge of the work and went back to his home in France." Here Andrews is citing: Gervase, & Stubbs, W. (1879). *The Historical Works of Gervase of Canterbury*. Rolls Series, 2 vols. London, Her Majesty's Stationary Office, pp. 20-21.

[354] Andrews, F. (1999). *The Mediaeval Builder and His Methods*. Mineola, NY: Dover Publications, pp. 12-13. "In the earlier periods no doubt the Church did a good deal of work for herself and set her sons to the labours of it. Up to the twelfth century, and probably well into it, cases can be produced where church officials and monk-masons and carpenters directed building operations and some of them also actually worked therein. But later and even contemporarily therewith the lay-master was engaged and almost exclusively on the more important enterprises. The buildings of early times—though later replaced by more ornate and permanent structures—were most frequently of wood, and often of the crudest workmanship and design—fitly attributable to untrained effort, by which indeed they were executed. Such instances as these may be rightly referred to ecclesiastical effort in its zeal to provide the necessary buildings for worship and shelter as the religious pioneers proceeded with their missionary settlements; but the more permanent structures of later days belong to the experience of 'masters' in building."

[355] See footnote 253 for a description of the *prône.*

subjective fiction. The understanding of the products of human making was instead understood to exist within a divinely ordered cosmos, and as such participate and demonstrate its place in that cosmos. Furthermore, it was assumed a tacit understanding by man of created things was possible, as understanding required knowing the essence of something, and it was man's essence to know essence.[356] It follows that a tacit or direct understanding of the surrounding cosmos was sought.

The Platonic foundation of medieval cosmology is apparent in Abbot Suger's description of the rib vaults at St. Denis Abbey. As has been shown above, the vaults avoided calamity because of their explicit and virtuous participation in God's cosmos. The freshly raised pointed ribs were more virtuous than previous semi-circular forms because they did their job well. The virtuous rib arch was recognized for its excellence in meeting the requirements of a divinely ordered cosmos. Excellence and virtue within the work of the master masons is likened to a technological view whose ultimate measure was against divine measure. The pointed arch was seen as a virtuous and more appropriate excellent arch. It served its function as structurally adequate, and therefore realised the form of structure and arch better than previous attempts at realising the idea of structure and arch. The arch was more than arch.

5.12 God in the World

How this tacit understanding of essence demonstrated the presence of God was explained by medieval thinkers as essences participating in the mind of God. As Monti suggests, these "*created Ideas, though distinct from God, are so closely related to him that they acquire almost no form of their own which could be defined; for they are totally absorbed in the contemplation of God and in his service*."[357] It follows that essences or ideas did not come from man, but instead came from God. New architectural elements such as the pointed arch could have been seen to come from God, and participate more fully in God's cosmos than previous architectural elements such as the semi-circular arch. The essences, insofar as they participate in God, have a particular relationship to God. The essence or being in itself participates in God, and is a created Idea insofar as it is self-creating. Reliance upon no other source for its being is a vivid shining forth of what it is in itself. By radically dividing something from the surrounding cosmos paradoxically integrates it into God's divine cosmos.

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[356] Boodin, J. E. (1929). Cosmology in Plato's Thought (I.). *Mind.* 38, 489-505, p. 498. "In a mythical way Plato shows that the mind's intuition of structure is due to rapport with the structure of reality. Like Kant, Plato sees that mind must bring structure to experience in order to discover structure. But Plato shows his superior sanity in realizing that the structure of the human mind cannot be conceived in isolation from reality, but must be understood in community with reality. It is ontological structure which the mind intuits; and the discovery of structure, so far as it is true discovery, is the discovery of real structure."

[357] Monti, A. (2003). *A natural theology of the arts: imprint of the spirit*. Aldershot, Hants, England, Ashgate, p. 92.

Such notions are surprising, but were given a home in medieval Christianity. The new Ideas, forms, and created order describes "*a totally sacramental world suffused with the divine presence, and invests the present created order with a most profound significance, for it is the raw material from which the new will come*."[358] Furthermore it should be remembered that the pointed arch was seen as new and thusly, "*new refers predominately to a change in quality or essence rather than something new that has never been in existence*".[359] "*The new creation is a revelation or apocalypse of something which had always existed before, but had not yet been manifested*".[360] The new creation was a place where Divinity was manifest in everything and God was no longer separate from his creation. God dwelled and rested in creation and imbued creation with divine and cosmic attribute, such as the miracle of the pointed arch and rib vault in the cathedrals of medieval Europe. Everything was understood in terms of God, and architectural elements were no exception.

Contrasted with this notion of God as intimately bound with the material world is the notion that God is separate from the universe, and he only sets in motion the mechanisms of creation but does not take an active role. From this mind-versus-matter-Deist perspective it follows that mankind is too removed from nature, and it is his task to understand, harness, and control the mechanical laws of nature in accordance with his will. Such notions were foreign to the medieval Church, and in fact the twelfth century bears witness to the Cathar heresy. The doctrine that matter was created by an evil God, and spirit created by a good God attracted much attention and condemnation by the Christian Church whose doctrine taught of the salvation of the entirety of creation.[361]

5.13 Pointed Arch Prior to St. Denis

The historical data of the origins of gothic architectural elements is scarce, but pointed arches were used at Autun Cathedral circa 1120. The unprecedented pointed arch was used in a manner similar to its semi-circular relative in the vaulting, and the outcome was a pointed barrel vault. While it is possible that pointed arches were introduced by contact with Arabic sources to whom such forms were commonplace, it is evident from the example of Autun Cathedral that the pointed form was utilized as if it was semi-circular. Furthermore, the elements of Gothic architecture are present at the Romanesque Durham Cathedral, but they were not yet

[358] Ibid., p. 140.
[359] Ibid., p. 140.
[360] Ibid., p. 141.
[361] Binde, P. (2001). Nature in Roman Catholic Tradition. *Anthropological Quarterly.* 74, p. 15-27. "In the twelfth century, the Roman Catholic Church devoted much energy to combat the Cathar heresy, which was founded on a radical dualism of evil matter and divine spirit. The Cathars believed in two gods, one evil, who had created matter, and one good, the master of the spiritual realm. Hence, in its ideological war against the Cathar heresy, founded on a doctrine that all matter was evil, Catholicism was forced to emphasise the goodness of the material creation. The Dominican order stood in the frontline of this battle, claiming that nature was good and therefore a proof of the goodness of the one and only God."

synthesised into the new Gothic style. What is to be taken from the presence of Gothic elements before the accepted birth of Gothic style at the Abbey of St-Denis, is the increasing use of previously unknown forms, and the subsequent building tradition and craft skill that developed. The skill of the craftsmen was improving, and new possibilities in form were becoming available.

It was later at the greatest abbey of the Paris region, the reconstruction in 1132-1144 of St. Denis that the most skilled craftsmen were employed and solicited for advice, and it was only because their skill had progressed that the various elements of Gothic style could be constructed at one location. The ornamental quality was important for the Gothic structure, and as masons progressed in their craft the delicate necessities of sculpture and statutes were met with high skill. The integration of ornament and structure is an important aspect of medieval cathedrals, and it is no surprise that masons also were capable of sculpting delicate religious icons. The development of the masonry craft through self-creating authentic principles, allowed for the development of the Gothic style because new structural elements of intricate shape were required. Insofar as the masons improved their masonry skill through allowing the ideas in the stone to surface, were the masons able to carve not only delicate religious icons, but also the individual stone pieces of new complex structural systems.

5.14 Inverted Structure

The further development of skill within the masonry tradition was accompanied by developments in the synthesis of architectural elements. The same predisposition that allowed for the acceptance of the pointed arch also allowed for a design solution that was whole and fully integrated. The importance of the rib vault is decided by its placement within the structural scheme; a crowning jewel high above the nave as it leads the eye to the sacred altar and chapels. The intentional placement of the rib vault high in the air necessitated the use of pillars to keep it there. The skill of constructing a rib vault as high as possible was a testament to the grace of God; the higher the vault, the more miraculous it was, and all the more present was God. The mason was therefore simply required to ensure the self-supporting and supposed non-horizontal thrust-producing-vault maintained its lofty position; it was held high by pillars and they by buttresses. Instead of delivering forces to the ground as it might be assumed by a modern structural engineer, the Gothic cathedral's pillars and flying buttresses were thought to hold high the miraculous rib vaults. Seeing the structure as rising from the ground and holding the vault high would have made the construction process of multiple contractors that did not use construction documents, easier.[362] Instead of knowing the absolute final vault shape and subsequent

[362] Andrews, F. (1999). The Mediaeval Builder and His Methods. Mineola, NY: Dover Publications, p. 1. "Work was commenced frequently—if not usually—before anything more than a general idea of the ultimate end had been foreseen, and constructive problems were attempted in the early days with but little knowledge of what would probably be the final statical result. The main lines of a building enterprise having

necessary structural elements required, the work could progress through the erection and stabilizing of the nave wall, and ultimately spring from what has been built prior to any one time, hence the cathedral grows from the ground up.

The flying buttresses were not seen as delivering the forces of the rib vault to the ground, but instead stabilizing and buttressing the very tall and potentially unstable nave walls. This structural understanding by medieval masons is illustrated by the use of towers at the west end of cathedral naves as a "book end" with which the structure is maintained through pre-stressing. The arcade and series of pillars was thought to be reinforced by large western towers. This is the essential structural understanding of the medieval mason; everything should be buttressed with heavy weight as the structure was designed to resist external stresses and disturbances through compression. As will be discussed later, this understanding of structure results from hand craftsmanship and a direct knowledge of the stone material. Unlike the contemporary focus upon strength of materials and equilibrium of forces, the Gothic structure was designed to resist wind. It is because of this ability that Abbot Suger would have considered the pointed arch as virtuous, not because of the more efficient transfer of forces to the ground. The nave walls were not opened because of a novel understanding of structure as delivering forces to the ground, but instead the solid Romanesque nave wall became unnecessary when supporting a rib vault that exerted orderly and linear thrust. The reduction of the rib vault supports occurred slowly over time, and only as much as the masons cared or dared to reduce them. Subsequent examples such as those of cathedrals at Reims, Amiens, and Troyes demonstrate an attenuation of supports and increased areas of stained glass over earlier constructions.

5.15 Boss Loading & Buttressing by Loading

It has been suggested here that the ribbed vault would have been understood as more virtuous than previous forms of vaulting because it withstood wind better than the alternatives. Abbot Suger praised the vaulting in this regard, and resisting wind through masonry structure was accomplished through an ontological understanding of the material. Unlike contemporary structural theory which articulates a system of calculable and mathematically predictable forces acting upon the strength of material suspended in equilibrium, there is no such manner of determining structural stability. Instead the medieval mason had a cosmology that emphasised a material ontology rooted in God's uncreated presence. Ultimately the weight of the material serves as the ontological basis whereby it was understood, as Coldstream argues, that "the weight...should follow its due order through a straight line".[363]

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been determined, the decorative and structural details of it were left, more or less, to the moment of their need."

[363] Coldstream, N. (1991). *Masons and sculptors*. Medieval craftsmen. Toronto, University of Toronto Press, p. 62.

Stability of Gothic structures was established through the use of the natural and obvious quality of the stone; its weight. It follows that through centuries of working directly with, and knowing ashlar and stone structures, it is possible to establish that a perpendicular-to-the-horizontal straight line is appropriate for ensuring structural stability. A tilted column or pier will obviously not stand. Furthermore, that the arch should also follow its due order through a vertical straight line, thereby establishing the necessity for the pointed arch, for the pointed arch follows a straight line more so than a semi-circular arch. The weight of stone is an obvious characteristic, and it was the weighty-ness of stone that allowed for resistance to wind. The mediaeval mason knew this weight in an ontological manner, and used it in the design and construction of ribbed vaults.

Quarrying stone, transporting stone to the work site, and hewing stone all require direct work and direct understanding. It is this understanding that underpinned the medieval structural theory because it guided design decisions in the task of resisting wind at high elevations. The weight, which would have been known to masons through direct knowledge, would have been emphasised in designing vaults with extraordinarily heavy and thick ribs and heavy bosses at the crossings of the arches. Buttressing against the wind was accomplished through adding weight, and structural rigidity against the wind was increased by increasing the weight of the structural elements. Compressing the stone under tremendous pressure increased the ability of the stone structural system to resist lateral wind. Ultimately the structural understanding of medieval masons was to "buttress" everything through using the weight of the stone. Thus, the medieval masons did not want to make light structures but heavy ones.

Ultimately the medieval understanding of structure did not rely upon any determination of the strength of materials unlike contemporary structural theory.[364] Instead the stability of the structure determined integrity, and this stability was determined by geometry. The geometrical and formal understanding that was implicit within the medieval cosmology presents itself in the design and construction of medieval pointed arches and rib vaults. It is from the ontological and formal understanding of material that the medieval mason was guided.

[364] Huerta, S. (2006). Galileo was Wrong: The Geometrical Design of Masonry Arches. *Nexus Network Journal.* 8, p. 25-52. Santiago Huerta explains how medieval structures never approached the compressive limits of masonry construction, and therefore did not require an understanding of strength of materials or limits. Instead medieval structures often increased loading to increase stability. "In conclusion, it is a fact that for historical masonry structures, the stresses are an order or two orders of magnitude below the crushing strengths of the masonry and, therefore, the problem of masonry design is not governed by strength but by stability."

5.16 Teleology of Rib Vault

The immanent structures of masonry are recognizable by acknowledging the eternal and uncreated character of creation through temporal and finite construction rituals.[365] The crafting and placing of the stones require the final form for right placement, yet the final form is determined by the crafting and placing of the stone. The proverbial chicken and egg dilemma is appropriate, for only God's position is above the causation sequence. The metaphysical question is answered through acknowledging that being is eternal, and at no point *in time* did the egg, chicken, or rib vault not exist. Insofar as the rib vault partakes in God's uncreated and eternal character is it possible to see that the rib vault has always existed outside of time, and it is only confusing when assuming the rib vault has a beginning and a completion. The construction of the rib vault is a cosmogonic act whereby the stone masons are actualizing God's creation from God's being.

Considered temporally, the construction process reflects the medieval cosmology which pervaded everyday life including stone masonry. We must see the rib vault as without beginning and end, for the immanent structure of the stone material finds God's uncreated being as its source; it allows for a construction process without construction documents. Instead of written instructions, templates were created that allowed for each stone to be crafted according to the arch form. Without the form, as determined by the master mason, the individual and uniquely shaped stones would fall, yet without the uniquely shaped stones the form would not be readily apparent.

Teleology was explored by Plato in his *Timaeus*, and we know that portions of the *Timaeus* were available during the medieval period. It follows that Platonic ideas about the cause and reason of things would have been included in understanding the surrounding world. The reason for the medieval rib vault is ultimately found to be in its good-ness, and we should not forget that medieval theology understood the ultimate Good to be an Idea of God.[366] It can be said that the medieval rib vault participated in the ultimate Good because it was a good rib vault.

A good rib vault must be constructed well, and to be constructed well the rib vault must act in accord with its material. Ultimately the material begets the final form through the skill of the mason, but somehow the form existed within the material before the rib vault was constructed. It is in this manner of form existing prior to its material expression that we can begin to see how the rib vault was understood as teleological.

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[365] See chapter 4.15 & 4.16 of this thesis for examples of construction as a ritual of prescribed steps.
[366] Plato, & Kalkavage, P. (2016). *Timaeus*, (27d8-29a).

The material establishes the necessary conditions for the rib vault, but ultimately it is the form that is the final cause or purpose. Not only would the medieval mind have understood the final purpose as determined by the religious institution, but also understood the final cause as an active and generative principle of all activity. Insofar as the rib vault participated in the final purpose of arch-ness and virtuous goodness would the rib vault participate in the ultimate Good.

Constructing the rib vault would have been easily understood by masons trained in the medieval tradition. The pointed arch was the basis of the rib vault, and combining two or more pointed arches allowed for the construction of the rib vault. Unlike the groin vaulting precedent of Roman hemispherical architecture, the rib vault required much less wooden formwork and scaffolding. The ribs of the rib vault would have provided the structure for subsequent construction, as the ribs were stable once the boss was loaded onto the apex. The construction process is implied in the form of the rib vault, and would have been self-evident to medieval masons. The ribs become the permanent form from which work progresses.

It is difficult to find in large medieval buildings stones larger than two men can lift, for everything was crafted by hand and moved by very basic machines that required human muscle for movement. In all examples, the material determined the work, and the manner in which it was treated. This emphasis upon the immanent and inherent structure of the world finds expression not only in the rib vault, but also in the geometry that underlay the rib vault. As geometrical constructions were self-evident, so too was the rib vaulting that proceeded from it, and indeed the entire cathedral.

The geometries available would have included the circle, and the infinite divisions of the circle to produce equilateral triangles, squares, pentagons, hexagons, or any regular shape. The cathedral masonry would have been completed to a level at least to the point of the arch springer, therefore the span would have been determined. The height of the arch would be calculated through a geometrical relationship to the span, given that geometry was used to set out the stone voussoirs. The benefit of rib vaults lay in the ability to span different distances, yet maintain all bosses' height at the same elevation. This means the individual stone of the boss must be bevelled according to the angle determined by the initial span and height. From the pointed arch form is the material work determined.

Laying out the rib vault is straightforward, for initially the centre line of each rib is drawn in plan to connect each springing point. The springing point is located at the top most point of the supporting masonry wall, and determined by the work previously completed. The geometrical system would have been determined before construction commenced, so the springing point

would reflect the whole geometry of cathedral as set out. The transverse ribs are usually wider than the ridge ribs, so the thickness of each rib would be reflected in plan as well.

In elevation, the ribs are of the same height, so the transverse rib would have to be longer than the ridge rib. It follows that in elevation each rib is set out with a unique radius above the top bed of the tas-de-charge.[367] From the initial span the many shapes of stone required for creating a structurally stable rib vault can be defined. Because each rib curve is different within any single rib vault, describing each arc is crucial. The different rib curves such as the transverse and diagonal curves must share the same apex, but cannot share the same span. Therefore, the arc that describes the rib is different. Determining the curvature of the ribs is possible by using the shared height and span. The unique curvatures can be obtained by determining the height where the ribs splay and become individual within the tas-de-charge. Knowing the height of the vault, and knowing where the arc beings to splay, we need to determine the centre point for each arc. In elevation, the span and height of the diagonal arc determines any other arcs because bisecting any subsequent arc between the height as determined and the tas-de-charge splay gives a line that intersects with the centre of the arc to be determined. The remaining line to intersect with the bisector is described by a line from the splay in the tas-de-charge to the centre of the diagonal arc.

It follows that obtaining the templates or moulds for the tas-de-charge can be obtained through a full scale elevation drawing that describes the thickness of the rib. Since the height of each course is known, and the arc can be described in elevation, then the distance from the origin wall can be determined for any mortar bed height. This distance from the origin wall can be applied to a plan that describes the thickness of the ribs, and the mould or template is described by a line that intersects each rib at the distance from the origin wall. As each mortar bed, vertically and regularly progresses away from the original supporting wall, the horizontal progression is also determined geometrically. Therefore, by drawing these geometries at full scale it would have been possible to generate the templates necessary for describing the shape of stone needed for each architectural and structural element. What is to be noticed is the swinging of arcs from previously known point allows for the construction to be "self-creating" and generative.

The templates were necessary for creating the unique shapes and sizes of stone needed in the design. The shape of each unique stone such as those used in columns, tas-de-charge, vault ribs, mouldings, keystones, etc., was accomplished by applying the geometries of the template to the

[367] Cambridge University Press. (1910). *The Encyclopædia Britannica: a dictionary of arts, sciences, literature and general information*. Cambridge, England, [Cambridge] University Press. *Tas-de-charge* is a French language term in architecture, for which there is no equivalent in English, given to the lower courses of ribs of a Gothic vault, which are laid in horizontal courses and bonded into the wall, forming a solid mass; this helps bond the ribs, vault and walls together. It is also known as a solid springer.

various faces of a stone. A wooden template describes the stone to be carved through the unique geometries carved from each of its sides, and could easily be sent to the quarry for stone work to be carried out there. Minimizing the weight of the stone was vitally important, and crafting stone at the quarry allowed for lighter travel. Minimal instructions could have been written or inscribed upon the templates as well, even though the work force is thought to have been illiterate. In the same manner that mason's marks were used as a short hand hieroglyphic for identification, so too could the templates communicate simple instructions on their face as well.

Chapter four described, in detail, the work of the medieval master masons. This chapter addresses Abbot Suger's chronicle of building the first example of Gothic style, where pointed arch, flying buttresses, and tracery are found for the first time in one location. The chronicle explicitly states how God is present not only in the Cathedral, but also during the construction process. The medieval Christian God was present for all classes of society, and His being determined the skills and tradition of the masons.

The following chapter will summarize and describe the understanding of Gothic architecture as presented in the current thesis.

6 Conclusion

The contribution to knowledge suggested in this thesis is an essential account of the Gothic cathedral within a medieval cosmology. The critical implications for current thought include a shift from 1) portraying medieval theologians as proto-architects, and from 2) the attempt to see direct manifestation of theological theories in constructed form. It is possible to see how medieval society and Gothic architecture were organized according to a Christian cosmology, and therefore were saturated with theological meaning, but the translation into material form is far subtler than previous scholars and historians account for. An authentic account of medieval architecture must do so using the medieval context of formal ideas, such as virtue, charity, uncreated being, and miracles in order to straighten the current discourse.

The "apprehension of wholeness instantaneously" is a feature of these formal ideas. This eternal beginning is ever present and apprehended in temporal unity. These very important medieval ideas allow for a number of meanings, and are inexhaustible sources for meaning. As sources of meaning, it is possible to understand medieval formal ideas as "templates", where a number of meanings can be found, and at this point it is possible to see how medieval masons could possibly use these symbolic "templates" alongside masonry templates to create Gothic architecture.

Instantaneity can be seen in the way medieval masons constructed the cathedrals. The lack of construction documents and reliance upon templates suggests a sacred and whole apprehension of the construction process. From a mythic and symbolic understanding of medieval masonry we can begin to see a process of construction whereby templates derived from geometrical principles became the instructions for building the monuments of 800 years ago. In the same manner that poetic creation myths were handed from generation to generation, we can see the building tradition adopt the same mechanism for passing information to successive generations. Furthermore, we can begin to understand the thought process behind a master mason who did not rely on construction documents but instead apprehended the cathedral in its entirety from the beginning. These craftsmen would have had to love, venerate, and authentically create the cathedrals. As was discussed in chapter 4.6, geometry allowed for the masons to fulfil their duties as the demand for authenticity is met with uncreated-being. The craftsmen did not rely upon another source, but instead allowed the geometry and material to develop naturally into the pointed arch and ribbed vault of the Gothic style.

Despite the absence of an explicit role or position within the medieval clergy or medieval monastery, the master mason was nevertheless participating in religious ritual, and through construction also participating in understanding the world as divinely created. It is this absence of

explicit mention by Christian chroniclers and clergy in their recounting of medieval construction that has unintentionally misled contemporary scholars as to how far theology influenced the Gothic cathedrals. Despite no recorded mason names at the Abbey of St-Denis, it was implicit that masons were doing the work of God. This means that the masons were not only participating in the Church as a religious institution, but also that the masons were realising God's presence in creation; thus, sharing in the work of God the creator through geometry and work.

These "ritual-liturgical" actions of the cathedral builders were not committed to written text, but given archaeological evidence and continuity of hand crafted masonry over many hundreds of years we can begin to outline what the "liturgy in construction" would have looked like. The ruling principles of stone, which was a necessary material for medieval builders, were revealed by medieval Christian tradition. Such a revelation of ruling principles was possible through the parallelism between the higher Godly realm, and the lower created realm. Some aspect of God was present on earth, even if his sublime and unknowable aspect was not. Ruling principles and eternal essences were accessible not only through solitude and revelation, but also through liturgy, work, and communion. There was a certain "sanctuary within the stone" that was accessed.

The Christian rituals such as the Eucharist were the means by which medieval man organized and understood the cosmos, as ultimately the Eucharistic rituals emphasised the material and created realms were co-mingled with divine realms. Through the activity of man celebrating the Christian narrative, all human activity can be understood as "symbolic". Furthermore, it is easier to find Divinity when it is realised through material, and throughout Christian history the patterning of matter into being was of great importance. It follows that the metaphysical intent of geometry and the measure of earth was of central importance, and through geometry the medieval mind was exploring nature. Like Christ as both God and man, geometry allowed for an aspect of God's uncreated being to manifest in material and earthly considerations. Craftsmanship and its foundations in geometry allows for the creation of objects that hold a divine relationship to the cosmos. The skill, technique, and craftsmanship were passed onto successive generations in the same manner as poetry and creation myths; through an oral tradition. It is thus possible to encounter Divinity through work and ordinary existence insofar as the appearances of Divinity are for God himself rather than an autonomous subject.

It was also possible to see the Gothic cathedral as an act of God's creation, built by God, for God. The medieval acceptance of numerous sources of divine presence allows for the cathedral and elements of the cathedral to manifest Divinity. The pointed arch was granted a new status, as the ribbed vaults of the great cathedrals were amongst the sacred relics acknowledged as being worthy of pilgrimage and worship. The ribbed vaults are not structurally necessary as the

cathedral will stand with only the wooden roof structure and flying buttresses. These crowning jewels of medieval architecture are just that, sacred artefacts that demonstrates God's presence. Ribbed vaults came to such an esteemed position given that forces are delivered in a ribbed arch more closely to a straight line than round arches, and subsequently were more virtuous, stronger, and more arch like than a round arch. The structure became decoration. Ribbed vaults did not depend on any other element, such as flying buttresses, for structural rigidity, and therefore shared in God's uncreated being. Those arches and vaults were by analogy an expression God's independence as uncreated being. We know of the importance of ribbed vaults, and the virtues of the form through the chronicles of Abbot Suger. The innovations at St. Denis as Abbot Suger oversaw for the first time the coalescing of the separate elements of gothic architecture, and are underpinned by written text. Of utmost importance is the explicit placing of the virtuous ribbed vault within the medieval cosmology by Abbot Suger, the combination of which has been neglected by modern scholarship.

The construction process of Gothic cathedrals also participates in the medieval cosmology. An essential understanding of the material guided the masons, and an essential understanding guided the master masons in their use of geometry. Hand labour was utilised to hew the stone to correct size, and every mason understood the weight of stone intimately. It is this direct knowledge of the material that informs the design of the cathedral, as the structural understanding was to simply buttress the stone forms to resist external stresses and disturbances. The weight of stone informed the formation of Gothic cathedrals, as stone is stronger when loaded. Boss loading, finial placement, flying buttressing, and western tower and central tower placement all contributed to the loading and structural reinforcement of the stone forms. It follows that from the inherent quality of the stone as heavy, the Gothic form was born. Geometry played an integral role as the stress limits of stone were not approached in the compression of Gothic structures, therefore medieval Christian geometry is more appropriate for designing stone structures, in this instance, than modern material science and modern spatial re-presentation.

The simultaneous process of design and build was possible through the use of geometry and wooden templates as paper or parchment was prohibitively expensive for use in the construction process. The crafting of the wall participates in realising the forms and geometries as defined by the master mason through templates, and the form of the finished architectural element pulls the construction forward by directing the actions of the mason. Weight bearing capacity and structural rigidity is determined by the quality of the work. Ultimately the finished form is a realization of the potentials of matter so determined by a divinely created cosmos. The "self-creating", generative, and teleological nature of Gothic form is realized at all levels, including the actions of the mason laying individual blocks. The inherent quality of the material decides what

size it wants to be, and what form it will eventually beget, and in this fundamental truth of masonry can the medieval theology be discerned. The hammer is not smashing through the material, but instead the hammer is lifted and allowed to fall according to essential and natural law whilst being skilfully guided to precise points on the chisel and stone by the mason.

Through building upon previous scholarship which detailed the building process, hierarchical structure of medieval society, and structural accomplishments of medieval masons, an appropriate and authentic account of the Gothic cathedral is presented. Understanding the artefacts of a historical period as the society would have understood them, insofar as possible, has been the goal of the current thesis. Here concludes the attempt to establish a common medieval metaphysic, and detail its implications for Gothic architecture.

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