THE CATHEDRAL

I. An investigation into the historical determinants of the form of the Christian church building.

II. The design of a new Catholic cathedral for Houston, in accordance with the form determinants proper to the second half of the twentieth century.

by

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ABSTRACT

Thesis:
I. An investigation into the determinants of the form of the Christian church building in history.
II. The design of a new Catholic cathedral for Houston, in accordance with the form determinants proper to the second half of the twentieth century.

I. Historical Survey
The form of a church building results from the community's concept of what a church ought to be. This concept may be defined broadly from two viewpoints: a) the external, or "ecumenical", by which the Church as an organization is considered as one segment of the entire life of a society; and b) the internal, or "liturgical" viewpoint, which considers the church as a place of worship, the worshippers' relation to God, and its liturgical expression. This historical survey examines these determinants, and c) the church buildings which resulted from them, in several stages throughout the Christian era, these being:

II. Design Program
Corresponding to the historical survey, the design program is divided into three sections: a) the ecumenical program, b) the liturgical program, and c) the resulting building.
a) The ecumenical program explores the Church's position in the modern world, and discovers that it is unique in history. The Catholic Church is near the perigee of its influence on the world. Much of the traditional structure of the Church is now outmoded and ineffective. But, at the same time, strong currents of new forces are rising to the surface, which promise great strength for the Church of the future, but not in the same way in which it has been strong in the past.

b) The liturgy, or common worship, has always been an important manifestation of the interior life of the Church. It is an aspect of the Church which touches directly the lives of its members. The liturgy is especially important to the architecture of the church, because it determines most of the functional and many of the symbolic requirements of the building. After four hundred years of stagnation, the liturgy is currently experiencing a remarkable renewal and transformation. Its guidelines are simplicity, clarity, and participation of the laity.

c) The radical reorientation of both the internal and the external aspects of the life of the Church in our day suggests the emergence of a new form for the church building, perhaps even a new era for church architecture.
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Part I: An Investigation into the Historical Determinants of the Form of the Christian Church Building.

Introduction:
The following will not be a history of church architecture. Rather, it will be an attempt to understand the forms of church buildings of the past through their causes. The form of a church building results from the community's concept of what a church ought to be. This concept may be defined broadly from two viewpoints: a) the external, or "ecumenical"; and b) the internal, or "liturgical".

a) The ecumenical viewpoint considers the relation of the Church to the world; that is, it considers the entire life of a society, of which the organized Church is one segment, of varying degrees and kinds of importance. It considers the influence of society on the Church, and the influence of the Church on society, and the particular ways in which these mutual forces work. The Church's role in society, its position in the world, contributes greatly toward the characteristics by which it is known in a given age. This image of the organized Church influences, in turn, the form taken by the church buildings of the age.

b) The liturgical viewpoint considers the relation of the worshipper to God, taking account of the prevalent concept of God, and the liturgical expression of this relationship, and the setting appropriate for worship in each age. It
considers the internal structure of the organized Church, and the disposition of the various hierarchical elements.

These two viewpoints are, of course, inseparable, by virtue of a host of secondary relationships and ramifications that obtain between their constitutive elements. But their distinction provides a very helpful tool for our purposes. These fixed viewpoints provide a clear picture of fluctuations of emphasis, throughout history, of various aspects of these relationships. The proof of this method is in its application. The following survey will examine the history of the determinants of the form of Christian church building through the ages, from a) the external, ecumenical viewpoint, and b) the internal, liturgical viewpoint, resulting in c) the actual form taken by the building.
1. Early Christian

a. Ecumenical Viewpoint:

Christianity grew up within the framework of the Roman Empire. The Roman political structure had imposed an effective unity on the Mediterranean world conducive to the rapid spread of the Christian movement. In addition, the Roman Empire had made extensive use of buildings to symbolize the central authority of Rome. For the first three hundred years of its life, Christianity was a persecuted minority group forced to operate underground. In the fourth century, with the espousal of Christianity by the emperor Constantine, Christianity became respectable. Christian churches were built for the first time, and worship became a public occasion.

b. Liturgical Viewpoint:

In the first three centuries A.D. Christian worship took place in secrecy, mostly in private homes. "It is not surprising that the worship of the early Christians reflects a strong sense of personal involvement reflected by participation in the actions of the liturgy in a most direct fashion. It was inevitable that such groups were characterized by a strong corporate sense, and the small number present made worship intimate." When worship became public, under Constantine, much of the earlier intimacy was necessarily lost, and the clergy began to assume most of the liturgical functions, with the congregation making responses. Their God was the God of love, and community spirit was strong among them.
c. Resultant Building Form:

The building form chosen for these first Christian churches was quite naturally that of the Roman basilica. The basilica had been used by the Romans as a multi-purpose gathering place and as a law court. Colonnaded on the interior, contrary to the form of the Greek temple, it emphasized the interior space and the community gathered there. An apse at one end, or sometimes both, contained a platform with a throne for the judge. In the Christian church, this platform became the predella for the altar and the bishop's throne, with the ambo (pulpit) at its forward edge. The people were able to gather around three sides of the altar with the clergy on the fourth side. The general form of the basilica was associated in the minds of fourth century Romans with central authority, justice, law and order.²

2. Byzantine

a. Ecumenical Viewpoint:

By the end of the fifth century, with barbarians in control of the western world, Constantinople, structured on the oriental influences of Syria and Persia, had become the political and cultural light of the world. The Church at Constantinople was superior to that at Rome, but under Justinian it came under the "patronage" of the state.
b. Liturgical Viewpoint:

The stylized elegance characteristic of the oriental court was turned to the service of God in the Byzantine liturgy. "God" acquired the cast of an eastern potentate -- omnipotent but somewhat remote. The chant became an integral part of this liturgy, involving the formal active participation of the faithful. Few variations were permitted in the liturgy.³

c. Resultant Building Form:

Three of the great Byzantine churches of the sixth century, Sta. Sophia, Ss. Sergius and Bacchus, and San Vitale, were built under the direct patronage of Justinian, as much for the glory of the emperor as that of the Church. All three are central plan churches, indicative of the stable, even static, society that produced them. Walls are covered with stylized mosaics, a characteristically hard and formal medium, but one which shimmers with reflected light, providing a setting of oriental grandeur and awe, supremely elegant.

3. Dark Ages

a. Ecumenical Viewpoint:

With the decimation of the Roman Empire, the Church became the sole
repository of all remnants of Roman civilization. Although political and military supremacy belonged to the barbarians, the Church possessed all moral authority, learning and culture, the prestige of the Roman name, and the care of the people. In time an assimilation occurred: the barbarians were converted to Christendom and Christianity itself became barbarized.  

b. Liturgical Viewpoint:
As the Byzantine liturgy became more rigid, the Roman became more flexible. Each day's service varied with the calendar and procedures varied from one church to the next. Pope Gregory (590-604) organized the sacramentary and defined the liturgical cycle, as well as introducing the famous Gregorian chant. Barbarian pantheism produced a fascination with nature that would have telling effect in the Romanesque and Gothic periods. God was an intimate part of life and the things of life.

c. Resultant Building Form:
Churches from the sixth through the ninth centuries retain the general basilican form of the Roman Church, but exhibit greater regional variations in its application, with a tendency toward crudeness and massiveness.
4. Romanesque

a. Ecumenical Viewpoint:

In a world of feudalism the phenomenon of western monasticism flourished, as an autonomous force, independent of the bishops as well as the lords. In the eleventh century, monasticism applied its energy to vigorous reform of the Church, and part of their reform was purgation of secular control from the Church. It was a short step from independence of secular power to control over secular power, and the Church stepped into the void left by the breakdown of the Carolingian Empire. In 1073, Pope Gregory VII became the supreme leader and final judge of the Christian people, with the lords as his vassals.6

b. Liturgical Viewpoint:

The austere Roman liturgy was developed, through the monasteries, into a service performed almost exclusively by the clergy, in Latin, by then a foreign tongue. Simultaneously, Franco-Germanic tendencies toward emotional devotions began to occupy the attentions of the people.7

c. Resultant Building Form:

The combination of the vigor and the authority of the reformers began the most productive church building age in history: From 1050 to 1350 France alone built 80 new cathedrals, 500 large churches, and tens of thousands of
parish churches, making one church for every 200 people. The northern European love of emotional involvement and their propensity for organic forms began to find expression in buildings that came alive; they were no longer boxes, but organisms. Thrust and resistance became the bones and sinews of articulated vaulting and buttressing. Each bay enclosed a vertical internal space, adding complication and subtlety to the unidirectional movement of the early basilicas.

5. Gothic

a. Ecumenical Viewpoint:
In the twelfth and thirteenth centuries relative peace prevailed throughout Europe, commerce flourished, and cities grew. There was a close connection between the commercial strength of the cities, their independence, and ecclesiastical construction. There was deep local pride and patriotism. The cathedral became a familiar part of life, being used for secular meetings and often serving as a town hall.

b. Liturgical Viewpoint:
The immanent God of the north European mind was highly refined in the various "Summas" written at this time, whose ambitious aim was to reconcile faith and
reason. The experience of the omnipresence of God found expression most frequently in personal devotions, without the need of communal worship as an intermediary. Performance of the ever more complicated liturgical rites was therefore left to the clergy. Following the example of monastic churches, the chancel was often screened in, for the exclusive use of the clergy and choir. The nave was divided into smaller spaces to serve a variety of functions; as shrines, chapels, and tombs.

c. Resultant Building Form:
The church's physical position in the city exactly expressed the Church's position in the culture of the society. As the central, towering, and dominant fact in the cityscape, it reflected the new centralization of ecclesiastical authority, its freedom from secular control, and the supreme and cooperative effort of the townspeople in the making of it. Such audacious building sprang from the same confident spirit that was able to mobilize virtually all the resources of Europe in the launching of crusades to recapture the Holy Land by a massive assault. The form of the Gothic church resulted from and encouraged personal religious experience. Scant attention was given to liturgical function, compared to the desire to create a living, organic building, steeped in mystery, based on many of the same principles governing the scholastic philosophy of the time: The principle of "manifestatio" or clarification, with
same principles governing the scholastic philosophy of the time: The principle of "manifestatio" or clarification, with its emphasis on enumeration, articulation, and interrelation; and the principle of "concordantia" by which contradictory possibilities are reconciled. 11

6. Renaissance

a. Ecumenical Viewpoint:
From the end of the thirteenth century the Church had begun a general decline, speeded by the removal of the Papacy to Avignon and the consequent multiplication of claimants to the papacy in the fourteenth century. Into the void left by the Church rose the forces of nationalism, the new world of scientific knowledge, the new geographical world of the Americas, and the oceanic expansion of European trade and colonization. 12 In Italy, cultural interest was directed toward the revival of the ancient Roman world, and Italian Humanism was born. The best the Church could do was ally itself with a movement that had grown up outside its walls. It was a cultural follower, where it once had been the leader.

b. Liturgical Viewpoint:
Allegory, legalism, and pietism had dictated the codification of the liturgy in the thirteenth century under Innocent III. In the following centuries, the meaning and practice of the liturgy became more debased, with the flourishing of private masses and the diminution of reception of Communion. 13
c. Resultant Building Form:

The architecture of the Renaissance happened to be concerned with churches.
By allying itself with this stronger force, the Church procured buildings de¬
signed primarily in accordance with the esthetic principles of humanism rather
than with any impulse originating within the Church itself. These principles are:
1) Spatial measurement based on elementary mathematical relationships.
2) Emphasis on repose rather than movement.
3) Placing man at the center, as the measure of all things.

That this architecture had a self perpetuating life of its own is shown by the
continuity of its development through an age when the established Church was
being rocked to its foundations by the Protestant Revolt.

7. Baroque

a. Ecumenical Viewpoint:

Post-Renaissance Europe was an expanding world. The Renaissance
beginnings in commerce, science, culture, and nationalism flourished
and multiplied. The Catholic Church, made painfully aware of its de¬
ficiencies by the Protestant Revolt, once more set about reforming itself,
and succeeded with such ferocious severity that most of the reforms still
remain in effect. The Council of Trent (1535 - 63) defined the Church's
stand on dogmas questioned by the Protestants, and enacted a mass of reform legislation. What it did not do was attempt to reform the Catholic rulers, and this was to have the eventual effect of reducing the influence of Catholicism in the south as truly as the Protestants had ruined it in the north. The Treaties of Westphalia in 1648 signified the end of the ages when the papacy was a recognized force in the public life of Europe. 14

b. Liturgical Viewpoint:
The Council of Trent established comprehensive laws for the celebration of the liturgy, and relegated any future liturgical questions to the Pope, with the general result that a fixed uniformity was imposed on the whole Church. 15 From this point until the twentieth century, the liturgy counts for little. The life of the Church is concerned, on the one hand, with organization and legalism and, on the other, with increasingly emotional forms of personal piety.

c. Resultant Building Form:
By a unique combination of the energies of reform within the Church and the Humanist tradition it had grafted to itself, the Church was able once more to influence the course of Architecture. The Humanist culture had been turned to the Church's advantage in the design of St. Peter's, and in its dome Michelangelo prefigured the Baroque age in a style appropriate
to the grandeur of his task. The Baroque received further impetus through
the design of the mother church of the Jesuit order in Rome, II Gesu', begun
in 1568, and destined to exert a wider influence than any church of the next
four hundred years. Most of the main characteristics of the Baroque are
exhibited or suggested in II Gesu'. With corresponding ecclesiastical
significance, they are:

1) The Renaissance central plan, which signified non-Christian humanism
to many, was given direction and movement by the addition of a longitudinal
nave.

2) Passionate vitality and richness break the academic rules and violate
Renaissance repose.

3) The interior becomes a single, unifying space, ideal for preaching.

4) Painting, sculpture, and architecture are interdependent, as are the
individual parts of the composition, subordinate to a dominant theme,
perhaps representing the Catholic Church's image of itself.

5) Clear light is introduced as a major architectural element, dispelling
heresy and corruption from the dark corners of the church.

6) A sensuous plasticity of form, seemingly modeled and scooped out by
the hand of a sculptor, creates a style of grandeur which has immense
popular appeal to the religiously wavering masses.
8. Enlightenment

a. Ecumenical Viewpoint:

In the seventeenth century, cultural leadership of Europe shifted from Rome to France. In the early seventeenth century France experienced a brief revival of Catholic life in all its forms. But an ever present undercurrent of European atheism, encouraged by the Humanist Renaissance, and released by the Protestant Revolt against religious authority, came to fruition at the end of the seventeenth century in the form of Deism, a system based on pure reason and natural virtue, which was to enlist the support of most of the chief intellectuals of the day. The invective genius of Voltaire, directed against the Church, put the Church in the position of the defendant. By directing his attack against the Jesuits, the real strength of the Church, he brought about the dissolution of the order in 1773. The European world was completely secularized -- the Catholic Church was considered at best a department of State (in all countries except America), whose office was the promotion of moral order. Nowhere was it free to live fully its own life.16

b. Liturgical Viewpoint:

Liturgical scholarship effected a genuine revival of ancient and Gallican liturgies for a short time in France. Its chief significance, though, was to plant the seed of liturgical revival which was to grow for centuries.
c. Resultant Building Form:

The rigorously centralized government of late seventeenth century France demanded the service of the arts to enhance the glory of the court. To this end the famous Academy was founded, as a department of the civil service, for the regulation of style and the education of architects. Jules Hardouin-Mansart embodied the type of the official French architect, and his work embodied the official style, a combination of Baroque grandeur and French elegance, as seen in his church of Les Invalides in Paris (1675). The Catholic Church's position in the world, a position of inconsequence, both as political power and as moral force, is expressed in its church architecture of the eighteenth century -- there is hardly any (excepting German rococo developments).

9. Protestant England

a. Ecumenical Viewpoint:

In late seventeenth century England the Established Church, by virtue of its close union with the State, was an integral part of the life and culture of the time.

b. Liturgical Viewpoint:

Protestant liturgy shed Roman Catholic mysticism, abandoned the separation of clergy and laity, and placed greater emphasis on hearing the Word, with services conducted in the native tongue.
c. Resultant Building Form:

The church architecture of Protestant England developed integrally with the secular architecture of this time. From the introduction of classical motifs in non-religious buildings by Inigo Jones, Christopher Wren was influenced by Paris toward the Baroque. To the richness of this style, modified by typically British restraint, he brought a keen intellect and engineering genius, to produce his masterpiece, St. Paul's, as well as fifty-five other churches after the 1666 London fire. These churches are organized along strict functional lines. Emphasis is placed on the reading desk and the pulpit; the long nave is abandoned, and tiers are introduced to bring the people closer to the spoken word; there is nothing to suggest a chancel. Gibbs then developed this style into the form familiar to us from typical New England meeting-hall churches. Robert Adam and John Wood continued the development, but in a secular vein.

10. Nineteenth Century

a. Ecumenical Viewpoint:

In the twenty-five years between the French Revolution, 1789, and the abdication of Napoleon, 1814, the last remains of the material structure
of the medieval Church were destroyed. The Church was stripped of its wealth and lands, but at the same time it was freed of that secular involvement that had been the source of so much scandal and corruption in the past. The year 1848 marked the end of European Absolutism, with Liberal (democratic) revolutions triumphing in nearly every capital of Europe. Nevertheless, the Church continued to align itself with absolutism, futilely trying to stamp out liberalism, until, in 1870, the Papal States were confiscated. Not until 1878 did the Church get a pope who understood the meaning of both the French Revolution and the Industrial Revolution: Leo XIII. His twenty-five year term of office began a revolution within the Church that is flourishing in our day. He aligned the Church with the movements toward individual liberty and social justice. He established the principle that the Church should never allow itself to be isolated from the general life of the time. Probably his most significant document is, appropriately, "Rerum Novarum": The Condition of the Working Classes. 20

b. Liturgical Viewpoint:

In the nineteenth century, liturgical interest was limited to the work of a few obscure and largely unappreciated scholars. Personal piety in the nineteenth century was of a private, romantic, and emotional nature.
c. Resultant Building Form:

Nineteenth century architecture is a succession of revivals and hybrids, resulting from the marriage of literary romanticism to scientific archeology. It was successively concerned with the problems of the landscape garden, the monument, the museum, and the theater. The Industrial Revolution put new construction techniques at the architect's disposal, mainly structural iron and steel and later reinforced concrete, which were applied to the problems of the exhibition hall and the factory in the latter half of the century. The Industrial Revolution produced architectural problems of its own, such as the individual small house and town planning, due to an expanding and mobile population. Thus the organization of exterior space becomes one of the chief contributions of the nineteenth century. At the end of the nineteenth century, the Catholic Church and architecture in general exhibit common structural characteristics: an elaborate and antiquated superstructure overlays potentially powerful impulses, as yet unrecognized, which are "of their time", grappling with real problems and laying the groundwork for the productive expansion of the twentieth century.
11. First Half of the Twentieth Century

a. Ecumenical Viewpoint:

Nietzsche heralded the post Christian era by declaring the death of God. At the beginning of this century, in spite of large numbers of communicants, Christianity was generally impotent in public affairs, and, to all appearances, in private morals. The half century is marked by religious persecution in Fascist Italy, Nazi Germany, Communist Russia, Spain and Mexico. Although unable to defend itself, the Church at least never capitulated. It was in non-political areas that the Church was to progress. Pius X (1903-14) turned his energies to reforms in the personal piety of the faithful, encouraging frequent Communion and reorganizing the liturgy. Pius XI negotiated concordats with the European States, guaranteeing freedom of religious practice, and becoming for the first time really independent of the Italian government, in 1929. He established new Catholic universities, organized foreign missions, and encouraged the development of native clergy. His encyclicals deal with social problems: capital and labor, and socialism. He stressed the necessity of apostolic action by the faithful and of organizations of the laity.21 A new direction in the Church's activities is apparent: It works now not so much from above as from below, through the grass roots, so to speak. Its structure is horizontal, where it had been vertical. It is developing a strong laity, involved in the world, whose influence will bear on their peers, often through the established secular machinery.
b. Liturgical Viewpoint:

Pope Pius X assured the revival of the liturgy by stressing its pastoral character. Specifically, he increased the reception of Communion, encouraged children to receive; he restored the original Gregorian Chant to the ceremony, revised the calendar of feasts, and the priests' breviary. From its monastic origins, the liturgical movement spread through the German youth movement through the work of Romano Guardini, and similarly in France through Fr. Doncoeur. The English speaking world was slower to follow, but in the U.S. the movement gained much impetus through the work of Dom Virgil Michel, O.S.B.22 The practice of personal devotions began to decline as people became more involved with the Church as an instrument of social effectiveness. In France, worker-priests joined factory assembly lines in order to enter into the lives of the workers there. The idea of quietly working out one's own spiritual salvation paled beside the fervor of wresting the material and spiritual salvation of all men from cruel circumstances.

c. Resultant Building Form:

By the middle of the twentieth century, architecture had come into its own. The battle against nineteenth century eclecticism had been largely won. The new architecture has successfully established itself on the basis of the following principles:

1) Emphasis on function as a determinant of the form of the building.
2) Simplification of form; paucity of materials; deletion of applied ornament; decorative quality of natural materials.

3) Technology becomes a form determinant, accompanied by a new esthetic.

4) Space is treated as continuous and flowing; inner and outer space interpenetrate.

5) Larger scale, and attention to the moving viewpoint, commensurate with the new mobility.

Church architecture has played a negligible role in the development of these principles, except in a few cases of work by Perret and Schwarz. A survey of typical twentieth century churches will reveal an apparent lack of understanding of these new principles:

1) While function is perhaps less of a determinant in churches than in other buildings, it is too often neglected entirely. Function here includes not only the circulation and seating of people, but also the liturgical services performed in the space.

2) Complication of form seems to be rather the rule in church design, as well as multiplicity of materials. The intention is usually an architectural tour de force, and the result is the abandonment of all principles of good design.

3) Though churches are often extravagant in shape, technological considerations are seldom instrumental in determining the shape. Rather, the shape is designed to express an abstract religious concept. This approach has the disadvantages
of a) being lost on the congregation, or b) precluding the expression of other, equally valid concepts.

4) Church space is usually static, being a single large room, and church architecture is preoccupied almost exclusively with interior space. This results from, and promotes, sharp separation of the church from the world.

5) Less thought has been given to the large scale problem of the church's physical place in the community than to hundreds of overworked details of church furnishing. Nowhere has the church taken account of the automobile.

The first half of the twentieth century has seen a church architecture lagging behind and essentially divorced from the architecture of its time. This condition is at variance with the intent and the character of the Church. What is now needed is, at the very least, to bring architecture to the service of the church, in the form of applying to churches the knowledge of itself that architecture has acquired, and, at the very most, to bring the church to the service of architecture in the form of developing new architectural means springing from the specific needs of the church, as has been done so often in the past.
Part II: The Design of a New Catholic Cathedral for Houston in Accordance with the Form Determinants Proper to the Second Half of the Twentieth Century.

Introduction:
The preceding historical survey has comprised an expanded statement of the present thesis, an investigation into the determinants of the form of the Christian church building. The remainder of the presentation shall comprise a demonstration of this thesis, in the form of the design of a new Catholic cathedral for Houston, in accordance with the form determinants proper to the second half of the twentieth century. Corresponding to Part I, in which various historical periods were considered under three aspects, Part II is divided into three sections: A) the ecumenical design program; B) the liturgical design program; and C) the resultant building.

Part II of the thesis, which follows, may be considered a continuation of Part I, in that it carries the historical survey into the present and the foreseeable future. It is a "historical prediction" of the Church in the second half of the twentieth century.
A. The Ecumenical Program

The ecumenical program explores the position of the Christian church in a post Christian era. The role of the Church has progressively declined over the past five hundred years, but there are strong evidences of a new vitality with the potential of radically reshaping the Church. This thesis accepts the hypothesis that much in the Church is outmoded and therefore irrelevant, and that its future life, if it is to survive, lies in impulses which are now only emerging. The following Ecumenical Program is an attempt to ascertain the characteristics of the Church of the future. These characteristics are now in different stages of development — some are clearly visible and widely prevalent; some are just breaking through the surface of acceptance; and some are still only speculative and theoretical. There is a remarkable consistency of thought among the leaders of the new movement, and a fairly accurate prognosis can be drawn. How much of this thought will actually be concretized is, of course, unforeseeable now, but architecture has a real and formative role to play in its development. By implementing ideas which are now only speculative, architecture may take a leading role in their eventual acceptance. According to a consensus of the best opinion, then, the Church of the future must strive to make the following characteristics its own.
1. The church of the future must be less "religious" and more "lay".

"What a fearful phrase this (‘organized religion’) is when one stops to think about it, and how calamitous that Christians should have come to find themselves committed to its defence.... For the last thing the Church exists to be is an organization for the religious. Its charter is to be the servant of the world."23 "And this, so far from requiring the stepping up of the Church as a religious organization, points rather in the direction of the dépouillement or stripping down which Bonhoeffer believed it must undergo. This could be put in another way by saying that the Church must become genuinely and increasingly lay -- providing we understand that much misused word aright. This does not mean its becoming a lay movement, in the sense of abolishing its sacramental ministers. ...Rather, the laity is the laos, or people of God in the world. And what Bonhoeffer meant by authentic Christian worldliness is echoes quite independently by the Roman Catholic, Fr. Yves Congar, in his designation of a layman as one for whom the things of this world are 'really interesting in themselves', for whom 'their truth is not as it were swallowed up and destroyed by a higher reference'. And this temper of mind...need not, indeed cannot, be confined to those who are not ordained. It must be the temper of the whole Church."24

2. The church of the future must be open. "In the open society of our century -- the society founded on the concrete rights of persons, rather than on abstract
ideas -- the Church can live under conditions highly favorable to her inner necessities. No previous form of life was so well adapted to manifesting the message of the Gospels: the freedom of the act of faith, the free community of believers, the service of believers to their neighbors....

Moreover, the open society has much to gain from an open Church. The open society needs sources of independent moral insight, and prophetic witness to religious reality. There is already too much conformity, standardization, and spiritual mediocrity in the open society. It does not need a dependent, fawning, religious organization, but a religious community which knows its own mind and speaks it."

3. The Church must decentralize.

a) In authority: The authority of the bishops to govern was greatly increased by the Second Vatican Council's declaration of their collegiality with the Pope. The collegiality of the priests with the bishop, and of the laity with the clergy will follow, it is predicted.

b) In philosophy: The unchallenged supremacy of St. Thomas Aquinas will be replaced by a diversity of viewpoints, open to the insights of science and non-Christian thought.

c) In doctrine: The Second Vatican Council is making no dogmatic pronouncements. Systematized, rationalized absolutisms are no longer relevant, and free exchange of opinions is in the air.
d) In liturgy: Regional variations are not only permitted, but encouraged, as part of the current liturgical reforms.

4. Reunion of the Christian churches. "Faithful to our ecclesiological principle that the Church continues the work of Christ in the world, we must say that the mission of the Church was, is and ever remains the healing of the wounds of the human family.... If it is true that the great forces dividing our generation are the pride of race, the selfishness of class struggle, the accumulation of group egotism, ideals of conquest, and religious or anti-religious intransigence, then we must claim that the Church was sent to heal all of these."27

"The unity of Christians is a condition for their effective dialogue with mankind."28

With these general characteristics in mind, let us now consider some more specific points: what constitutes the uniqueness of the cathedral compared with the ordinary parish church? The parish church is based upon a territorial area, a convention which began when transportation facilities limited the distance one could travel to church. The parish territory is now often determined by the area required to support a parochial school. Many people think that the territorial parish is now outmoded, and that churches should serve "functional" groups of people who have something in common, such as
downtown businessmen, and factory workers, rather than geographical groups whose proximity to one another is only coincidental. From this viewpoint, the existing Catholic cathedral in Houston could continue to serve its present parish as a parish church, and as a first step away from this system, the new cathedral would have no parish. During the week it would serve the central business district. In time the emphasis on Sunday attendance at Church will wane, as the work week becomes restructured, and the church will take its place as a part of the businessman's life, not as something separate from it, as it is now.

In this preceding respect, the new cathedral will be the most advanced church in the city. But tradition is still rightly a strong element in the Catholic Church, and the proper place for this tradition to reside is the cathedral. Services in the parish churches will become simpler and more direct, and will concern smaller gatherings of people than the present congregations of hundreds; perhaps Mass will even be celebrated in private homes with small groups, which would aid in the recovery of the sense of community vital to Christianity. Supplementing such a program, the cathedral will bring together the faithful from the entire city on important feast days, and stage services with great richness, pomp, and ceremony, drawing on the Church's bountiful tradition.
B. The Liturgical Program

The liturgical renewal of our day is the key to many of the important changes now evolving within the Church. The liturgy is the Church's official act of public worship. It is through the liturgy that most of the faithful have most of their contact with the Church. Significantly, it is in this area that the most widespread reforms have already been enacted, along the guidelines of simplicity, clarity, and participation. The liturgical reform is indicative of the Church's concern for: relevance to the modern world, involvement of the laity, decentralization, directness, and reunion of the Christian churches. The liturgy is especially important to the architecture of the church, because it determines most of the functional and many of the symbolic requirements of the building.

1. Liturgy

There are two basic approaches to worship: 1) as primarily a matter of feelings; 2) as work done in God's service. The first is worship for the sake of the effect it has on the worshipper. It is predominant in Protestant worship of the last 150 years, being the result of the double influence of Romanticism and Revivalism. Psychological stimuli are manipulated, often with professional skill, to produce "worshipful" reactions in a passive and receptive congregation. In the second approach, the worshipper has an active
role in fulfilling a duty, based on the principle that love obligates us to respond with action, an act of obedience. Here emphasis is placed on God rather than on man. Architecture serving the first type of worship must act as a psychological stimulus, inducing the proper religious feeling in the worshippers. In personal devotions of this nature, the individual does not depend on the presence of other worshippers. One of the greatest difficulties here is the wide range of individuality in this type of response, of people conditioned by diverse backgrounds.

"The word liturgy derives from a Greek term 'leitourgia', a term referring to the performance of a public task expected of citizens of ancient Athens. It simply meant fulfilling the civil obligations.... The origin of the term lies in the Greek word 'laos', meaning people, and 'ergon', meaning work."29 Hence only the second type of worship, above, may properly be called liturgical. "The primary and exclusive aim of the liturgy is not the expression of the individual's reverence and worship for God. It is not even concerned with the awakening, formation, and sanctification of the individual soul as such."30 The liturgy is "the entirely objective and impersonal method of prayer practiced by the Church as a whole."31 It is sustained by thought, and does not concentrate markedly on particular portions of divine truth. As a rule it is controlled and subdued.32
2. Architecture

"We have heard from a number of sources the opinion that the day of cathedral building is past, and I think there are good reasons for us to recognize this as a valid position. By this I mean the type of building which through its form seeks to assert power, to impress people rather than to serve them, to confront and impose its authority on people rather than to enter into a dialog with them.... What people say is 'churchly' is often not really churchly; what people say looks like a church often only looks like churches, not like the church."33

"Our churches are first of all and above all the houses of the people of God. It is only in a secondary sense that they can be described as 'house of God'. They are called this because the Christian community which comes together in them -- the ecclesia -- is (and it alone is) the Temple of the living God."34

"Christianity is not the translation of people out of this world into another kind of existence where God is present. The essential nature of our faith is not that men enter a state where they are in touch with God, but that God has entered man's estate, and He has provided the potential for us to see not only the exceptional experience but all of life as in Him.... Nor is our worship something mysterious which finds its appropriate expression in optical illusions, half concealed spaces, darkness and heavy drama. ...the difference between art and liturgy: One might say that liturgy is constitutive of the church, and that the architecture is, or ought to be, revelatory of the church; that one makes
and the other reveals what is made; that one establishes and the other exhibits in sensible form what is established. It is also possible to say that architecture is itself liturgy. To build a revelatory form is an extension of the liturgical form into another medium, that the act of building is not after all so different from the act of speech and gesture, that the externalization of idea can take place in the sound and movement of the liturgy but also in the space and substance of architecture. And that the building is in a sense 'rebuilt' and therefore renewed as liturgy when the community gathers to use it and perceives in it the image of their corporate being.”

3. **Function**

With this general background let us now consider some more specific aspects of the problem of the liturgy as a determinant of church form. The following remarks are from a paper by Godfrey Diekmann, O.S.B., entitled *The Reformed Liturgy and the Eucharist.*

Five liturgical pastoral principles found in the Constitution on the Sacred Liturgy, basic to the theme, are:

a) The centrality of the Eucharist, as the fount and sum of all the other sacraments.

b) The Eucharist as an action of worship performed by Christ and by the entire people of God.
c) The personal dimension of Christian worship, in and with the community. The human scale is consequently of the essence of a church building.

d) The sacraments as signs. Authenticity, clarity (simplicity), and meaningfulness are imperatives.

e) Flexibility; adaptation to local needs and circumstances. Allowance for future changes in the liturgy.

"It might be advisable to eliminate -- a priori -- all preconceived ideas of what a church should look like, and start rather with the indubitable principles of the nature and purpose of the Eucharist, its essential action-structure and the worship objects needed for same, and the specific community which will take part in this action in proper mutual relation and function."

a. The Altar

"Without question, the altar must receive first consideration, precisely because it is at the altar that the Mystery of Salvation is renewed." There should be only one altar in the Eucharistic space, and if there are any others, they should be placed in chapels separated from the principal part of the church. "Since participation is the determining factor, a one step predella would normally suffice." In the case of concelebration, the priests should not block the people's view of the altar. Also, the altar should not block the view of the celebrant in his chair. "Though inviting participation, the altar
should be sufficiently removed from the congregation to safeguard its character of sacred, consecrated object that inspires due reverence. The same one God whom we worship is both transcendent and immanent." Present needs "would weigh the balance on the side of immanence, of accessibility and sharing."

b. The Chair of the Celebrant

"The celebrant never phases out: he presides over the entire service, even if others are at any given time alone performing the action proper to them. He it is who presides; and he does so at the three chief places of action and ministry: the altar, chair, and ambo. But it is the chair which according to sound tradition symbolizes his presidency." The priest does not preside from the altar until the offertory of the Mass. "The Instruction says: 'The seat should be placed so as to be easily seen by the faithful, and that the celebrant may appear to preside over the entire community of the faithful.' But it must under no circumstances give the impression of domination. How to express prominence without dominance."

c. The Ambo

"Only within the last decade or so, hand in hand with the development of the biblical movement, has due attention been directed also to the unique importance of the Word. Even the terminology relating to the Mass has been altered to
bring home the lesson: the Mass consists of two integrally related parts, the liturgy of the Word, and the Eucharistic liturgy." The liturgy of the Word is celebrated at the celebrant's chair and at the ambo. The Instruction favors one ambo rather than two. "The ambo should occupy a prominent place in the sanctuary." It should be to the celebrant's right. "Its structure should suggest that it is primarily for the purpose of reading a book, the Scriptures."

d. The Tabernacle

"Liturgists have been generally unhappy about the tabernacle on an altar," because it confuses worship of the Host with the action of the Mass. Placing of the tabernacle:

1. "The tabernacle should not be such that it calls undue attention to itself during the celebration of Mass.

2. It should nevertheless somehow be in visual and spatial relation to the altar.

3. It should not be a focal point in the sanctuary.

4. Because of its character of private devotion, it should spatially and by architectural structure or ornament be conducive to private, intimate, devotional communing."
e. The Choir

"Music forms a necessary and integral part of the solemn liturgy.... Choirs are to be diligently promoted, especially in cathedrals.... The pipe organ is again placed in high esteem." The function of the choir will be to alternate with, and lead the faithful, as the case may demand. It is no longer an incidental appendage intended to enhance and beautify the service.36

f. The Baptistry

Two sacraments besides the Eucharist require their own space: Baptism and Penance. "We have an indication of two basic principles which should govern the placing of the baptistry: first, it should be so located and designed as to facilitate the participation of an entire congregation; second, it should be so located and designed that the dignity of the sacrament is clearly apparent, that it may be effectively expressive of the meaning of Baptism for the Christian assembly."37

g. Confessionals

"The traditional place for confessionals, somewhere near the rear of the church, is a good one," representing restoration to communion with the Church and the Eucharist. "Confession is a renewal of Baptismal grace", so the location of the confessionals should relate to the baptistry. The only fixed requirements for confessionals is that they "should be located in an open place — that is,
which can be seen from the main body of the church -- and that they feature a fixed grill or lattice which obstructs vision."
C. The Resultant Building

The preceding historical survey has explored in depth the fundamental formal determinants underlying church architecture of the past. The design program has applied the conclusions of this investigation to the problem of church building in the present age. State of the problem, a most elusive, yet essential, aspect of architectural design, has thus been accomplished.

The solution of the problem will now be presented. As frequently happens, many aspects of the solution are implicitly contained in a clear statement of the problem. At the present point of development, that is, between programing and design, many design decisions have actually already been made, and the physical form follows with an inexorable inevitability. Based on the stated program, and seen as a logical development of it, the design solution has a quality of objective necessity. The design may be understood only in the light of the detailed program.

The following photographs depict the design solution of the problem presented by this thesis, the design of a new Catholic cathedral for the city of Houston, specifically in accordance with the form determinants proper to the second half of the twentieth century. The final design solution has been attained through a series of design studies, executed in model form, and presented here in order
of their logical, as well as chronological, sequence. A detailed evaluation of the rationale pertinent to the final design follows the photographs. For the present, it is sufficient merely to trace the development exhibited in the study models.

Study #1 (page 44) exhibits the basic design concept: a square building, with glass walls, situated on a downtown block. The four enclosed corner elements contain chapel, sacristy, baptistery, and confessionals, respectively, as well as vertical circulation elements. The second floor consists of loft space intended to house such miscellaneous functions as priest-caretaker's quarters, offices, meeting halls, conference rooms, and space for discussion clubs, Bible study groups, classrooms, and so forth. A central skylight floods the interior with natural light. The floor plan takes the "horseshoe" shape, in which the congregation gathers on three sides of the altar, with the bishop's throne on the fourth, fittingly emphasized by a backdrop of organ pipes. The floor plan is so arranged that very small congregations may be accommodated with an appropriate aspect of intimacy on the altar platform itself, with all members standing. Moderately large groups will occupy the central square of seating, and the transcepts will be used only for capacity crowds on major feasts. The aisle around the central square of seating, which connects the four solid corner elements, and is therefore square in plan, will be used for processions. The altar platform itself provides for rearrangement of the liturgical furniture,
including chair, benches, ambo, lectern, and communion stations, as the service requires. The transcept space has a solid ceiling, contrasting with the great central space which has virtually no ceiling at all.

Study #2 (page 45) represents a further development of Study #1. From the same starting point, it goes considerably farther than the original scheme and corrects many of the deficiencies encountered in it. The corners are completely restructured: stairs and elevators are isolated from the strictly ecclesiastical elements, resulting in greater simplicity of execution and better expression of the function of the individual parts. Simultaneously, the outside corners are opened, providing an exterior gathering space, clarifying and emphasizing the entrances, and locating the access space at the point of heaviest traffic. Actual entrance doors are located between two massive piers, dramatizing entrance to the church. The structural problem -- the square doughnut -- is solved by means of a two-way system of major edge beams inside and out, supported on the shear walls of the stairs and elevators on the outside perimeter, and on the walls of the chapel, sacristy, baptistry, and confessionals on the inside perimeter. Above these four latter elements the air-handling equipment is located, whose housing enhances the massing pattern of the roof. The skylight is given structural expression, and its apex lowered, to contribute to the general air of compact volume. The transcept ceiling is lowered from 45 to 30 feet, further emphasizing the contrast between it and the light-covered central space.
The floor plan of this second study shows radical improvement on the first. The altar is placed at the center of the square -- its natural and logical position, both symbolically and geometrically. The congregation is still dispersed about three sides of the altar, with the fourth reserved for a platform for the bishop's throne. In smaller ceremonies, when the bishop is not present, this platform may be occupied by the choir. Transcept seating has been removed, a great help in making this church a cathedral, for the interior space is thereby freed at the critical points of entrance, and openness is gained near the glass, close to the sidewalk public. The organ is placed in the fourth transcept, as before, but now in such a position that the organist may direct the choir, and indeed, a divided choir, if desired for important services. Aisles leading to the altar are directed along the diagonal of the square, connecting the altar, both visually and functionally, to the important secondary centers of activity (chapel, sacristy, baptistry, confessional), while at the same time providing an ideal seating arrangement. The floor slopes toward the altar for spatial as well as functional reasons.

Study # 3 (page 46) represents a departure from the line of reasoning which we have seen culminate in Study # 2 and embodies a major decision toward simplification and clarification of the entire design concept. By removing the space for miscellaneous functions from the second floor to the basement, the roof becomes a single clear statement which is structurally homogeneous. Therefore, it may now be treated as an integral structural system, whereas
previously it was necessarily treated as two separate systems. Considered as a square plate supported at four points, the roof becomes a two-way waffle type slab, consistent throughout, one large skylight covering the entire city block. Since vertical circulation to the second floor is no longer necessary, the corners are opened even more, de-emphasizing the entrance transition from the exterior to the interior. Use of the basement solves the problem of parking. Lobbies are now provided in the basement at the termination of tunnel access from adjacent parking garages, with stairs up to the church entrance areas. The stairwells double in use as lightwells for the subterranean spaces. More usable loft space is provided in the square basement than was possible in the doughnut shaped second floor of previous schemes.

Study # 4 (pages 46-47), with its variations, is the culmination of the possibilities introduced by Study # 3. Proceeding from the assumption that a cathedral is an important image of the organization it serves, namely the Church, it was thought necessary to go beyond the merely functional in design. In actual fact, total function and total logic demand the recognition of values which transcend the immediate function and logic of physical design. Study # 4 adopts the altar as its point of departure. Emphasis is given the centrality of the altar in the overall scheme by modulation of the proportions of the roof-skylight. The waffle slab apertures become deeper and wider toward the center of the square, climaxing a dramatic play of light and shadow above the center
and climax of liturgical action, the altar. A hierarchical structure is thus imparted to the edifice. This superstructure in turn regulates the secondary activity transpiring below, as the four corner elements and the window mullions take their cue from its pattern. Variation "b" on this scheme treats the roof as solid, with concentric clerestories ascending the ziggurat. Although such an arrangement would provide an interesting play of natural light on the ceiling, it was felt that it would fail to produce the high level of illumination, flooding the interior, that was desired. Variation "c" presents a completely solid roof, penetrated by a single central oculus, Pantheon style. To be effective, such a scheme would require direct natural light through the oculus. It was felt that direct light in such quantity would impede the performance of the services within.

The final design solution refines and perfects Study #4. A complete explication of its features follows the photographic presentation
1. Ecumenical Explication

The following shall be an attempt to explicate the preceding design solution on the basis of criteria established by study of the modern Church's position in the modern world.

The site chosen for Houston's new cathedral is a downtown block, in the heart of the central business district, presently occupied by parking facilities. This choice represents a deliberate attempt to bring the church to the people, in distinct opposition to former policy, in which the Church took pains to separate itself from the world, demanding that the world's people come to it. By voluntarily going into the marketplace of the modern city, the Church places itself at the service of men, in a gesture similar to Christ's washing of his disciples' feet. By placing itself directly into the physical fabric of the city, the Church makes its strong bid for an integral place in the lives of men. The Church's ineffectiveness in modern life is related to its isolation in space and in time; in space, by its location on the fringe of activity, and in time, by functioning primarily on Sundays, a day apart from the life of the business world. The spatial solution to this problem of isolation is the province of architecture, but the temporal solution is inseparable from it. With the gradual restructuring of the forty hour work week, now already well begun, it is hoped that the Church will take the opportunity to establish itself in the new structure. With the accessibility afforded by such a central location, the Church could provide services during the week, scheduled to the convenience of the workers in the
central business district, and simultaneously de-emphasize mandatory Sunday attendance, which is, after all, nothing more than a vestigial sociological phenomenon, retained from agrarian days.

Besides facilitating service to the central business district, a central location facilitates service to the entire diocese. On major feasts the cathedral will become something of a pilgrimage church, offering a tradition-steeped grandeur in its services not to be found in any parish church. By dissociating itself from any territorial parish, the cathedral will become a church for all; it will acquire a certain universality of appeal; it will be the city church.

The new cathedral has a dominant characteristic of openness which follows the Church's recent policy of "aggiornamento" ("open window"). Except for roof supports, the walls are entirely of clear glass and the ceiling is one tremendous skylight. From the exterior, the building may be seen into, and seen through. By flooding the interior with natural light, window reflection is eliminated, and glass really serves as the transparent material it is, instead of acting as a mirror, as it usually does on exterior walls. Every passerby is thus invited to look, or even walk, into the church. The Church has opened its windows, revealing its inner workings for all to see. From the interior, the church has no walls. The internal space of the church extends in all four directions across sidewalks and street, to the walls of adjacent buildings, and down the adjacent streets, off into
the distance. Thus, as the sanctuary space extends itself to include the congregational space, the church space extends itself to include the city, and a member of the congregation feels himself to be at once in the sanctuary and in the city, of the sanctuary and of the city.

The new cathedral ignores all familiar churchly and religious architectural forms, either of the traditional styles, or of the "modern style" of the twentieth century. It uses the language of the secular architecture of its time, fully consciously and intentionally. The historical survey of the present thesis lists the principles of the architectural revolution of the twentieth century and the corresponding failure of church architecture to recognize them (pp. 20-22). Let us now examine the proposed new cathedral in the light of these established principles.

1) **Function:** Here function must be taken to include not only the use of the building, but those tangible and objective criteria established by the site. Considered thus, from the mutual standpoints of use and site, it is seen that the building's form is very strongly determined by function. The square site dictates a square plan, which in turn dictates central placement of the altar. City traffic patterns dictate corner entrances, with access from all sides. Criteria of use reinforce the square plan, with congregation on three sides of the altar, and the bishop's throne and choir on the fourth. The need for four distinct enclosed spaces suggested their use as corner supports, retracted from
the edge of the building to allow the free flow of traffic.

2) **Form:** The form is restrained, almost austere. The interior space is clearly intended as a setting. It is a place wherein something happens, and all parts of the building relate to this, its content, rather than to the building as an end in itself. Materials have been limited to two, concrete and glass, undecorated and unveneered. Complication, with its attendant pretentiousness, is avoided. Expression of a single abstract religious concept is likewise avoided.

3) **Technology:** In the new cathedral, the structure is the building. What holds the building up, what the building is made of, and what the eye sees, all are one. No attempt is made to cover or hide the structure. Structure as a form determinant is inseparable from considerations of function, form, space, and scale. Thus the waffle ceiling, besides being structurally correct, provides the desired scale, progression, quality of light, form, and character. The supports for this waffle system, ideally two per side, serve as the walls of the four corner spaces.

4) **Space:** Inner and outer space interpenetrate. By flooding the interior with light, glass reflection is eliminated, and even this slight spatial barrier reduced. The space of the church becomes integral with the space of the city. The interior space of the church acquires a dynamic element by the changes in direction of the observer moving through the building.
5) **Scale:** The new cathedral has the largeness of scale of a single statement 250 feet square, boldly covering an entire city block with obvious unity of purpose. In its vertical dimension it contrasts markedly with its neighbors. The height of the actual ground floor space is as grand as any in the city, but overall building height, which has come to represent investment in real estate speculation, is absent. The Church is not a competitor in the financial market of the city. It has something entirely different to offer, and does not pretend otherwise.

The end result, of course, is that this particular church simply "doesn't look like a church", or rather, it does not look like any of the churches of the past. So much the better! This result is thoroughly consistent with the criteria for the church of our time as established in the preceding design program. The Church of tomorrow is different from the Church of the past, and church buildings must differ accordingly. Real changes are maturing within the Church, and these must find expression at the surface, in the physical form of the church building. The new Church speaks to men in the language they understand. It speaks clearly and directly. It unashamedly avails itself of common means to its somewhat uncommon ends. It makes no apology for itself. It is energetically progressive, no longer placidly defensive. It is taking the world and its laymen seriously and expects to be taken seriously in return. It does not regard itself as a thing apart from the world, as good set off against wickedness, but as integrally in and of the world, as yeast in dough. It has nothing to hide. It seeks the good will of all men.
2. Liturgical Explication

The liturgical space of the new cathedral consists of two distinct and, indeed, contrary types: the vast open, light-filled body of the church; and the four dark, solid confined corner elements. That the space provided serves well the usages provided for, we shall now demonstrate.

The Catholic Mass requires three centers of activity: the altar, the ambo (lectern), and the celebrant's chair. The altar is given unimpeachable predominance by its position at the center of the square of the church. Provision is made for rearrangement of all other altar furniture. The ambo and chair are shown positioned along the diagonal of an aisle for maximum visibility of all elements from all seats. However, the number of chairs required will vary from day to day, and the location of the ambo may be changed. In order to adapt to local needs, then, as well as to accommodate future changes in the liturgy, nothing is stationary but the altar, the bishop's throne, the organ, and some fixed seating.

The congregation is seated on three sides of the altar, assuring maximum closeness and visibility, and therefore, maximum involvement in the Mass. Seating is grouped in such a way as to contribute to the sense of community among the participants. Distraction will be no problem, because of the centrality of the seating orientation, the slope of the floor toward the altar, and, most important,
because of the character of the new vernacular liturgy: a dialogue with active participation alternating with active listening, with no "dead spots." The fourth side, completing the square, contains a platform for the bishop's throne and space for benches for deacons and servers. The throne provides a place for the bishop to preside over the service of the Mass. But more than this, it symbolizes his episcopal rank as leader of the diocese. It requires a prominent, and permanent, position, located on axis with the altar. It is removed an appropriate distance from the altar to enhance its importance and to enhance the importance of procession from one to the other. In smaller services, when the bishop is not present, this platform may be used by the choir.

Surrounding the central square of seating is the aisle which will be used for processions, connecting the liturgical elements in the four corners of the church, and related to the altar by the four diagonal aisles. Beyond this aisle are the transcepts, free of fixed seats. These serve as transition spaces for entrance and exit traffic, and contribute greatly to the open character of the interior space. On major feasts, with capacity crowds attending services, the transcepts will provide standing room for the congregation.

The organ is located behind the bishop's throne, forming a fitting backdrop for it. The organ is positioned such that the organist faces away from the altar, and may thereby also serve as choir director. The choir faces the altar, fanning out
from the organist on one or both sides of the organ. By being on the same level and in the same space as the congregation, the choir is thus an integral part of the service. Members of the choir are actively engaged in the worship service, and are not merely providing background music.

The tabernacle is located in the chapel in the first of the four dark, solid corner spaces. The chapel is a quiet, private retreat from the life of the city. It furnishes the setting for reflection, meditation, and personal devotions. The stations of the cross are hung here. The chapel provides for individual prayer, in counterpoint to the open public space of communal, liturgical worship, of the main body of the church.

The second corner contains the baptistry, open to the central space, but separate from it. Appropriate to the character of the sacrament, the space is dark and massive, reminiscent of a tomb, as Baptism is the sacrament by which we pass through death into life in Christ's resurrection. The baptistry is located so as to facilitate participation in the sacrament by an entire congregation. At the same time, it is near the doors, symbolizing entrance into the Church.

Confessionals occupy the third corner. Since confession is a renewal of Baptismal grace, and likewise effects rebirth from the death of sin, it is appropriate that the confessionals be contained by an architectural form identical to that housing
the baptistry. The fact of being open to the main body of the church and yet separate from it, is an ideal solution for the confessionals.

The fourth corner contains the sacristy, where priests and servers vest for Mass. Its location near an entrance is necessary for access from the exterior. Its remoteness from the altar provides for processional entrance and exit before and after Mass. Its degree of privacy is sufficient for its function.

The functional requirements of the Catholic liturgy have been fulfilled. But the most important quality of a building, what may be called its character, is functional only in an extended sense, and must be evaluated accordingly. Architectural space provides the physical means for specified functions, but by so doing, it also presents an intangible aspect, a spiritual content, which affects the occupant of the space. This spiritual content follows from the strictly functional content, and is integrally bound up with it, in the sense that the building produces a total effect on the total person. The space generated by the new cathedral building possesses a distinct character of spiritual content, appropriate to the function of the building; indeed, appropriate to the building's reason for existing. The final result is in consistent harmony with the objectives set forth in the liturgical section of the design program. The space created expresses the concept of liturgical worship used as the starting point, the idea of work done in God's service, objective and unemotional, the ritual performance of
prescribed tasks, executed out of love. The interior of the building is an
unobtrusive setting for this community action, universal and intellectual
by nature. It reinforces the magnificent understatement of the liturgy. As
the church space is in and of the city, the liturgy is in and of the lives of the
Church's members. Freedom of movement characterizes the space, the use of
the space, and the users of the space.
CONCLUSION

Two routes of progression have been discovered and pursued throughout this thesis. There are the two analytic viewpoints of the determinants of the form of church building, the internal and the external, called here the liturgical and the ecumenical, respectively.

The dual approach to the solution of architectural problems may be discerned in all stages of history, in all types of buildings, from the classical-romantic conflict, through static-dynamic expression, to the form-function philosophy. Resolution of dichotomies has provided the substance of all architectural effort.

Indeed, many conflicting opposites are operative in every situation.

Architecture results from the selection of alternatives and the reconciliation of opposites. In the present study, the selection of alternatives has in every case been determined by the solution to the reconciliation of opposites, to the resolution of the internal and external considerations of form determination.

Seen as manifestations of the particular versus the universal, our two viewpoints become two forces, acting in mutual opposition, interacting toward culmination in an architectural entity.
The particular is concerned with the exigencies of the immediate situation, with the interior development of the form, a posteriori.

The universal is involved with indefinable factors of the largest possible scope, progressing a priori from general principles to their tangible embodiment.

The concurrence of these ambivalent impulses is an event of some significance. The result is a formal statement participating in and expressing the particular and the universal of its origin, while consequently, by virtue of its very existence in physical shape, possessing a particularity and a universality of its own.
NOTES

1. James F. White, Protestant Worship and Church Architecture, p. 52.
2. Ibid., pp. 56-60.
5. Dalmais, p. 150.
6. Dawson, Religion and the Rise of Western Culture, p. 120 ff.
9. Ibid., p. 44.
10. White, p. 72-75.
11. Erwin Panofsky, Gothic Architecture and Scholasticism.
12. Christopher Dawson, Understanding Europe, p. 42.
18. White, p. 80.
19. Ibid., p. 97.
20. Hughes, pp. 224, 265.
21. Ibid., pp. 269-78.
22. Dalmais, p. 171.
24. Ibid., p. 137.
29. White, pp. 3-25.
31. Ibid., p. 123.
35. Sovik.
38. Ibid.
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