

LIBRARY
Montana State University
BOZEMAN

1098-17
ARCHITECTURAL LIBRARY.

127
LIBRARY
Montana State University
BOZEMAN

BUILDING RESEARCH DATA
FOR
A CISTERCIAN MONASTERY OF THE STRICT OBSERVANCE

Undergraduate Thesis Project
H. C. Rose, Director and Critic
Department of Architecture
Montana State College

Submitted by
Larry Jay Keller
Winter Quarter, 1964

5



HOLY ORDERS

function

FUNCTION FOR A CISTERCIAN MONASTERY OF THE STRICT OBSERVANCE

REQUIREMENTS OF THE MONASTERY

General

The Trappist monk's requirements for living are at a strict minimum. More than adequate accommodations are in direct violation of the observance of the monk's poverty vows; nevertheless, living is not made excessively uncomfortable. Ample heat and light where needed, are provided. A Trappist is a contemplative, not a hermit. The purpose of Trappist life is to achieve "true" love of God, not athletic endurances.

Permanence of the Monastery

The Trappist, unlike most secular persons, lives in the monastery for his entire life unless he is sent to establish a new community. Therefore, a monastery must be constructed to have a long building life. This requires extensive use of permanent materials and construction practices.

Also, the function of a Trappist monastery never changes. Flexibility need not even to be considered.

ROLE OF TRADITION IN THE DESIGN OF A TRAPPIST MONASTERY

General

The design of Trappist monasteries has actually been a process of searching out elements found in early Cistercian monasteries and of adding the necessary rooms absolutely needed

for life today. This is mainly because life in a modern monastery is very similar to life in a medieval monastery.

Requirements

The Trappists have set down certain principles of monastic design in the book, Usages and Customs of the Reformed Cistercians of Our Lady of La Trappe. (10 : 2) This book simply restates the design of the first two Cistercian monasteries, Citeaux and Clairvaux. The elements of Clairvaux, for example, are all embodied in a modern Trappist monastery and arranged in exactly the same way. The following floor plans of Clairvaux, built in 1149 A. D., and the Abbey of Gethsemani, built from 1850 to 1959 A. D., show the traditional elements and relationships.

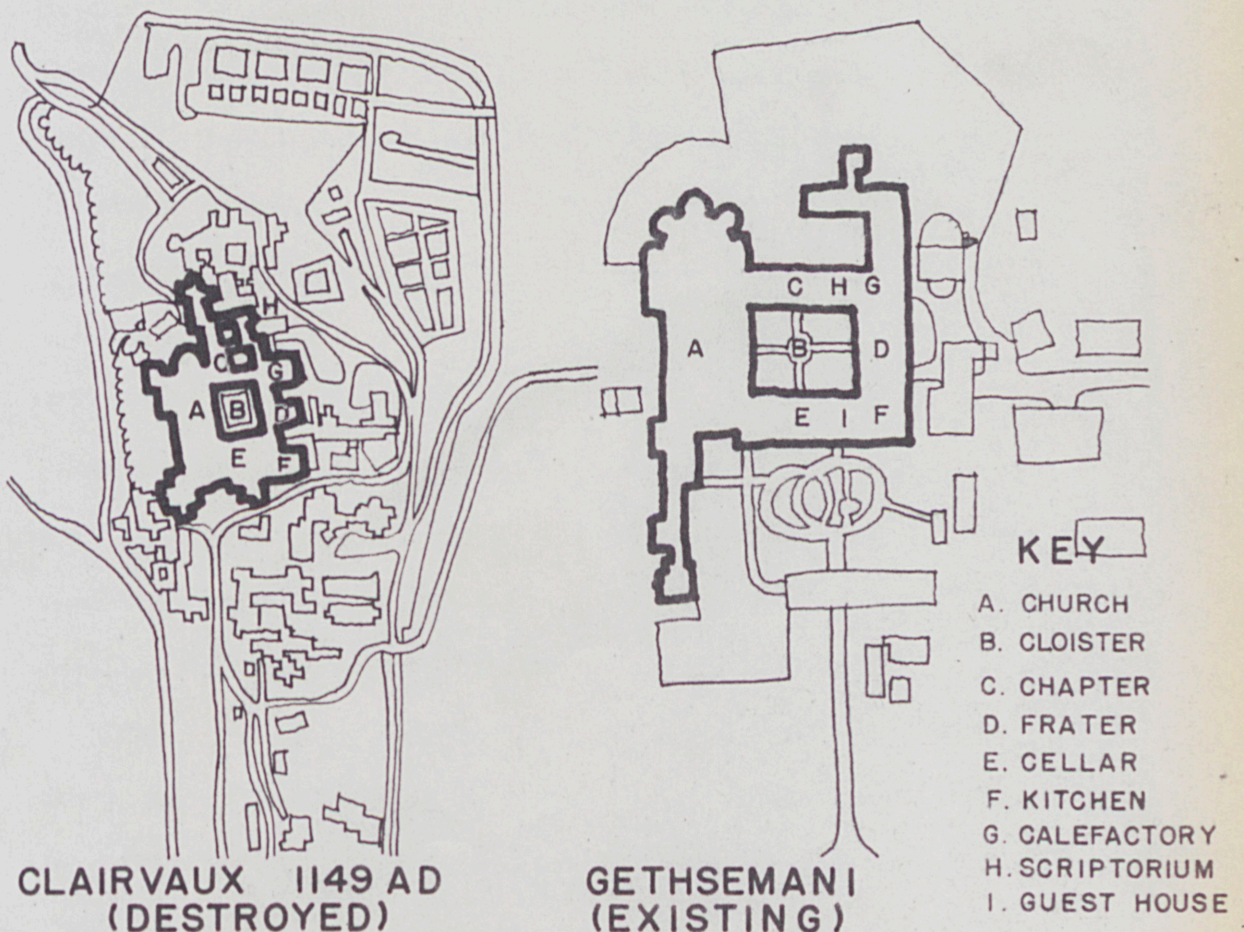


FIG. 31. RELATIONSHIPS OF MONASTERIES.

TRADITIONAL ELEMENTS OF A TRAPPIST MONASTERY

THE CHURCH PROPER

Location of the Church

The church, in all instances, is located on the northern elevation of the monastic complex. The main reasons for such a location is that the church, being the tallest building, shields the rest of the monastery from the cold north winds in winter while allowing the southern sun to penetrate the other monastic buildings in summer.

Traditional Shape

The church is basically a long, thin structure laid out in the form of a long rectangle. The cross-shaped church of Citeaux, the mother church of the Trappists, was until recently the determining shape. The cross-shape has been neglected ever since the Gothic Revival period of architecture was replaced by modern styles.

Arrangement of the Church

a. Presbytery

The upper part or eastern part of the church where the high altar stands is called the presbytery. It is raised only one step above the level of the rest of the church. The distance from the high altar to the wall of the apse must be great enough to allow free movement about the altar.

The high altar is dominated from behind by a statue of the Blessed Virgin. Here also are a large wooden crucifix, six candlesticks, and, to either side, over the step, a large

candelabrum. The candelabrum should be at least four feet high and under no circumstances made of gold.

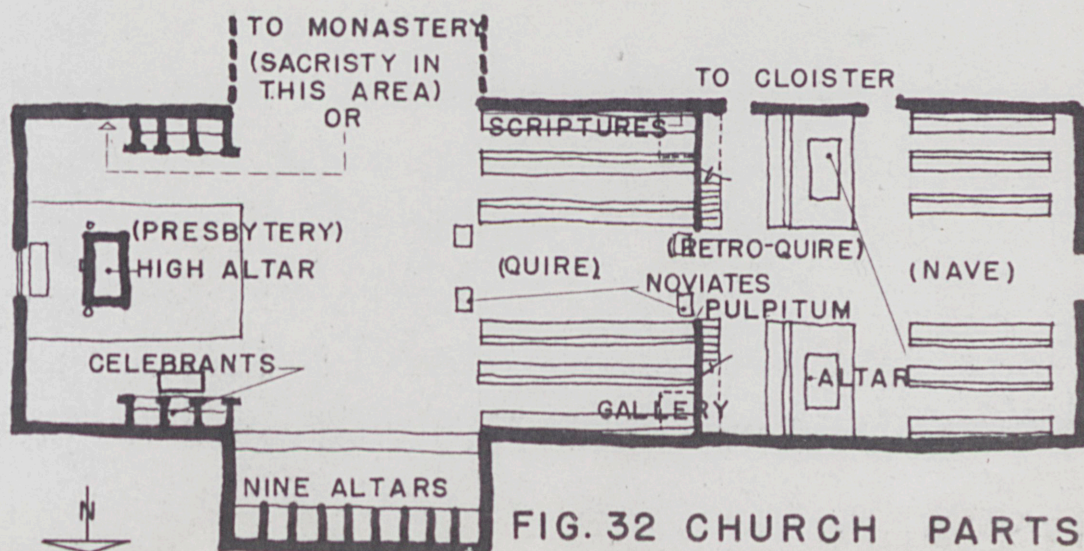
The altar itself must be made of wood and be of "simple, geometric design, without any representational figures." (10 : 12)

On the altar there must be a tabernacle which houses the Holy Sacrament. Above the tabernacle is usually a simple cloth canopy.

Looking east, to the left or the Epistle side, there should be a small table beside which are three stalls for the celebrant and his servers at Thrice. Included in the stalls must be a bench on which the servers may sit during mass. The stalls face toward the altar.

The rear wall of the apse has a round-window so the rising sun may filter into the church during the Office of Lauds. No stained glass is allowed, although glass of one color may be used throughout.

The following Fig. 32 shows the relation of various parts of the church. Fig. 33 shows the circulation diagram of the church.



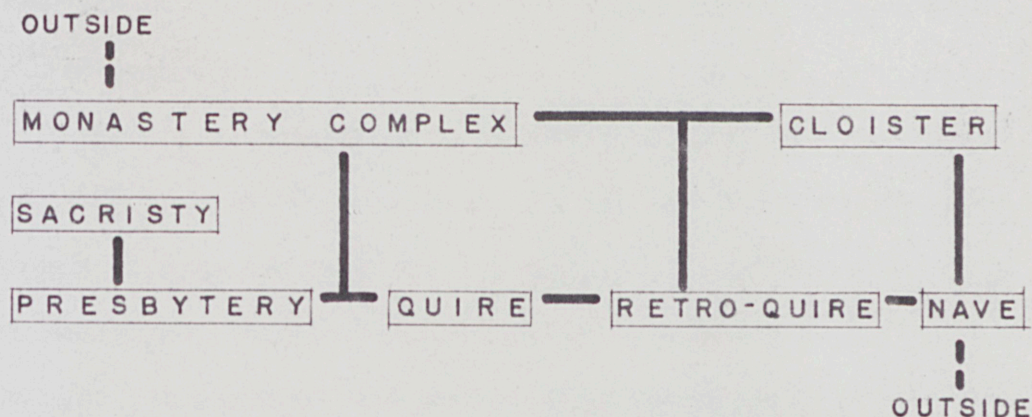


FIG. 33. CHURCH CIRCULATION DIAGRAM.

b. Quire

The second part of the church toward the east, which is called the quire, is for the monks' stalls which face each other in a north-south direction. On the front, the stalls contain a long desk which is sloped to provide a support for a large scripture books. The seat is actually a double seat; the smaller part, the so-called Misericord, is to permit the religious to rest during times when they must remain bowed for long periods. The novices' stalls are in front of the monks' long desks. There is no similar desk in front of them, their desks being at either end of the quire; the upper stall is used during Thierce and high mass, the lower one is for use during the other offices. To distinguish the stall for the abbot, his crozier is fixed at his place on the monk's long desk.

On the back of the monks' stalls traditionally is a wooden grill work where the precious scripture rolls are placed.

New Trappist churches have not always included the grill work, the determining factor being if the church has scripture rolls.

c. Retro-Quire

The third part, called the retro-quire, is for the sick and infirm among the religious. It is separated from the quire proper by a screen known as the "pulpitum," against which are, on the right, the stalls of the abbot, the sub-prior, and, on the left, the prior. The pulpit galleries on both sides of the retro-quire sit on top of the pulpitum facing the altar. The steps leading to the galleries come from the center of the church.

d. Nave or Lay-Brother's Quire

The fourth part, the nave or lay-brothers' quire, is separated from the retro-quire by another pulpitum or, in other instances, a set of altars on either side of the center aisle. It contains the pews of the lay-brethren, an altar for the De-Beata Mass and another for the daily Requiem Mass. These two altars are much smaller than the high altar, and only have four candles with no crucifix or candelabrum.

In the rear of the nave is simply a blank wall with an access to the outside.

e. Transepts

The transepts form the cross shape by intersecting the nave between the presbytery and quire. The transepts are today diminished in importance, the right transept simply being an

entrance for the monks. The other transept contains the nine altars required by the Rule of St. Benedict for the priests to perform their individual masses. The altars are dedicated to St. Benedict, The Sacred Heart, St. Bernard, St. John, St. Anthony, St. Michael, St. Peter, St. John the Baptist, and The Pieta.

f. Sacristy

The sacristy is located near the high altar in a separate room away from the main church nave. The sacristy is furnished with secure and convenient aumbries or presses in which may be kept the ornaments, the sacred vessels, linen, and other objects of worship (see Program). The sacristy must contain a grating through which holy water and water used for cleaning may be emptied away. There should be one or two taps with hand towels.

g. The Burial Ground

The burial ground is situated, as far as possible, behind the apse of the church. It is divided into three parts: the first for the sepulchre and ordained priests, the second for the other quire monks, and the third for lay-brethren. It is surrounded by a wall or hedge and must be carefully tended. The crosses over the graves are of hardwood or cast iron painted either black or white. Each bears an inscription showing the religious name of the deceased, his status (priest, deacon, etc., monk, or lay-brother) and the date of his death.

This inscription is in Latin for quire monks and in the "vulgar" tongue for lay-brethren. The crosses and inscriptions are renewed when necessary.

h. Other Articles

The church must have enough liturgical books (The Official Order of Trappist Offices,) missals, graduals, and psalters for each member to have one of each.

Lighting

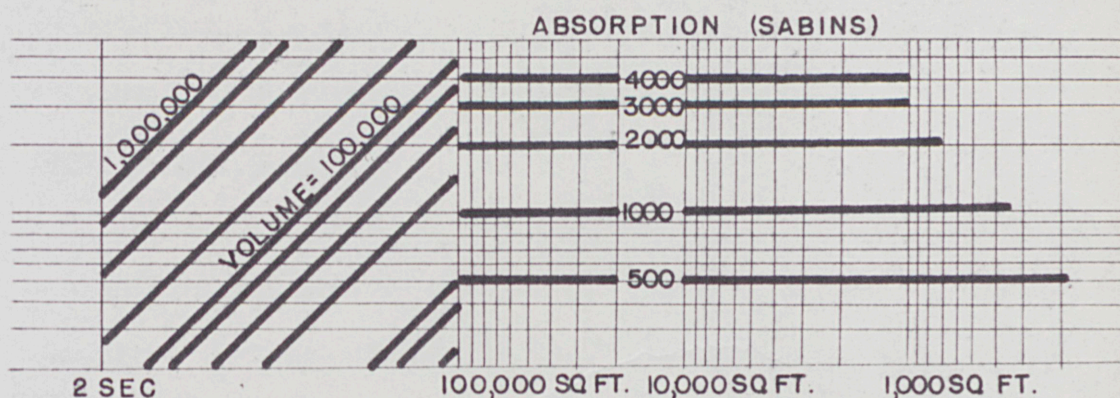
The requirements for lighting in the church are minimum. A Trappist Church requires three lamps. The first hangs over the presbytery step where it is kept burning day and night; the second hangs in the middle of the quire and the third in the nave. Since the monks have memorized the Offices of the Church, no individual lighting is needed for reading. Other lamps are hung before each of the nine altars of St. Benedict. A lamp may be put over the altars in the retro-quire if desired.

In daylight, only one window is required, the window in the presbytery. Nevertheless, other windows should be placed to provide even light levels during the day offices.

Acoustics

The Trappist Church needs an acoustical treatment so that the reverberation time is about two seconds. This is needed to make the Gregorian Chant sound natural. The Gregorian Chant was developed for the large reverberation times of the great cathedrals of Europe. The following chart gives the minimum

volume and height required for a reverberation time of two seconds when the width is given, with absorption values of the room.



DIRECTIONS: FOLLOW ABSORPTION VALUE TO 2 SEC. LINE AND READ VOLUME. PROJECT VOLUME TO ABSORPTION LINE FOR SQ. FT. (PROCESSES CAN BE REVERSED) (1:664)

TABLE 6. ACOUSTIC REQUIREMENTS.

The normal mode of vibration is determined by experience.

The Chant is "tuned" to the normal mode by the leader of the Chant.

Since no sermons take place in the monastic church, the high reverberation times are not a problem to the understanding of speech. The spoken selections and antiphons are memorized.

THE CLOISTER

Definition of Cloister

The cloister is essentially a covered arcade open to the weather. All the monastic buildings face on the cloister which provides a sheltered walkway to and from the various parts of the monastery. By extension, the term cloisture has been used incorrectly to describe the entire monastery.

Location of the Cloister

Being a rectangle, the cloister has no real direction. Nevertheless, two arcades must run parallel to the nave of the church, in other words, in an east-west direction.

Shape of the Cloister

The Trappist cloister has always been rectangular. The rectangle symbolizes the restful and relaxing function of the cloister. A certain Denys the Carthusian summed up such an idea in 1150 A. D.:

"Rectangular bodies necessarily remain in a state of rest and being in no way destined to a rotation movement like spherical bodies." (3 : 52)

A square cloister was once considered superior to a simple rectangular one; but, such ideas have lost favor since the fall of medieval mysticism and symbolism.

Arrangement of the Cloister

a. Auditory or Great Parlor

The auditory or great parlor is located in the cloisters between the chapter and warming room. Here the Superior listens to those who wish to speak to him and gives out individual work. A large notice board is displayed in this area.

The auditory also has the storage room for the religious to leave their cowls and put on their scapulars before going to work in the fields. The postulantes and novices are provided with a bench in the auditory because here they await admission to the chapter, whether before taking the habit or making

the arcade there must be access to the following monastic buildings:

1. The presbytery, quire, and lay-brothers' quire in the nave of the church proper.
2. The chapter house
3. The frater
4. The kitchens
5. The scriptorium
6. The warming room or calefactory.

The cloister also provides access to the guest house--consequently, to the secular world--to the monastic farm and to stairways leading to the monks' and lay-brothers' dormitories.

The following circulation diagram clearly shows the general function of the cloister arcade:

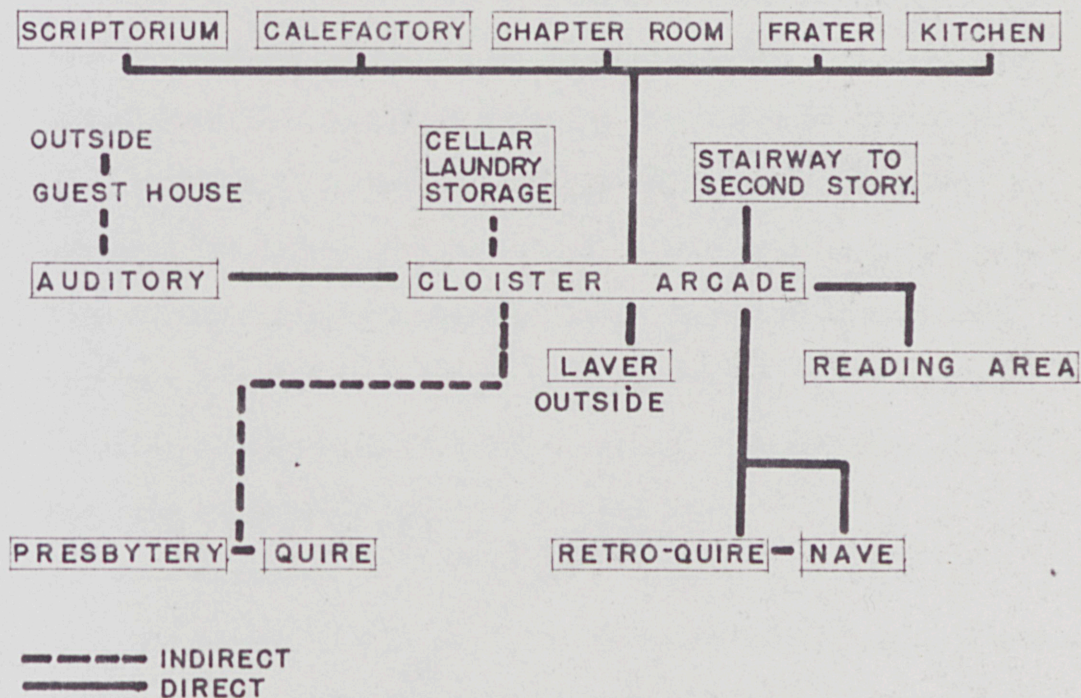


FIG. 34. CLOISTER CIRCULATION DIAGRAM.

their professions from the first entry. It is also in the great parlor that oblates, novices, and those who have taken their final vows gather to recite De Profundis when they leave the chapter room before the monks.

The monastery may have other parlors but only the great parlor is required. Recent Trappist monasteries usually have another parlor in the dorter or dormitory.

b. Reading Area

The oral-reading area is located in the center of the cloister garden. At this point is a statue of the Blessed Virgin and beneath it the Reverend Abbot's chair. When reading is done, the reader must always face the Abbot.

c. Laver

The cloister must have two lavers or washrooms. One is located near the auditory; the other, although having no traditional location, should be near the lay-brothers' dormitories.

Traditional lavers usually "jutted" into the cloister garden. The lavers were hexagonal in shape with a huge fountain in the middle measuring at least four-feet in diameter. Most new Trappist monasteries have the lavers in the monastic building complex away from the cloister. The fountain also has been replaced by modern sinks and taps.

d. Covered Arcade

The arcade usually is a minimum of five-feet wide, extending to approximately ten-feet wide in some monasteries. From

The guest house entrance must be kept shut whenever a secular person is in the monastery because no secular person is allowed in the cloister unless by permission of the superior. No one can ever enter the cloister at times set apart for reading or meditation.

The arcade should be constructed so a minimum of the monks' view into the cloister garden is obstructed. Also, a railing for the monk to lean on during contemplation is desirable.

Noise is no problem because absolute silence is observed in the cloister. The superior only speaks in cases of necessity. During times of reading, noise from movement is even at a minimum.

e. Cloister Garden

The cloister garden is the open area surrounded by the covered arcade. The garden is landscaped, sometimes even terraced, with all plants indigenous of the area. The following table is a listing of plants indigenous to the Miles City area:

PLANTS
COLORADO BLUE SPRUCE
RED OAK
WILLOW
COTTONWOOD
MOUNTAIN ASH
RED DOGWOOD
MAPLE
RUSSIAN OLIVE
CANTONEASTER
CARAGANA

TABLE 7. PLANTS INDIGENOUS TO THE
MILES CITY AREA. (28:)

Fences are not necessary because Trappist Rule allows only the abbot to walk in the cloister garden.

THE CHAPTER HOUSE

Location of the Chapter House

The chapter house is placed between the auditory and the warming room or calefactory. It opens onto the rectangular cloister area from the east side.

Shape of Chapter House

The Chapter House has no specified shape but is unanimously made rectangular. The north-south direction is wider than the east-west direction because of the way the seating must be arranged (see the section Arrangement of the Chapter House.)

Arrangement of the Chapter House

In the chapter house, the abbot's seat should be at the east end. On his right is the prior's seat and on his left, the sub-prior's. The religious occupy the stalls or benches on both sides. The novices are placed farthest away from the abbot or, if there are different levels in the chapter room, below the religious.

Each monk has under his seat in the chapter room, a locker for his books. A movable pulpit should be available for sermons when they are delivered.

Lighting

The chapter room is lighted traditionally by an unspecified

number of high windows in the east wall. Lamps over the entire seating area are required because of the amount of reading done in the chapter room. A minimum lighting level of 20 footcandles is required.

Acoustics

Good acoustics are very important in the chapter room, especially during the transaction of monastic business. The maximum reverberation time should be about one second.

SCRIPTORIUM

Location of the Scriptorium

The scriptorium or writing room is on the eastern side of the cloister. No position has been clearly established by Trappist tradition. Most Trappist monasteries located it between the chapter room and the church. Nevertheless, a few monasteries have moved it on the other side of the chapter room, next to the warming room or calefactory. This last relationship seems to make more sense because the calefactory can be used as a place for reading, therefore, not requiring a large scriptorium. In any case, the scriptorium must open to the cloister.

Shape of the Scriptorium

To date the Trappists have not specified any particular shape for the scriptorium. The Monastery of the Holy Ghost at Conyers, Georgia, even has a circular scriptorium.

Arrangement of Parts of the Scriptorium

a. Aumbry

Upon entering the scriptorium, the first room should be the aumbry where all paper, pens, ink, thread, needles, scissors, etc. may be stored for common use. A special book rack for important books of the community should be included. The aumbry also includes a desk for special clerical work.

b. Library

From the aumbry, one should enter the library. The normal size of the Trappist library is approximately 8000 volumes of which about 800 are usually handwritten treatises by the monks of different monasteries. Desk space will require room for approximately 80 monks.

Unlike a public library, no books ever leave the library; therefore, no facilities are needed to check or return books. Cataloguing and repairing of books is done in the aumbry.

All the sacred scriptures of the Trappist Offices are required to be handwritten; this is usually done by novices during the novitiate period.

Lighting

The scriptorium is usually full of windows, although skylights are becoming more and more popular. The light level should be 25 footcandles. The problem of glare is also very important in the Scriptorium.

Acoustics

Trappist monks require that absolute silence be maintained whenever in the scriptorium; therefore, acoustics is not a problem.

KITCHENS

Location of the Kitchens

The kitchen occupies the southwest corner of the cloister. In this position food can be obtained from the cellars, prepared, and served without leaving the kitchens (see Fig. 35.)

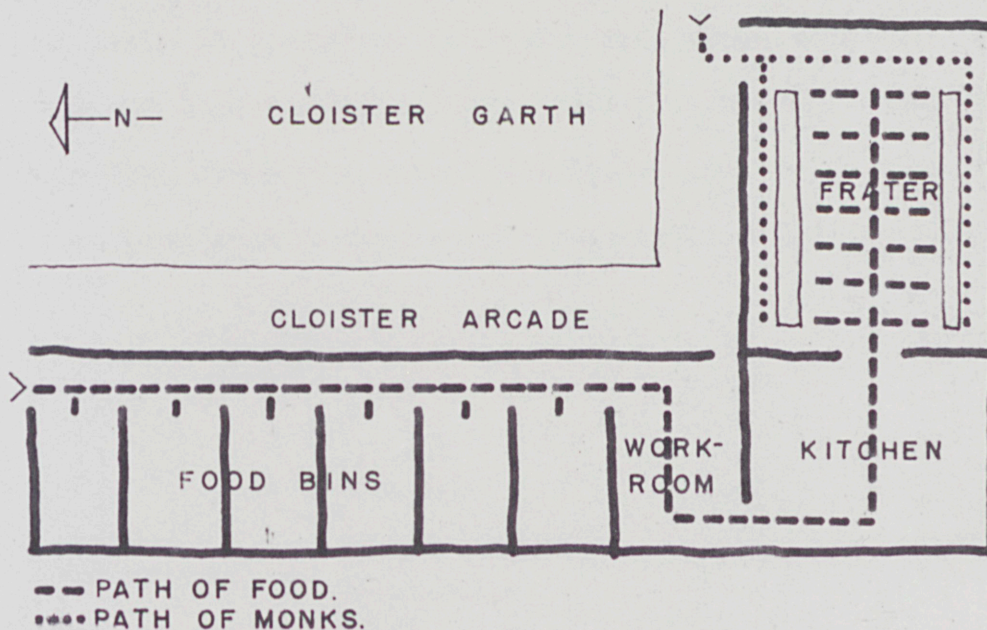


FIG. 35. LOCATION OF KITCHEN.

Shape of the Kitchen

Traditionally, kitchens have been rectangular but Trappist requirements make no mention of this.

Arrangement of the Kitchens

a. Kitchens

Each Trappist monastery is required to have two kitchens, one for the community and one for the guests. Today the kitchens are in the same room; yet, each has different facilities.

Each kitchen has a large oven, two burners for the heating of large kettles, a sink, and storage. The storage is traditionally in the form of large shelves that separate the kitchen from the workroom. It is on these shelves that the washed dishes are placed. All pans are of metal with spoons and forks of wood. No provisions for frying are needed because of the Trappist Rule forbidding fatty foods plus the requirement that non-fatty foods be prepared without lard. A sketch of a traditional monastic kitchen and its circulation follows in Fig. 36:

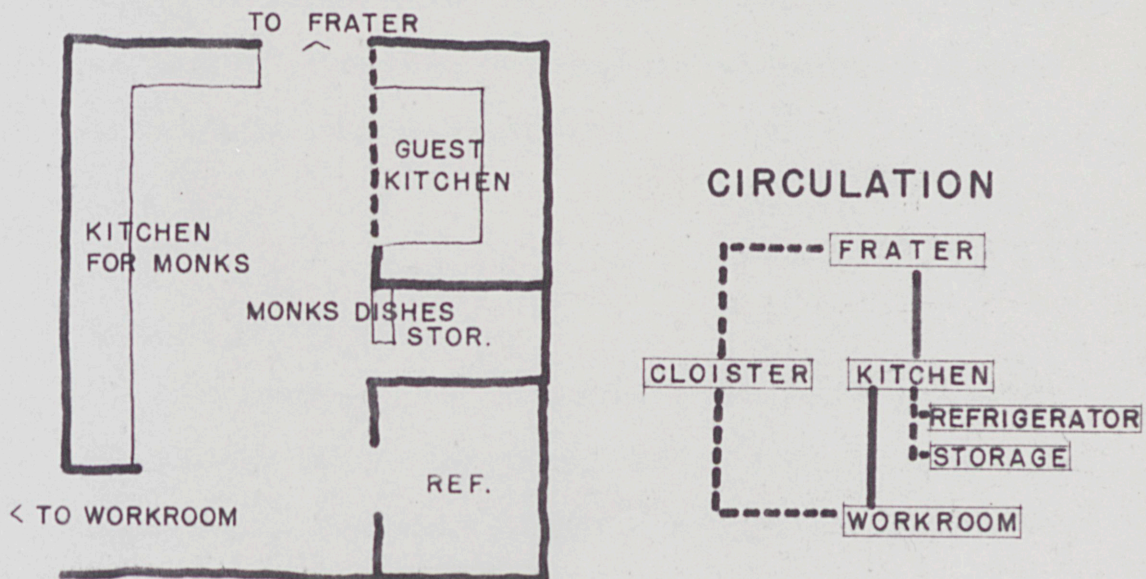


FIG. 36. TRADITIONAL KITCHEN LAYOUT

A Trappist meal for about one hundred monks is usually prepared by four monks. These monks are assigned by the superior to cook on certain days. Only the cellarer, hosteller, and farmery master are allowed in the kitchen without permission.

b. Workroom

The workroom is usually directly next to the kitchen. It is used principally for preparing vegetables for meals. It must be kept scrupulously clean.

The workroom should contain four or five worktables with cutting blocks. To the outside of the workrooms should be a garbage area that opens from the outside so garbage may be carried away and be disposed of.

Lighting and Acoustics

The lighting should be adequate in the kitchen. Good acoustics are not needed because of the isolation of the kitchen and lack of noise since the monks are not permitted to speak or bang pots while in the kitchen.

FRATER

Location of the Frater

The Trappist frater is located on the southern side of the cloister and in this respect differs from all Benedictine monasteries. The tables are set in an east-west line.

Shape of the Frater

The frater is extremely long and narrow. This is due to

the Trappist rule that seating of the monks must only be along one side of the tables with the maximum rows of tables being two. This arrangement also makes the serving of dinner possible without reaching over the monk's shoulder.

Arrangement of the Frater

a. Dining Hall

The dining hall has two rows of tables from one end of the hall to the other end. Between the wall and the table are the monks' benches. In the center of the tables at the east end is a platform raised up by one step. Only the abbot, the prior, and the sub-prior sit at this table, together with any guests who may be admitted to the frater.

No table cloths are used on the tables although the tables may be waxed and oiled. Each monk has his own wooden spoon, fork, knife, two-handled cup and cloth napkin. The pans for vegetables are furnished by the kitchen.

When eating, the monk must wear his cowl or a cape. Upon entering and at the time of leaving or crossing the frater, the head is inclined in the direction of a crucifix above the doorway to the cloister.

b. Lectern

Above the level of the tables and along the outside wall should be a lectern where a monk can read during dinner. The lectern always faces the crucifix.

Lighting

The frater needs little light; a few windows are ample. The only lamp allowed is located over the lectern. Since the Trappist monks continually fast except at dinner, the frater is never used without sunlight. The light breakfast and supper are eaten in the kitchen.

Acoustics

The lectern reader must be heard by the community of monks over the noise of eating. A hard surface behind the lectern is usually sufficient. Reverberation times will usually not be critical because of the small volume of the frater; however, if a high ceiling is in the frater, reverberation times could be important.

THE WARMING ROOM OR CALEFACTORY

Orientation

The calefactory is located on the southeast corner of the cloister with the chapter house and scriptorium to the north and the frater to the west. The calefactory opens on the east to the cloister.

Shape of the Calefactory

Although the Trappists do not specify a shape for the calefactory, it is assumed to be rectangular.

Arrangement of the Calefactory

The calefactory is usually furnished with a large fire-

place surrounded by wooden benches. When the monks come from working in the cold air, they can sit in the calefactory and warm themselves. Strict modesty is always observed. For example, to warm the feet, shoes may be removed, but not socks. Care is taken not to burn any of the monk's garments.

The calefactory is used only sparingly. Monks can never remain there longer than necessary.

Lighting

Lighting must be adequate in the calefactory either by windows or lamps.

Acoustics

No speaking is ever allowed in the calefactory.

DORTER

Location of the Dorter

Traditionally, the dorter or dormitory for the quire monks is located above the chapter house, scriptorium, and calefactory on the east side. The lay-brothers' dormitory parallels the quire monks' dormitory on the west side of the cloister. It is also on the second story. The monks' individual cells face away from the cloister with the common hallway on the cloister side. The dormitories themselves may compose one entire story.

American Trappists have deviated from tradition by extending dormitories--to the south over the frater and kitchens--to include rooms for novices in the main dormitory complex.

Shape of the Dorter

The dorter is a long narrow space because of the arrangement of the monks' cells. It is naturally rectangular because the individual cells are specified by Trappist rule to be "constructed of straight walls and right angles." (9 : 16)

Arrangement of Parts of the Dorter

In the dorter, the cells are separated by wood, or as is more common, masonry and concrete partitions. Each cell is closed by a white curtain; above it is written the monk's name and number. The curtain is dropped to signify it is occupied, raised when unoccupied. The curtain of another monk's cell cannot be raised under any pretext by another person, exceptions being the superior, the farmery master, and the chamberlain. When another person wishes to contact a monk he knocks on a small, hollow piece of wood attached to the right-hand partition of the cell he wishes to enter. The monk on the inside immediately shows himself if he can; otherwise, the person who wishes to see him waits. The cells of the young monks are dispersed among the cells of the older monks. The cells of the lay-brothers and quire monks should be separated as far as possible.

Each cell is furnished with a bed, a crucifix, a holy-water stoup, one holy picture of the monk's choice, and two pegs on which to hang his outer garments. Nothing else may be added without special permission from the superior.

The bed consists of: (1) a mattress covered with a serge sheet and laid out on wooden boards; (2) a bolster of freshly threshed straw; and (3) one or two blankets, depending upon the need. Under no circumstance may a monk stand on his bed or rest there without permission.

The beds are made every day and blankets changed once a week. The monk sleeps in his regular habit unless the superior rules otherwise because of excessive heat or sickness. Footwear is removed and placed ~~in~~ under the bed. Novices and oblates at night hang up their caps and cloaks on the provided pegs. During the winter months, the monks have an extra scapular to wear over the habit while sleeping.

There are two entrances and exits required from the dorter: (1) access directly to the church; the quire monks entering in the south transept of the church, the lay brothers entering the nave of the lay-brothers' quire; (2) access to the cloister usually near the calefactory or the great parlor. The later access provides a way to reach the dorter after dinner for Merdienne and after Compline to sleep. The following diagram shows the dorter circulation patterns:

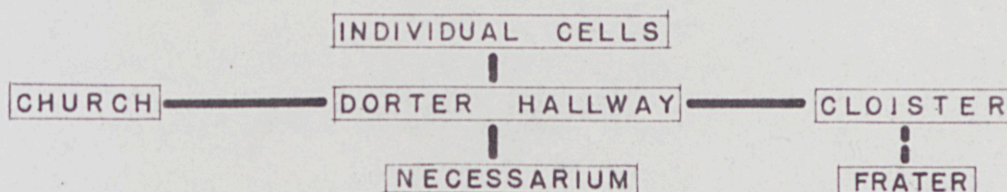


FIG. 37. DORTER CIRCULATION DIAGRAM

Lighting

Each cell has a private window overlooking the landscape. No size for the window is specified but since no reading is ever done in the cell, a large size window is really not needed.

The complete dorters for the lay brothers and quire monks each only contain two lights. These are lighted during night-fall and remain burning until daybreak. No other light is permitted by Trappist rule at anytime.

Acoustics

No speaking ever occurs in the dorter even by a superior. Trappist sign language is not even to be used by persons other than the superior.

OTHER TRADITIONAL ELEMENTS OF THE TRAPPIST MONASTERY

CELLARS

General

The cellars extend along the complete western side of the cloister. Above the cellars are the lay-brothers' dorter. The cellars are accessible from the outside and from the kitchen workrooms.

The cellars of today include insulated storage bins and large refrigerators. For a monastery in the Miles City area, the necessary bins and refrigerated areas must be provided.

GUEST HOUSE

General

The guest house is usually located near the auditory; it opens to the corridor that leads to the cloister only. The guest house should be furnished with beds and bathrooms for at least two people. All accommodations should be at a minimum; no females are ever allowed to use the guest rooms.

NECESSARIUM

General

Traditionally, the necessarium (bathroom) was located on the ground level near the calefactory. Today, Trappists prefer the necessarium half-way between a row of cells. The necessarium includes individual shower stalls that can be closed for privacy.

INFIRMARY

General

The infirmary is always needed in the monastery because of the added care that must be given the old and sick without secular intervention. With a new community of 100 monks, at least five rooms are considered minimum for the infirmary.

The infirmary is in no means elaborate, the room resembling the monks' cells. In fact, the preferred position for the infirmary is near the cell areas.

The infirmary contains one room for medicine which is always of the latest variety and an office for the attending monk. Recent practice has been to include in the infirmary a dental office and a small chapel.

The infirmary must be able to be isolated from the rest of the monastery if contagious disease occurs. The following diagram shows the circulation and needed areas for the infirmary:

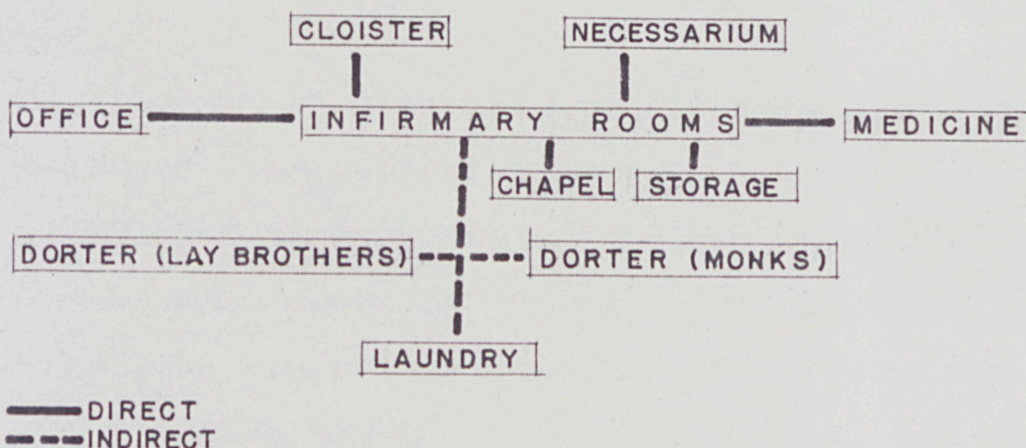


FIG. 38. INFIRMARY CIRCULATION DIAGRAM

NON-TRADITIONAL ELEMENTS OF A TRAPPIST MONASTERY

SUPERIOR'S OFFICE

General

The superior of a monastery has in modern days had more and more paper work in the overseeing of a monastery. Monks' orders and the official community business are among his duties. Today's monastery provides him with a separate office near the auditory of the monastery.

The office proper usually contains a desk, file drawers, and safe. Just outside the office is a small area containing a desk and typewriter. Here a novice or lay-brother serves as a secretary when needed.

The office must be lighted to the extent of modern office proto-types.

TAILOR SHOP

General

A Trappist monk is required to make his own habit; the community as a whole provides work aprons and scapulars.

While medieval habits were hand-sewn, monks today are given the tailor shop to use. The shop is located near the laundry and has a mechanical sewing machine, material storage, scissors, buttons, and thread.

LAUNDRY

General

A medieval monk did all his washing in the fountain placed in the cloister. Because of the improved knowledge of sanitation, the modern monk has a special area for laundry equipped with washing machines and drying space. Irons are provided but only for use on sacred cloth for the sacristy and church proper.

Modern Trappist Monasteries place the laundry in the basement beneath or beside the food cellars. No clothes may ever be dried outside the confines of the laundryroom.

PRINTING ROOM

General

Recent Trappist monasteries need a printing room to print various manuscripts and books. The press, nevertheless, is not elaborate, containing a handpress with hand-set lettering. The special requirement is that Latin along with English type be available. The print room should contain the following:

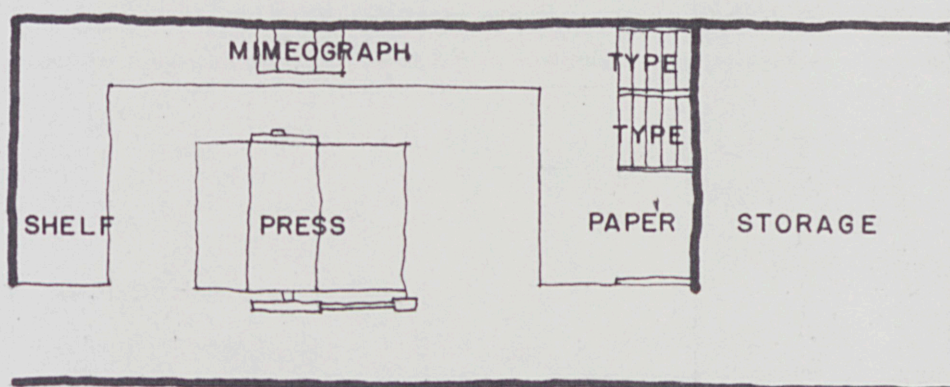


FIG. 39. TYPICAL PRINT ROOM LAYOUT.

MECHANICAL ROOM

General

The mechanical room for the monastery would contain the boilers and pumps required to heat the dormitory and hot water. The location of the mechanical room is dependent upon distance to heated areas, the closer to the heated areas the better. The mechanical room should, nevertheless, be in the basement because of its weight and the danger of explosion.

REPAIR SHOP

General

The repair shop has been proven a necessity to a monastery because the monastery must be self-sufficient. Calling for secular repairmen at every breakdown would be unreasonable.

The shop should contain at least one workbench, a vice, an oxy-acetylene welder, and a good selection of manual tools.

The manual tool list follows in Fig. 40:

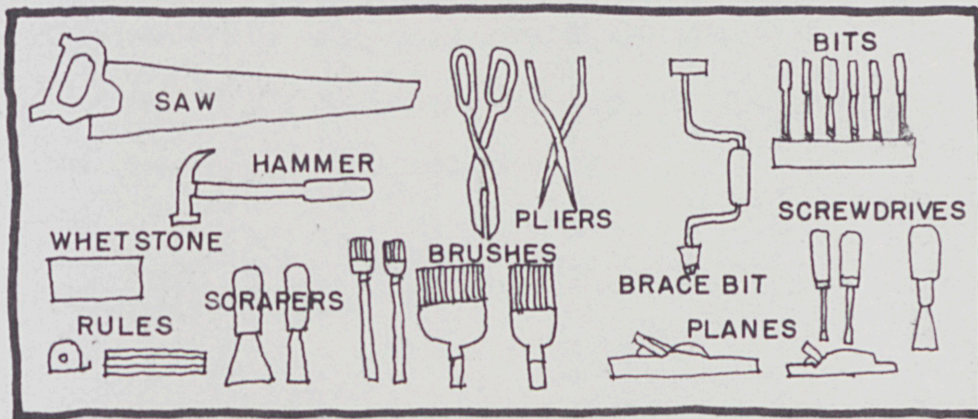


FIG. 40. HAND TOOLS FOR REPAIR SHOP.

The location of the shop should be near the laundry and tailor shop or the boiler room. It would be desirable if the shop could be out of the way of the Trappist religious activity.

MAINTENANCE CLOSET

General

The maintenance closet is for storage of all the equipment needed to keep the monastery clean and functioning. The area contains a slop sink and an area to store such items as fuses and light bulbs needed to keep the mechanical equipment function-

ing properly.

A maintenance closet should be located on each floor of the monastery, close to the kitchen on the lower floor and close to the infirmary on the upper floor.

STORAGE AREAS

General

Although a monk only owns his robe and eating utensils, storage for the community as a whole has proven necessary. The area should contain shelves of all sizes.

Basement areas are usually used for this purpose, but the basement must be absolutely dry.

MISCELLANEOUS AREAS

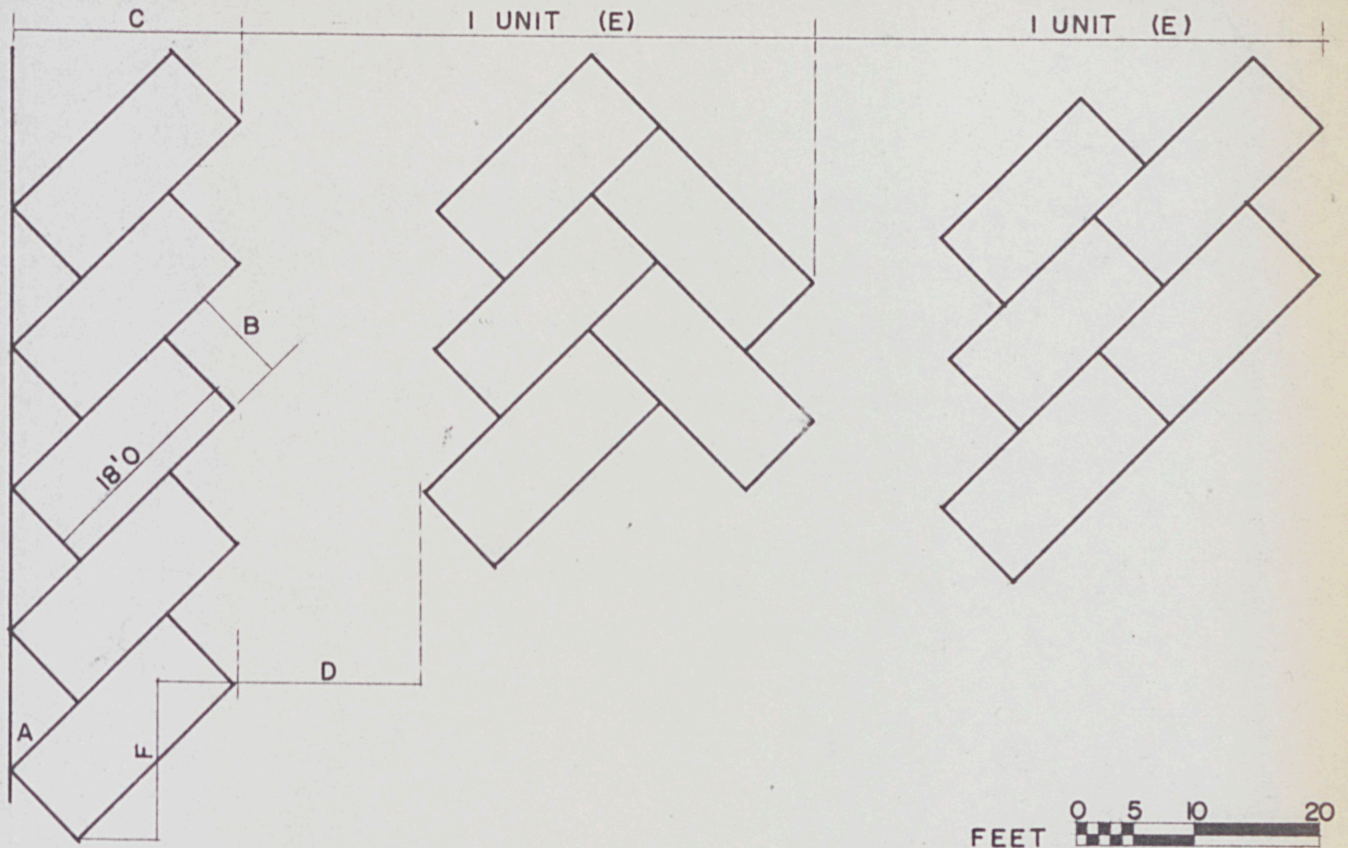
PARKING

General

As explained in the section titled Site Analysis, the maximum traffic load would require five parking spaces. The following Fig. 41 shows the minimum dimensions for parking spaces.

The parking must be a sufficient distance to the main entrance so the traffic will not disturb monastic life, visually or audio.

Since all guests must come and leave during the day, no parking lighting needs to be installed.



A	DIRECTION OF PARKING	B	C	D	E	NO. OF STALLS IN LENGTH	AREA PER CAR SQ. FT.
90°	BACK - IN	8'0"	18'0"	22'0"	58'0"	X (LENGTH) 8	232
60°	BACK - IN	8'0"	18'0"	17'4"	55'0"	X-11 9.25	254
45°	DRIVE - IN	8'0"	17'2"	12'8"	47'0"	X-17 11.3	266
90°	BACK - IN	8'6"	18'0"	22'0"	58'0"	X 8.5	247
60°	BACK - IN	8'6"	18'10"	18'4"	56'0"	X-11 9.8	270
45°	DRIVE - IN	8'6"	17'2"	12'8"	47'0"	X-17 12	282

FIG. 41. RECOMMENDED PARKING DIMENSIONS
(17:611)

ROADS

General

The main road to the area is unpaved consisting of compacted earth or gravel. The following Fig. 42 shows the recommended widths, curves, and crowns for such roads.

Since the building is located in a rural environment, no sidewalks, curbs, or unusual drainage systems are required.

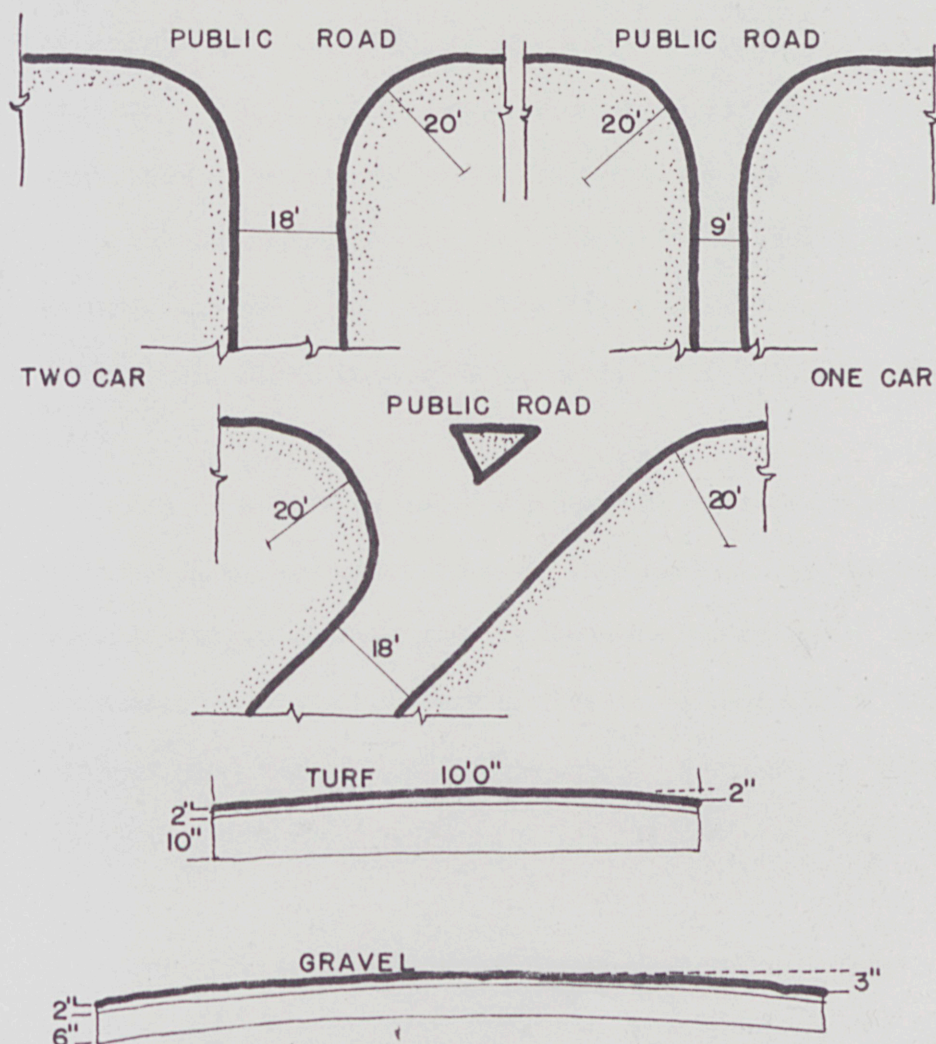


FIG. 42. UNPAVED ROADWAYS.

(17:561)

FUNCTION OF THE FARM
FOR A CISTERCIAN MONASTERY OF THE STRICT OBSERVANCE

REQUIREMENTS OF THE FARM

General

The farm, unlike the monastery proper, is very conscious of change and adopts all of the latest farming techniques and equipment. This allows Trappist monasteries to be known as consistently producing better-than-average yields.

All the monastic farming is done by the monks in approximately six hours, the time the Rule of St. Benedict allows. During this time, each monk has a specific duty at a specific place.

The farm work is generally supervised by an elder who is in control of a crew of four or five monks. The elder is experienced in the phase of farming he supervises. Contrary to popular belief, the supervision is nothing but a teaching process with regular breaks for rest. All work is carried out with diligence and care but not to the point of physical torture.

The work required by the Miles City area farmland would mainly consist of tending the vegetable garden of the monastery, raising livestock, and cultivating the field crops of beans, wheat, and barley. (See Economics) The vegetable garden will be

mainly tended by hand tools with limited use of a small garden tractor. The field crops on the other hand, will be mainly worked by machinery similar of any wheat ranch in Montana. The livestock is in the form of a beef herd. Beef cattle do exceptionally well in the Miles City area and only require limited care, equipment, and buildings. (See Economics)

Farm Building Requirements

The farm buildings, unlike the monastery, are usually designed for a limited period of use and maximum flexibility. Nevertheless, they must look like they are part of the monastic complex and, if possible, be visually pleasing.

The farm should be located downhill from the monastery proper because of sanitary reasons. The farm may be located on any side of the monastery, the accessibility to the fields and livestock being the determining factor.

FARM MACHINERY AREAS OF THE FARM

FARM MACHINERY STORAGE

Location of the Farm Machinery Storage

The storage for farm machinery is located directly off the main road to the fields and near the gasoline storage. It should be located a sufficient distance from the church so the noise of the machinery will not disturb the activities in the monastery. No roads to the fields must ever pass near the monastery.

Shape

The storage should be shaped so each piece of machinery may be moved without having to move another piece of machinery first. This usually necessitates a long rectangular building opening on one or two sides.

Arrangement of the Farm Machinery Storage

The storage should be divided into four general areas although they need not to be partitioned. The areas and machinery follow in Table 10.

MACHINERY	AREA	MACHINERY	AREA
CATERPILLAR D-4	120	PLOW	50
TRACTOR	100	RISE	50
1 1/2 TRUCK	100	HARROW	50
PICK-UP	80		
		LEVELER	100
MOWER	75	DRILL	20
RAKES	75	SEEDER	100
HAY STAKER	100	COMBINE	200
WAGON	75	MANURE SPREADER	75

TABLE 10. FARM MACHINERY.

(20:3)

Lighting

The storage areas should have some means of artificial light for emergencies. The area, however, need not be well lighted because in most instances the machinery would never be used in non-daylight hours. A recommended lighting level would be three footcandles.

FARM MACHINERY REPAIR SHOP

Location of the Farm Machinery Repair Shop

The repair shop usually is directly next to the storage area for machinery, sometimes even attached. The repair shop must provide easy access for all machinery entering and leaving the shop.

Shape

Although any shape could work, the rectangular shape is best because most farm machinery approximates the rectangle in shape.

Arrangement of the Farm Machinery Repair Shop

The repair shop should contain an area for the storage of tools including an air compressor and arc welder. A lubrication pit should be provided for servicing vehicles from below. (See Fig. 43) In the floor of the lubrication pit should be a large concrete sump.

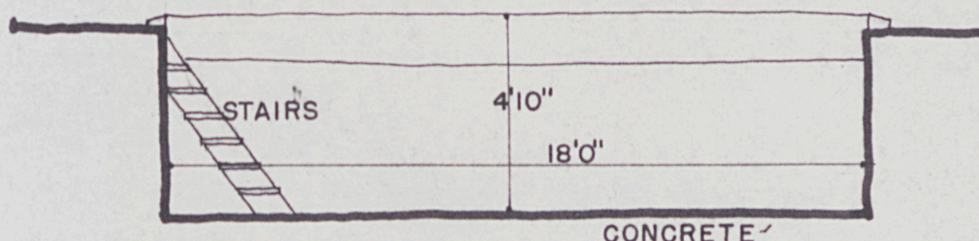


FIG. 43. LUBRICATION PIT.

(17:387)

The doors to the shop must be large enough to allow even such machinery as combines to enter. Also, the entire building must be vented and of fireproof construction.

Lighting

The repair shop should be artificially lighted with a light source that has at least 10 footcandles. For very specialized work, moveable lamps should be provided.

PAINTING SHOP

Location of the Paint Shop

There is no absolute position for the paint shop, although locating it next to the repair shop would allow one air compressor to service both areas. The paint shop must, however, be near the road to the fields.

Shape

Again, the rectangular shape seems best because of the shape of the farm machinery.

Arrangement of the Painting Shop

The paint shop should contain a special room that is completely fireproof for the storage of paint, brushes, spraying equipment, and rags. The room should open into the painting area.

The painting area should be easy to clean with a minimum of openings to limit dust. An efficient ventilating system is required to prevent affixation.

Lighting

Artificial lighting of at least 15 footcandles is required in the paint shop.

GASOLINE STORAGE

Location of the Gasoline Storage

The gasoline storage should be away from all the buildings but, nevertheless, on the main road to the fields. The gasoline storage should be located so secular gasoline trucks can service the tanks. If the tanks could be located so they can be covered with trees, they would not cause an aesthetic problem.

Shape

The shape of the gasoline storage tanks are generally round because of the strength of a circular shape. Rectangular tanks are rarely used.

Arrangement of the Gasoline Storage

The gasoline storage should contain a main tank and an auxiliary tank. The tanks should be set on stands so gravity-filling may be used rather than employing a pump.

Lighting.

None.

LIVESTOCK AREAS

LIVESTOCK FEEDING AREA

Location of the Livestock Feeding Area

The livestock feeding area must border the pasture area on an access to the pasture area.

Shape

The shape of the feeding area is dependent upon the shape of the feeding stalls.

Arrangement of the Livestock Feeding Areas

The livestock feeding area is composed of an open or covered group of feeding stalls. On the Miles City site, a covered feeding area is not needed because of the abundance of trees in the fields for shade.

The feeding stalls can be circular or linear. At least two feet of feeding stall per head is needed.

Lighting

None.

FEED STORAGE

Location of the Feed Storage Area

The feed storage area should be located directly next to the livestock feeding area.

Shape

The feed storage area can be of any shape.

Arrangement of the Feed Storage Area

The feed storage should allow the storage of alfalfa, hay, and barley. It must be arranged so the feed cannot mix in the bins but, nevertheless, allow mixing of the feed when it is used.

The feed bins must have an outside opening so they may be filled. Also, there must be no way for moisture to enter the feed bins to cause spoilage.

Lighting

None.

CALF BARN

Location of the Calf Barn

The calf barn is usually next to the feeding area and feed storage, sometimes combined with the feed storage.

Shape

The calf barn is usually rectangular but may be of another shape.

Arrangement of the Calf Barn

The barn should have at least ten stalls with feeding provisions. The stalls should be off the main entrance and have a concrete floor for easy cleaning.

Lighting

Since the barn is mainly used when cows are calving, some type of artificial light is needed in case calving occurs at night.

CROP AREAS

GRANARY

Location of the Granary

The granary borders the main fields of the farm. It should be near one of the main roads to provide access by secular vehicles.

Shape

The shape of the granary varies from farm to farm, the most common variety being the round shape. A circular shape

is usually stronger than a rectangular shape for the amount and type of material used.

Arrangement of the Granary

The granary must have three bin areas for beans, wheat, and barley. (See Economics)

The granary can be made of metal, concrete, and wood. Wood is rarely used because of the large amount of maintenance it requires.

The bins must be absolutely waterproof and vented to combat spontaneous combustion and dust explosions.

OTHER REQUIRED FARM AREAS

GREENHOUSES

Location of the Greenhouse

The greenhouse is located near the vegetable garden.

Shape

The shape of the greenhouse is generally rectangular because glass, in most cases, is cheaper flat and, therefore, cheaper to place on a flat surface.

Arrangement of the Greenhouse

The greenhouse is made up of numerous shelves to set and water starting plants. A concrete floor is usually required for ease in cleaning.

Lighting

The lighting is of ultra-violet and conventional variety. The ultra-violet lights are in one area to provide an area to allow plants to grow without natural sunlight. Steam heat is used to keep the plants from freezing.

LUMBER SHED

Location of the Lumber Shed

The lumber shed with the carpenter space is located near the main farm buildings.

Shape

The shape is usually rectangular, being determined by the shape of lumber.

Arrangement of the Lumber Shed

The lumber shed is divided into two parts: (1) the lumber storage space; and (2) the carpenter shop with tool storage. The lumber storage should provide storage for lengths up to 20 feet without any exposure to weather.

The carpenter shop should contain a workbench and ample wall space to hang hand tools. Drawers and shelves are also required for storage.

The carpenter shop should contain the tools listed in Table 11.

Lighting

Artificial lighting should be of an intensity of 10 foot-candles per sq. ft. in the carpenter shop. Lumber storage needs no light because no accurate work is done in this area and lumber would not be needed at night.

ELECTRICIAN SHOP

Location of the Electrician Shop

The electrician shop is near the machinery repair shop because of the overlapping of the functions of these two areas. The repair shop and electrician shop are frequently combined.

Shape

There is no special or advantageous shape for the electrician shop.

Arrangement of the Electrician Shop

The electrician shop should contain shelves and cabinets for electrical equipment and parts. A work bench with chairs and sufficient outlets is required. The tools in the electricians shop are variable and usually dependent upon the electrician.

Lighting

Artificial lighting should be provided with an intensity of at least 10 footcandles.

HAND TOOL STORAGE FOR GARDEN WORK

Location of the Hand Tool Storage

The hand tool storage is always near the vegetable garden or the monastery.

Shape

There is no particular shape for hand tool storage.

Arrangement of the Hand Tool Storage

The hand tool storage should contain shelves and cabinet space for the following tools and supplies.

TOOL	TOOL
SHOVEL	FERTILIZER
HOE	SEED
RAKE	WHEELBARROW
ROLLER	SMALL TRACTOR

TABLE II. HAND TOOLS AND SUPPLIES
(20:3)

Lighting

None.



FAITH

required duties for a monk

REQUIRED DUTIES FOR A MONK
OF A CISTERCIAN MONASTERY OF THE STRICT OBSERVANCE

REQUIRED DUTIES AND THE FUNCTION OF THE MONASTERY

General

As explained earlier, the life of a Trappist monk is essentially the same as the medieval Cistercian monk. He follows specific duties at specific hours every day with no deviation unless unusual circumstances require change. And the life of the Trappist is not likely to be changed because of its already long existence.

But if Trappist life has not changed, the conditions surrounding that life have. For example, the war-like conditions of medieval Europe have long since vanished. Yet, the monastery of the Trappists retains a fortress-like appearance, even though the need is not present. This points up the fact that monastic design is essentially determined by tradition. The function of the monk has simply been adapted to the traditional monastic building.

The Trappists prefer to preserve tradition, even in modern monasteries, rather than produce an efficient, functioning building. Still, any improvement in function without destroying the relationships between the parts of the monastery is acceptable.

The following descriptions explain exactly what a Trappist monk does in his daily life. Circulation diagrams at the end of this section clarify the monk's movement in the monastery.

DAILY LIFE IN A TRAPPIST MONASTERY

2:00 a.m.

A Trappist day begins at exactly two o'clock in the morning by the ringing of the monastery bells. The bellringer is a lay-brother. He does not own an alarm clock or any other similar device; rather he relies upon habit.

The monks assemble and proceed silently without the aid of light into the church. Here the monks fill the stalls immediately in front of the altar. The lay-brothers and infirm take their places toward the rear of the church. The church is completely dark except for the presence of one candle.

The first office of the day is special and typical only of Trappists. The office is dedicated to the Blessed Virgin, patroness of all Trappist monasteries. The office continues for one-half-an-hour and is followed by a short period of meditation.

3:00 a.m.

At precisely 3:00 a.m., the first of the canonical offices begins, that of Matins and Lauds. Matins comes from the original vigiliae or night watchers and bears a strong relationship to the Roman military division of the night into three parts. It is characterized by the singing of the psalms in form of Gregorian Chant and reciting anthems and lections selected for the particular day. The Gregorian Chant is sung in even cadences with the anthems and lections coming at the

long pauses between verses. This is the period of austere monotony to symbolize to the monk the hopelessness of life without Christ.

The psychological effect of the Trappist Offices is mainly due to the Chant itself. Unlike modern, and like most traditional music, it has no fixed rhythm and follows the rhyme of the spoken word. Therefore, it lacks emotion and a "personal style." It has a universal and supra-individual character because it contains the words of God, not man.

3:30 a.m.

Immediately following Matins is the second canonical office, that of Lauds. Lauds is a complete change from Matins because the monk anticipates the rising sun. The psalms for Lauds are sung faster and with more spirit than those for Matins. At Lauds the coming of Christ is symbolized by the certainty of the anticipated rising of the sun.

Lauds ends with the prayer attributed to St. Ambrose:

Splendour and glory of the Father,
the light out of which light comes,
light of the light and fountain of light,
dawn of the day's brightness. . . .

May the day go by joyously
in the morning of purity,
in the high noon of faith
and without nightfall upon the spirit. (12 : 27)

About 4:00 a.m.

As Lauds ends the priests say their private masses in front of the altars dedicated to St. Benedict; the others par-

take of Communion. This is actually a short, quick mass, giving time for the following reading and private prayer. This takes place in the same stalls where the monks recited the office of Matins and Lauds.

5:30 a.m.

At 5:30 a.m., the third canonical office is recited. This office is called Prime, the first of the day offices. Prime follows the form of Lauds with quick chanting and short psalms. Prime formally ends with the psalms themselves after which, from the eighth century on, the monks withdraw to the chapter room and are seated each according to his seniority, the greater the seniority, the further to the east. The abbot and the prior sit at the far east portion. The martyrology is first recited, then portions of the Rule of St. Benedict explained. Prayer for deceased members of the order and for benefactors living or dead follows. The last function is the public confessions of transgressions of the Rule and the accompanying punishment for the violation. Punishment usually consists of a gentle reminder of the purpose of the Rule in contemplative life.

6:30 a.m.

In winter after Prime, a very light breakfast (frustulum) may be taken by those who do not wish to fast until dinner. In summer a slightly heavier breakfast, (minx) is taken by everyone because of the heavier work schedule. In either case, only bread and vegetables, boiled without lard, are served.

6:45 a.m.

At precisely 6:45 a.m. the monks leave the monastery for the fields. The monks leave in double file after gathering a scapular from the auditory. The scapular fits over the choir habit as shown in Fig. 2 to prevent soiling of the habit.

Work is quite variable among the monks, usually depending upon the certain ability of each monk. The most modern types of farm machinery, such as caterpillars, tractors, and automatic seeders are used.

A Trappist monk is one of the best farmers in the world and he takes meticulous care in performing his duties. Farming methods that are now accepted by secular society as correct have been used by Trappists for centuries. The Canadian Government has realized this and has commissioned the Trappists to operate an agricultural college for the Canadian Government at Oka, Quebec.

During the time the monks spend in the field, the novices attend classes in the chapter house with the abbot and prior. Here the novice learns the reasons for monastic life and the procedure followed in monastic life. In the library or scriptorium, the novice studies writings about the order and various chants so he can follow the observance of the Offices.

9:30 a.m.

At 9:30 a.m. the bells of the monastery ring signaling Thrice, the fourth canonical hour. All the monks working near

the monastery enter the laver to wash their face and hands, remove their scapular, and deposit working tools. From the laver they proceed directly to the church.

If a monk is in distant fields, the head of the work group for the day signals and the monks chant only parts of the office. This allows time to reach the church for High Mass. Positions taken by the monks in the field for Thriece are exactly the same as in the church.

Also, at this time, the monks in charge of preparing the meals for the day are excused. Everyday different monks prepare the meal.

Thriece is essentially the same as Lauds, except that in Lauds the emphasis is upon sustaining the individual and community rather than emphasizing the glory of the coming of Christ.

10:00 a.m.

After Thriece, the monks assemble in the Church to perform the High Mass. The Mass, in itself, is the central mystery of the monk's faith as with all Roman Catholics. It is basically the liturgical action in which the priest as representative of Christ renews the offering to God of Christ's own sacrifice of himself on Calvary. Christ is present on the altar under the species of bread and wine.

10:30 a.m.

Immediately after High Mass is the fifth canonical office, the of Sext. Sext is the blessing for the upcoming meal.

11:00 a.m.

From the chanting of Sext, the monks proceed to the frater to await dinner. If dinner is not ready, the monks may sit in the cloister and read. This is usually the case because of the practice of letting inexperienced monks take turns at cooking.

The meal includes no meat or fish. Usually each person is given a pound of dark bread, vegetables that can be grown on the farm, fruit if in season, and a mild beer or sour wine to drink.

In the frater, perfect silence is observed with no one being allowed to walk about the room eating. The monks have to wear the cowls of their habit up and eat in a position where the head is always slightly inclined. The monks sit on one side of the table only.

The scriptures that are read by an appointed monk during the meal are selected previously by the abbot.

12:00 a.m.

After dinner the monks retire to their individual cells in the dormitory for meridiene, commonly called a siesta. The siesta lasts approximately one hour. When the monastery bell rings, the monks go to the church for None, the sixth canonical office.

1:07 p.m.

None was originally at three o'clock, the traditional time

at which Christ died, but today it is at exactly 1:07 p.m.

None is the evaluation of the purpose of Christ's death. The chant sung at None is Psalms LXXX and CIX plus the selected psalms for the day.

1:30 p.m.

None ends at 1:30. It is followed by silent reading in the Scriptorium and private prayer. This time can also be used for personal manuscripts or required correspondence.

2:00 p.m.

After a common prayer, the monks again leave the monastery for farm work. The monks remain at work until the monastery bell rings at 4:30 p.m.

4:30 p.m.

At 4:30 p.m. there is again another time for private prayer that prepares the monk for Vespers by relaxing the bodily tension from working and producing the correct frame of mind.

5:15 p.m.

Vespers is the oldest of the offices. It sanctifies the sunset as Lauds sanctifies the sunrise. On Sundays and days of feasts it is celebrated with great solemnity; the priest being dressed in a special cape and the altar scented.

Vespers came from the Jewish tradition of the reckoning of the day from evening to evening. This accounts for the Trappist practice of celebrating Vespers twice on special holy days.

The chant for Vespers, as legend has it, was composed of poems written by St. Ambrose from the six sermons on the six days of creation. They appear today as follows:

Marvellous Creator of light
Uttering the light of each day
And at the birth of first light
Taking upon Thyself the world's beginning.

Thou who ordainest that from daybreak to
evening
Shall be called day,
Chaos and darkness fall;
Give ear to prayers mingled with weeping...

Hear us, kindly Father
And Thou Only who art equal to the Father
With the Holy Ghost, our comforter,
Who reign world without end. (12 : 121)

5:45 p.m.

Meditation follows Vespers for at least one-fourth-an-hour followed, in turn, by collation, simply a light refreshment. This consists of a light, mild beer.

7:10 p.m.

At exactly 7:10 p.m. the office of Compline begins. It is the last of the canonical offices and is directly attributed to St. Benedict. Historians say St. Benedict started Compline to replace the Office to the First Sleep practiced in the IV century.

Compline is the period for the examination of the monk's conscience. The entire monastery gathers in the cloister and one of their number reads the scriptures. Absolute silence is observed except for the reader.

8:00 p.m.

Exactly at 8:00 p.m. the monks go directly to their cell for sleep.

CIRCULATION OF THE MONK

General

The following Fig. 43 shows the circulation pattern a monk follows daily.

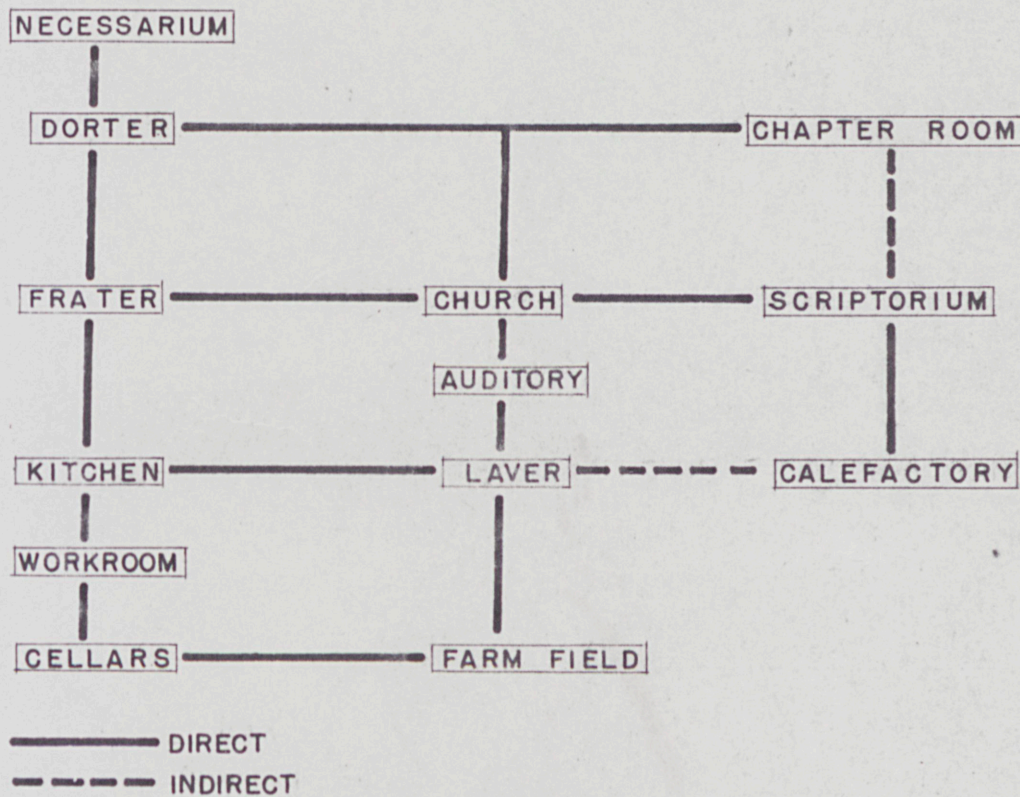


FIG. 43. MONK'S CIRCULATION.



LAST ANOINTING

AESTHETIC CONSIDERATIONS
FOR A CISTERCIAN MONASTERY OF THE STRICT OBSERVANCE

THE ROLE OF TRADITION AND LITURGY IN MONASTIC AESTHETICS

General

The aesthetics of a monastery are essentially determined by (1) tradition and (2) liturgy.

Tradition determines relationships between the buildings, the shapes, and the various uses of materials and color. Tradition cannot be neglected for it is an integral part of the Trappist Order.

Tradition gives the Trappist Order a feeling of being continuous. The modern Trappist Order remains obedient to the Rule of St. Benedict which was formulated in the sixth century A.D.

Tradition is not a limiting factor, only a guide. Modern aesthetics in a framework of traditions are usually just as successful as very "free" creations because, in the end, the aesthetic creation will be essentially an individual act, not a copy of previous examples. Tradition does not have a specific style.

The liturgy has an influence on aesthetic considerations because of the numerous ceremonies it establishes. Each ceremony requires an aesthetic character with certain aesthetic articles. The section titled Required Duties for a Monk

explains the liturgy required by the Trappists.

FORM

General

The form of the monastery must reflect the poverty, modesty, and rugged masculinity the monk voluntarily takes upon himself.

Poverty and modesty can best be illustrated by simple, well-known, and conservative forms. Rugged masculinity calls for sharp corners, roughly textured surfaces, and straight lines.

Primary and geometric forms best express Trappist life. They are simple, well understood, and beautiful in their simplicity. Le Corbusier states essentially the same fact in

Architecture of Truth:

"... cubes, cones, spheres, cylinders or pyramids are the great primary forms which light reveals to advantage; the image of these is distinct and tangible within us and without ambiguity. It is for that reason that these are beautiful forms . . . (12:vi)

The Trappist monastery should have a "oneness" of form as much as possible. Remember, a monastery is a religious way of life; each element of that life being important and religious. This is not to say that each portion of the building must not be recognizable; rather, all the individual parts must look like they need the other parts to exist.

From the outside of the monastery, the church portion should be slightly dominate in form. The cells should have a unique form since the individual monk is the common denominator of the communal group; nevertheless, the cells, to show

the monastery is a community, should repeat the unique form. The entrance, shops, and storage areas should reflect the form of the monastery proper.

As to the question of whether the form should blend in with natural surroundings or be in complete contrast to the surroundings, there is no "right" answer. Frank Lloyd Wright has designed successful buildings blending with the surroundings; Le Corbusier and Mies Vander Rohe have done the opposite just as successfully.

The question of justifying aesthetics upon surroundings is especially relevant when considering the form of a Trappist monastery. Does a Trappist monastery look like other Trappist monasteries or like the surroundings? Surroundings in this case are important only for views and climatic conditions.

SIZE AND SCALE

General

The Trappist monastery should aesthetically fit the monk. The building, in other words, should look like it is made for monastic occupancy. The entire monastery should shy away from excessive heights, mainly in the doorways, cloister, and dormer. The church, where man makes his union with God, is usually expressed as being slightly above human scale; hence, it is slightly larger and higher than the rest of the monastic buildings. The church, however, should be modest in size.

MATERIALS

Aesthetics of the Use of Materials

Trappist monasteries have always prided themselves for their "honest" use of materials. "Honest" means expressing a material exactly as it is used. For example, brick veneer hung on a concrete wall is not an honest use of material because the brick is expressed as doing the work of the wall which it is not. This is what St. Bernard called "useless embellishment." (5 : 4)

The aesthetic feeling derived from the "honest" use of materials is very important to the Trappists. A wall loses its beauty when the monk knows it is actually false; because, in itself, this gives the impression that the monastery and, consequently, his existence there are also false. To the monk, beauty is pure without embellishment.

The Trappist also demands proper use of materials. Since it has been Trappist tradition to be "down to earth" in all their activities and especially in their work, materials illogically used cannot be pleasing. And, it should be mentioned that a Trappist community is hard to fool when it comes to building because it is mandatory that every Trappist community have a monk trained in architecture. (10 : 12)

Aesthetics of the Desirability of Materials

Early Trappist monasteries used stone for the main building material because of its plainness and austerity while, at the

same time, symbolizing the humble, severe, and earthy character of the monks. Stone made the monastery strong and fortress-like in appearance; a symbol of the everlasting God to Whom the monks devoted their life. The weight of the stone was symbolically comparable to the weight of the trials a monk experienced in reaching God. The stone was cold and not "homey" to the secular person; but, to the monk, it was perfect because the monastery was his home only until he attained everlasting life. Since the ideals of the stone are the same for modern monasteries, a material with approximately the same feeling as stone should be used. A stone monastery would be financially prohibitive for Trappists to build today. (See Economics)

Today the only substitute for stone's quality seems to be concrete. Concrete can be textured by rough-wood forms to make it rugged; or it can be smooth and plain. Concrete usually appears heavy, earthy, and humble because it is associated with buildings having large loads and low cost, austere because of its uniform grey or white natural color.

Concrete also allows all types of forms to be built in almost any size. This permits the use of one material throughout, making unity of the building much easier to achieve.

Concrete can be aesthetically complimented by wood, glass, and stone. Wood gives a feeling of warmth to the concrete; a feature needed in the warming room and chapter room. Wood, when used with concrete, keeps the feeling of being humble

and inexpensive because it is a common building material for the Miles City region.

Glass, a necessity for the required light to enter the various monastic rooms, is aesthetically pleasing with concrete because of the plain and flat similarity of both surfaces.

Stone, as explained, contains approximately the same properties as concrete; therefore, it is usually pleasing when used near concrete. Stone pebbles on panels and walks add texture to concrete surfaces without seeming to be cheap or luxurious embellishments. Rock veneer is not acceptable because it is not an honest use of material.

Other materials that may work well aesthetically with concrete, depending on their placement, are brick and most metals --gold being an exception because of its association with wealth. Plastics and similar materials would aesthetically cheapen a monastery because they have a commercial, gay, and temporary feeling; a feeling totally unrelated to a monastic order.

COLOR

General

Where color is allowed, Trappist monasteries have mainly used combinations of muted browns and greens. Today the Trappists prefer bright pure colors in small areas; the color being allowed in the following parts of the monastery:

- (1) The main entrance to the monastery;
- (2) The chapter room (near the abbots seat);
- (3) The auditory
- (4) The church (near or about the altar).

A spare use of color makes it impossible to achieve a cheap and gay appearance by color alone. The color should only be spots to catch and focus the eye.

Color in the church tends to be blue because of the restful and serene characteristics associated with the color. This, by the way, is also the reason why the Virgin Mary is usually cloaked in blue.

The use of color must never come to look like embellishment but, rather, must be an integral part of the building.

IMAGERY

General

In 1213, representational figures of "one color and with a simple geometric pattern" were allowed. (24 : 53) Unnecessary embellishments were never allowed; nevertheless, the failure of the chapter to define "unnecessary" led to wide abuses. Today, except for the crucifixion and the Virgin Mary, all imagery of religious figures and embellishments not needed for the function of the offices are strictly prohibited. The ruling stems from St. Bernard's attack on the "rich and ornate monasteries of the Clunian monks." (24 : 55) Today the following script from the "Apologia ad Guillelmum" is still quoted as Trappist doctrine:

"...The walls of the church glitter with a display of riches, and the poor lack everything; its stones are covered with gilt, and the children go unclothed; the good of the poor pay for embellishments to charm the eyes of the rich; the dilettante can satisfy his curiosity in church, but the poor find nothing there to sustain them in their wretchedness. Why cannot we at least respect the images of the saints and not spread them about the very paving we tread with our feet? People spit in the faces of angels, and passer-by trample on the heads of saints. And if we cannot feel respect for the images of the saints, could we not at least feel it for so much fine colour? Why make things so beautiful in order to cover them with filth? Above all, what have these things to do with poor men, monks, of religion? Great God, if we are not ashamed of such trivialities, at least we ought to regret the amount they cost!" (5 : 24)

In 1134, stained glass windows were forbidden even when they represented the Crucifixion. In 1182, an order to destroy all such windows was carried out. Today the rule is in existence; however, a special art of glazing in grisaille with geometric and abstract designs is permitted.

The figures of the Virgin Mary and the Crucifixion have usually been painted and of a very realistic nature. Since representational religious art has somewhat been replaced by the more abstract variety, the Trappists have commissioned highly abstract figures to replace the traditional variety. The abstract figures also relate much better to modern monasteries.

Modern Trappist images are usually made of wood, concrete, and metal. The cast plaster images have been neglected because of their association with the cheap and temporary.

SYMBOLISM

Virgin Mary

The symbolism of the Virgin Mary varies from monastery to monastery depending upon the emphasis to be placed on Mary. The certain symbols ordained by the Trappists as particular to Mary follow:

"The apple, when in the hand of the infant Savior signifies the sin in Paradise, which made His coming necessary; but in the hand of the Virgin, it designates her as the second Eve.

"The Serpent, the general emblem of Satan and sin, has a peculiar meaning when placed beneath the feet of the Virgin, and is illustrative of the prophecy 'She shall bruise thy head.'

"The Globe beneath the Virgin and entwined by a serpent is the symbol of her triumph over a world fallen through sin.

"The Pomegranate, the emblem of hope, is frequently given to the Virgin by the child Jesus.

"Birds represented the soul, or the spiritual opposite the material. Thus the dove is the Holy Spirit hovering above Her; while the seven doves, which signify the gifts of the Spirit, when surrounding the Virgin make her the mother of wisdom. When doves are near Her while she reads or works, they express her gentleness.

"The Book in the hand of Mary, if open represents the book of Wisdom; if closed or sealed, it is a mystical symbol of the virginity.

"Flowers were consecrated to the Virgin; and fruits signify 'The fruits of the Spirit' ---joy, peace and love." (12 : 8)

The symbolism the Trappists use for the Crucifixion are as follows:

"The owl is attributed to Christ, who sanctified himself to save mankind, 'to give light to them that sit in darkness and in the shadow of death.' This explains the presence of the owl in scenes of the Crucifixion.

"The Phoenix symbolized the coming resurrection in scenes of the Crucifixion.

"The anemone may be depicted in the scenes of the Crucifixion, or in conjunction with the Virgin Mary to show her sorrow for Christ. Red spots on the petals symbolize the blood of Christ, for it is said that anemones sprang up on Calvary the evening of the Crucifixion.

"The dandelion, 'one of the bitter herbs', also symbolizes the Crucifixion.

"The deep red of the carbuncle stone is significant of blood and suffering, hence the stone is considered to be symbolic of Christ's Passion and martyrdom. Five carbuncles are shown to symbolize the five wounds received by Christ during the Crucifixion.

"The sun and moon in scenes of the Crucifixion indicate the sorrow of all at the death of Christ.

"A Crown of Thorns is emblem of the Crucifixion. The tonsure of monks is a reventual imitation of Christ's sacrificial Crown of Thorns.

"The hammer was used to nail Christ to the Cross so it is one of the instruments of the Passion and is a symbol of the Crucifixion.

"The sponge is one of the emblems of the Crucifixion because the Bible says, 'And straightway one of them ran and took a sponge, and filled it with vinegar, and put it on a reed, and gave Him a drink.' Matthew 27:48 (25 : 16)

SPECIAL AESTHETIC CONSIDERATIONS FOR SPECIFIC PARTS OF THE MONASTERY

The Church

The church, unlike the Gothic, should be mysterious and humble in character. Mysterious because here is where the monks witness the mysteries of the Christian cult essential to sanctification. The mysterious atmosphere allows the monk to concentrate on God and God alone. The church is humble because the monk himself must be humble before God. The following aesthetic considerations are recommended by the Trappist Order:

- (1) The church usually rises above the rest of the complex but not to any extreme. Bell towers of "excessive" height are not allowed, a small one being preferred.
- (2) The number of windows in the church is at a minimum; only one window is allowed in the apse.
- (3) A heavy-looking, flat ceiling is preferred to a pitched or ribbed ceiling.
- (4) No extreme use of color is allowed throughout the church.
- (5) Flooring is made of unpolished and rough brick, stone, or concrete.

The Cloister

Since the cloister is where the monk can rest, walk, and read, its character must reflect these needs. Also, the cloister must be in scale to the monk for in the cloister the monk shows his human mode of being. The cloister should not be esoteric or mysterious in any way.

The following are aesthetic suggestions for the cloister:

- (1) The cloister arcade should be made to look light and free.
- (2) The materials of the arcade should complement the garden.
- (3) The arcade should allow as much light on the walkway as needed to make the walkway characteristic of a secular arcade.

Individual Cells

The cell should give the feeling of utmost poverty and humbleness. Room size and ceiling heights should be at a minimum and the materials used as stark and cold-looking as possible.



MATRIMONY

economics

8

ECONOMICS FOR A CISTERCIAN MONASTERY OF THE STRICT OBSERVANCE

GENERAL ECONOMIC CONSIDERATIONS

Aesthetics and Economy

Traditional aesthetic requirements in a Trappist monastery indirectly determine the economic factors; nevertheless, the relation of aesthetic considerations to economic considerations is one of harmony. This is due to the extreme simplicity, austerity, and poverty the Trappist demands in the aesthetic expression of the building. Such an expression is naturally cheaper to achieve than the over-ornamented imitations of past historic styles.

Economics of Building Materials

Material costs have little affect upon material selections because the aesthetic expression of the material is more important to a Trappist. Economy reaches a point in a monastery where there is diminishing returns. In other words, if a certain aesthetic expression is desired, cost is usually not a factor because the monastic establishment will be used for centuries, quite different from a secular church which has an average life span of 60 years. Nevertheless, if the choice between materials is equal, the selected material is usually chosen for its economy. An example is the replacement of stone, by concrete, as the main building material.

Stone has many merits as a building material; but, it is

extremely expensive today unless quarried near the building site, a possibility non-existent in the Miles City Area. Also, the stone-mason's craft is dying out; therefore, the time required to set stone makes the labor costs out of proportion in comparison to concrete. A rock building of the same size as a concrete building costs close to five times more than concrete according to the 1963 Building Construction Cost Data.

Steel and wood, the other possible building materials, cannot be used because of their aesthetic qualities. This is explained in the previous section titled Aesthetics. In the following estimates, concrete is assumed to be the building material.

Economics of Site Improvement

The site improvement is mainly done by the monks. Historically, the monks have been excellent in the art of landscaping. The monasteries of Cîteaux, Clairvaux, and Gethsemani are but a few examples of Trappist landscaping.

Economics of Space Utilization

The space utilization of a monastery is traditionally evolved, not functionally, for use of all portions of the monastery. Combinations of facilities are impossible because of the special traditional design elements in each room (see Function).

Economics of Uniformity

Uniformity, which produces cheaper construction of various building components, is possible but should never conflict with aesthetic considerations. For example, uniformity should be used in the monks' dormitory because all cells must be exactly

alike. The modular building system seems to conflict with Trappist ideals because modular planning usually produces a building looking like various secular and commercial buildings. Commercialization and secularization must be avoided even to the point of neglecting economy.

COST ESTIMATE

Square Foot Cost Estimates

Square foot costs for the monastery can be determined from comparisons with other new Trappist monasteries. The figures for the proposed monastery will have to be adjusted to consider the higher material costs of the Miles City area. Labor costs will run approximately the same in Miles City as elsewhere because the lack of experience and efficiency of Miles City labor is balanced by lower wages in Miles City than in other areas of the United States. For example, cement finishers on the East Coast received \$4.20 per hour in 1963 compared to \$3.50 for the same laborers in Miles City.

The following monasteries have calculated their average square foot costs from the actual area divided into the building costs. The monasteries are approximately the same size as the proposed Miles City monastery and are subject to the same Trappist Order requirements. Also, all the monasteries, except for Georgia's, are located in climatic areas similar to the Miles City area. The following figures do not include the cost of land. The actual cost of the site according to the John A. Aye Real Estate Agency of Miles City is approximately

\$320,000. This is approximately \$90 an acre, quite comparable to the Miles City area average of \$85 an acre. (28 :)

MONASTERY PROPER	MAJOR MATERIALS USED	TOTAL SQ. FT. X 10 ³	TOTAL COST	COST PER SQ. FT.
GETHSEMANI, KY.	CONCRETE BRICK	100.3	NOT AVAILABLE	
CONYERS, GA.	CONCRETE BRICK	92.4	1,180,000	12.80
HUNTSVILLE, UTAH	CONCRETE WOOD	90.2	1,220,000	13.30
LAFAYETTE, OREG.	CONCRETE WOOD	80.4	980,000	12.20
DUBUQUE, IOWA	CONCRETE BRICK	85.2	984,000	11.50
AVERAGE SQ. FT. COST				12.45
MONASTIC FARM	SEE DIVISIONS ABOVE			
GETHSEMANI, KY.	STEEL WOOD	13.2	68,500	5.20
CONYERS, GA.	STEEL CONCRETE	16.1	99,700	6.20
HUNTSVILLE, UTAH	STEEL CONCRETE	10.8	85,000	7.10
LAFAYETTE, OREG.	STEEL CONCRETE	11.8	72,000	6.10
DUBUQUE, IOWA	STEEL CONCRETE	12.6	71,800	5.80
AVERAGE SQ. FT. COST				6.08

COST INCLUDES LANDSCAPING BUT NO SITE, INSURANCE, AND ARCHITECT COSTS.

TABLE 13. AVERAGE SQUARE FOOT COSTS FOR* SIMILAR TRAPPIST MONASTERIES

(26:2, 27:3, 29:2, 31:2, 32:3, 34:1)

The square foot costs cannot be estimated from the Marshall Valuation Service figures for churches because Trappist Monasteries require far less interior furnishings, heating and plumbing, and electrical work. (14 : 2)

Total Cost Estimates

The total initial cost of the monastery is calculated in the following table. Farm machinery purchase and land costs with legal fees are included.

ITEM OF EXPENSE		TOTAL COST
MONASTERY PROPER		
1	APPROXIMATE COST OF MONASTIC COMPLEX FOR 90,415 SQ. FT. AT 12.45 PER SQ. FT. ¹	1,120,000
2	COST OF ENTIRE SITE INCLUDING ALL LEGAL FEES.	320,000
3	ARCHITECTS FEE AT 5% OF ITEM 1	56,000
4	INSURANCE AT 2% OF ITEM 1	22,500
ESTIMATED COST OF MONASTERY PROPER		1,518,500
MONASTIC FARM		
1	APPROXIMATE COST OF MONASTIC FARM FOR 11,500 SQ. FT. AT 5.08 PER SQ. FT. ¹	70,000
2	INITIAL COST OF USED MACHINERY INCLUDING HAND AND SHOP TOOLS	100,000
3	ARCHITECTS FEE AT 5% OF ITEM 1	3,500
4	INSURANCE AT 2% OF ITEM 1	1,400
ESTIMATED COST OF MONASTIC FARM		174,900
TOTAL COST OF MONASTERY		1,693,400

¹SEE PROGRAM

TABLE 14. TOTAL ESTIMATED COSTS FOR THE PROPOSED MONASTERY.

(27:3, 29:2, 31:2, 32:3, 34:1)

Total Cost Breakdown

In order to give an indication of the breakdown of building costs, as a percentage of the total cost of a monastery, a special schedule follows which was compiled from information supplied by the comparable Trappist monasteries described in table 15. The cost breakdown was copied from the Marshall Valuation Service procedures.

	GETHEMANI	CONYERS, GA.	HUNTSVILLE, UTAH	LAFAYETTE, OREG.	DUBUQUE, IOWA	AVERAGE
ITEM OF COST						
FOUNDATION & SLAB	12.50	11.00	14.00	10.00	12.50	12.00
SHELL INCLUDING ROOF	49.50	50.20	45.00	52.00	48.50	49.04
WINDOWS & DOORS	5.00	6.00	6.00	5.50	6.00	5.70
INTERNAL FINISHINGS	9.50	10.00	10.00	9.50	9.50	9.70
INTERNAL PLUMBING	2.00	4.00	4.00	2.00	2.00	2.80
HOT WATER HEATING	6.25	5.00	7.00	8.00	7.00	6.65
ELECTRIC LIGHTING	1.00	2.00	2.00	1.00	1.75	1.55
BUILT-IN FITTINGS	3.75	3.80	5.00	8.00	3.75	4.86
DRAINAGE	4.00	3.00	5.00	4.00	4.00	4.00
PAVING & FENCING	6.50	4.00	2.00	1.00	6.50	4.50
TOTALS						100.

ESTIMATED

**TABLE 15. AVERAGE COST BREAKDOWN
FOR SIMILAR TRAPPIST MONASTERIES.**

(27:3, 29:2, 31:2, 32:3, 34:1)

The average cost breakdown can be altered for the proposed monastery of Miles City in the division of plumbing and drainage. The proposed site has to drill at least 350 feet for water and then case the well. This will probably make the plumbing cost close to 6% of the total cost.

The drainage costs on the other hand are practically non-existent because of the natural slope on the site (see the map.) One per cent of the total cost should be ample to cover the problem.

Other costs should approximate the average calculated in Table 15.

From the total costs calculated in Table 15, the breakdown of costs are shown in the Table 16.

ITEM OF COST	AVERAGE % IN MILES CITY	TOTAL COST	COST PER ITEM
FOUNDATION & SLAB	12.00	1,120,000	134,000
SHELL INCLUDING ROOF	49.04	"	550,000
WINDOWS & DOORS	5.70	"	69,900
INTERNAL FURNISHINGS	9.70	"	108,000
INTERNAL PLUMBING	5.80	"	64,000
HOT WATER HEATING	6.65	"	74,500
ELECTRIC LIGHTING	1.15	"	12,900
BUILT-IN FITTINGS	4.86	"	54,500
DRAINAGE	1.00	"	11,200
PAVING & FENCING	4.50	"	50,000
TOTALS			1,120,000

TABLE 16. ESTIMATED COST BREAKDOWN
FOR THE PROPOSED MONASTERY.

FINANCING

Initial Financing

A Trappist monastery must be built in its entirety, without any stages, because of the restricted activities required in the observance of the Rule of St. Benedict. Observance of the Rule requires all the rooms mentioned in the section called Function of the Monastery. Also, all the rooms must be build in entirety

because monks from the Gethsemani Abbey will immediately fill the new monastery.

Initial financing of the monastery will be by loans from the Roman Catholic Church and the Cistercian Order of the Strict Observance Fund. All loans are interest free; but, in keeping with Trappist policy, all loans are paid in full as soon as it becomes possible.

Although figures are not published for the amount of money the Roman Catholic Church allows for monastic construction, loans approaching \$5 million have been undertaken by the Trappist Monasteries in Georgia and Iowa. (34 : 1 29 : 1) The Cistercian Order of the Strict Observance Fund has over \$10 million presently at its disposal. The fund is increased primarily by private donations.

The other means of initial financing come from private donations. Donations given to existing monasteries may be combined for the construction of new monasteries. The amount of donations for construction of the other recent Trappist monasteries in the United States follows in Table 17. The proposed monastery can be assumed to receive a similar donation.

MONASTERY	DATE OF DONATION	TOTAL DONATED
GETSEMANI, KY.		NOT AVAILABLE
CONYERS, GA.	1944	2,200,000
HUNTSVILLE, UTAH	1946	1,800,000
LAFAYETTE, OREG.	1951	3,100,000
DUBUQUE, IOWA	1955	2,700,000
AVERAGE		2,450,000

TABLE 17. PRIVATE DONATIONS GIVEN TO TRAPPIST MONASTERIES.

(27:3,29:2,31:2,32:3,34:1)

Maintenance and Operating Costs

The financing of maintenance and operation costs come directly from the farm income. This income also provides the means to write off the debts incurred in the initial building.

The maintenance and operating costs of the monastic buildings will be very low compared to secular buildings. This is because the monks are responsible for maintenance and their labor is naturally donated. The only maintenance and operating costs are estimated in the following chart;

MAINTENANCE & OPERATING COST	COST PER MONTH	COST PER YEAR
1. ELECTRICITY COSTS	40.00	480.00
2. GAS COSTS	150.00	1800.00
3. MATERIALS - FOR REPAIR	50.00	600.00
- FOR OPERATING	150.00	1800.00
4. MISCELLANEOUS	100.00	1200.00
TOTAL		4880.00

ALL COSTS FROM AVERAGES FROM 1959-1963

**TABLE 18. ESTIMATED OPERATING COSTS
FOR A TRAPPIST MONASTERY.**

(27:3,29:3,31:3,32:3,34:1)

Maintenance and operating costs of the farm are summarized under Farm Income.

Farming Land Required for Monastic Operation

The land required to support the occupants of the monastery with ample food is compiled in the following table. The crops are all suitable to the Miles City area and approved by the Rule of St. Benedict. Correspondence with Gethsemani Abbey of Kentucky shows that amounts stated are ample for 100 monks, including surplus to be used in poor production years. (27 : 4)

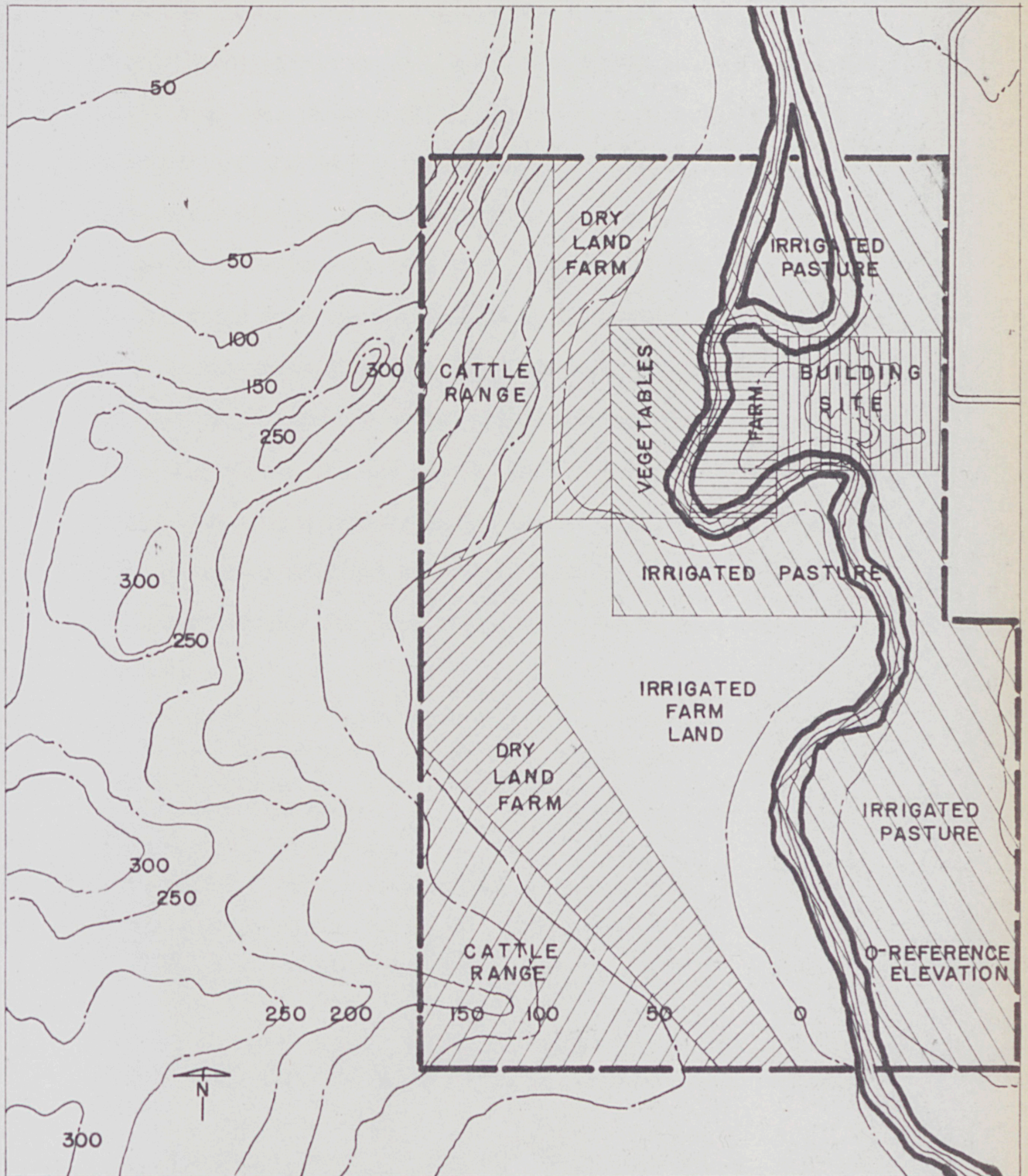
CROP	PLANT VARIETY	CROP YIELD PER 100 FT. OF ROW	ACREAGE REQUIRED FOR 100 MONKS
BEANS	PENCIL POD BLACK WAT	1/2 BU.	8
BEETS	DETROIT DARK RED	2 1/2 BU.	8
CABBAGE	DANISH BALLBREAD	2 BU.	20
CARROTS	CHANTENAY	2 BU.	4
SWEET CORN	GOLDEN CROPS BANTAM	1/4 BU.	16
CUCUMBER	CHICAGO PICKLING	4 BU.	20
LETTUCE	MIGNONETTE	...	4
ONIONS	SWEET SPANISH	1/3 BU.	2
PEAS	LINCOLN	1/3 BU.	8
POTATOES	RED PONTIAC	1 BU.	20
SPINACH	NEW ENGLAND	1/3 BU.	8
SQUASH	ARIKARA	6 BU.	20
TOMATOES	DOUBLE RICH	3 BU.	16
		PER 25 FT.	
APPLES	HARALSON	6-10 BU.	20
PLUMS	TECUMSEH	3-6 BU.	8
RASPBERRY	LATHAM RED	2-3 BU.	4
STRAWBERRY	DUNCAP	1-2 BU.	4
GOOSEBERRY	NEW WELCOME	2-3 BU.	4
TOTAL ACREAGE TO FEED 100 MONKS			200

ALL CROPS EASILY GROWN IN MILES CITY & APPROVED BY THE RULE OF ST. BENEDICT.

TABLE 19. CROPS AND ACREAGE NEEDED TO SUPPORT 100 MONKS.

(27:3)

The total needed acreage indicates that of the total land available, 200 acres must be allotted for monastic life and no profit can be expected upon that acreage. The remaining farm acreage is 3400 acres. The proposed allotment of land is indicated on the following map:



SCALE 0 1 2 3 4 5 FEET X 10^3

KEY ——— PROPOSED MONASTERY SITE

FIG. 44. PROPOSED LAND USE OF THE PROPOSED SITE
(20:12, 21:10, 28:1, 30:2)

Farm Profits

The income from the farm should come from beef cattle, wheat and dry-field beans. Dairy farming is not suited to the Miles City area because of the distance to markets for dairy products and the hard wintering by dairy cattle. Dairy cattle also would disrupt observance of the Rule of St. Benedict because of the extensive care they require. In addition, the monks eat no dairy products whatsoever--milk, butter, cream, cheese, etc.

In the Miles City area, approximately 50% of the land should be used for cattle production while 44% used for crop production. This combination has the highest cash value yield from the land while providing a variety of income means in case of bad growing conditions or plant and animal diseases. (20 : 4)

Requirements for land used for cattle raising are as follows:

CROP	PLANT VARIETY	CROP LAND	ACREAGE REQUIRED FOR 1 HEAD
ALFALFA	RANGER	IRRIGATED	1/3
BARLEY	BETEZES	DRY	1/3
PASTURE	(WELL MANAGED)	IRRIGATED	1
TOTAL LAND TO SUPPORT ONE HEAD			1 2/3
TOTAL LAND AVAILABLE (56% OF 3000)			1680
TOTAL HEAD THAT CAN BE RAISED			1000

TABLE 20. AMOUNT OF CATTLE THAT CAN BE RAISED ON THE PROPOSED FARM.

(27:4)

The initial herd for a monastery is supplied in full from the stock of other monasteries: This is in the form of a donation. The monastery, because of the Rule of St. Benedict, cannot use any of the herd for food. Also, since the herd is supplied in full for the acreage of the monastery, no increase is desired

in the herd. The monks are only interested in paying off the monastic debt, not in becoming major cattle producers.

On the proposed acreage, cattle gain approximately 600 pounds every six months. Cattle are sold at the end of six months as calves or at the end of a year and one-half as yearlings. Cows are sold as cannors after their calf production ceases. Bulls are sold only after they lose fertility. Ninety-five per cent of the cows can be expected to have calves every year. (21 : 3)

In the Miles City area, the average herd is recommended, by the Department of Agriculture, to contain 40% cows, 58% calves and yearlings, and 2% bulls. Of the herd, the Department of Agriculture recommends selling 90% of the yearlings and 10% of the cows. (21 : 4)

The profit realized by raising cattle is given in the following graph. The graph points out that cattle profits are increasing steadily; and, if present conditions continue, the profits will increase in the same ratio.

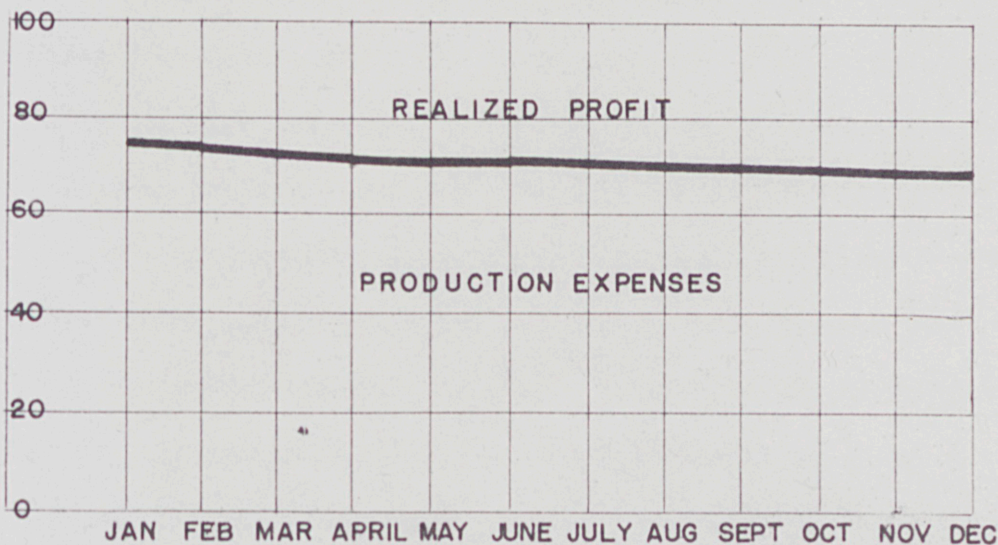


FIG. 45. REALIZED PROFITS FROM CATTLE IN THE MILES CITY AREA.

(20:5,21:2)

The prices given for cattle today average approximately \$31.50 per cwt for calves, while yearlings and cows bring \$23.80 per cwt. Bulls are not considered because of their small numbers and because they play a small part in livestock income.

The following charts give the estimated profits from cattle:

DESCRIPTION OF INCOME	QUANTITY	INCOME
CATTLE SALES		
YEARLINGS AT 23.50 PER CWT	440 AT 1000	103,400.00
COWS AT 20.20 PER CWT	40 AT 1200	9,600.00
EXPENSES		
PRODUCTION EXPENSES (FIG. 45)	70% OF INCOME	79,000.00
REALIZED PROFIT		34,000.00

TABLE 21. ESTIMATED PROFIT FROM CATTLE FOR THE PROPOSED MONASTERY.

(21:2)

The Miles City cropland (see map) is recommended by the Department of Agriculture to be used for Justin Wheat, Betezes Barley, and Navy-White Beans. The Department of Agriculture also recommends 60% wheat, 20% barley, and 20% beans for the Miles City area. (20 : 2) These crops have the largest cash value for work involved. The yield and expected cash values follow in Table 23, not including production costs.

The crop profits after production costs are given by the graph in Fig. 46. Production costs include machinery repair and replacement and building repair expenses from the raising of crops. It should be noted that price supports for 1963 are considered in evaluating the profits. A rise in price supports would increase profits; a lower price support would do the opposite.

CROP	PLANT VARIETY	CROP LAND	YIELD PER ACRE	CASH PER ACRE
WHEAT	JUSTIN	DRY	40BU.	80.00
BARLEY	BETEZES	DRY	80 BU.	60.00
BEANS	NAVY WHITE	IRRIGATED	2000	150.00

TABLE 22. RECOMMENDED CROPS AND YIELDS FOR THE MILES CITY AREA.

(20:2)

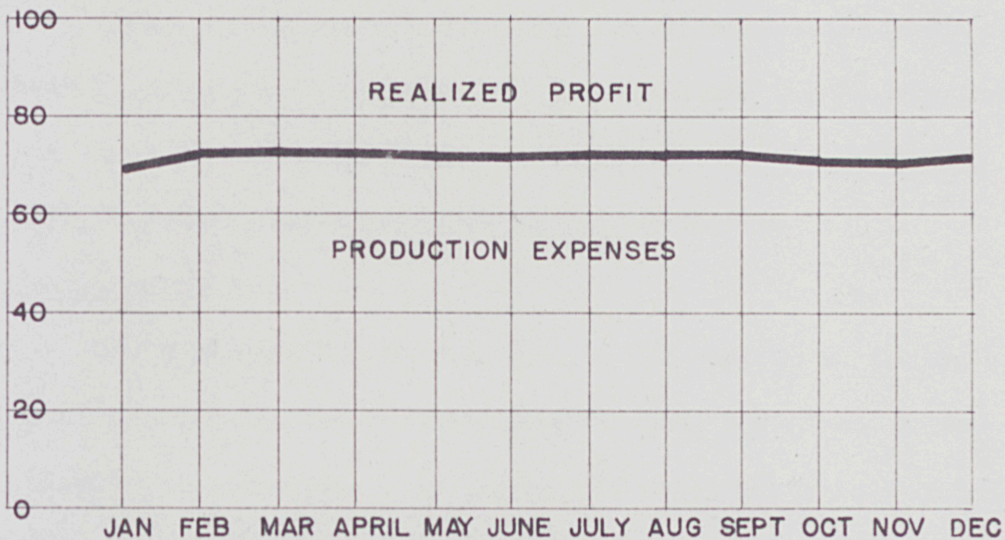


FIG. 46. REALIZED PROFITS FROM CROPS IN THE MILES CITY AREA.

(20:5)

The following table gives the estimated profits that can be expected for yields in the Miles City area:

DESCRIPTION OF INCOME	ACREAGE	TOTAL INCOME
CROP SALES (TOTAL ACREAGE=1320)		
WHEAT AT 80.00 PER ACRE	790	63,200
BARLEY AT 60.00 PER ACRE	265	15,900
BEANS AT 150.00 PER ACRE	265	39,800
DESCRIPTION OF EXPENSES		
PRODUCTION COSTS	74% OF INCOME	87,200
REALIZED PROFIT		31,700

TABLE 23. ESTIMATED PROFIT FROM CROPS
FOR THE PROPOSED MONASTERY.

(20:2)

Other industries the monastery may undertake are honey and beeswax production and ceramics. Nevertheless, these industries are minor in comparison to profits from livestock and crops; and, therefore, not considered as income sources.

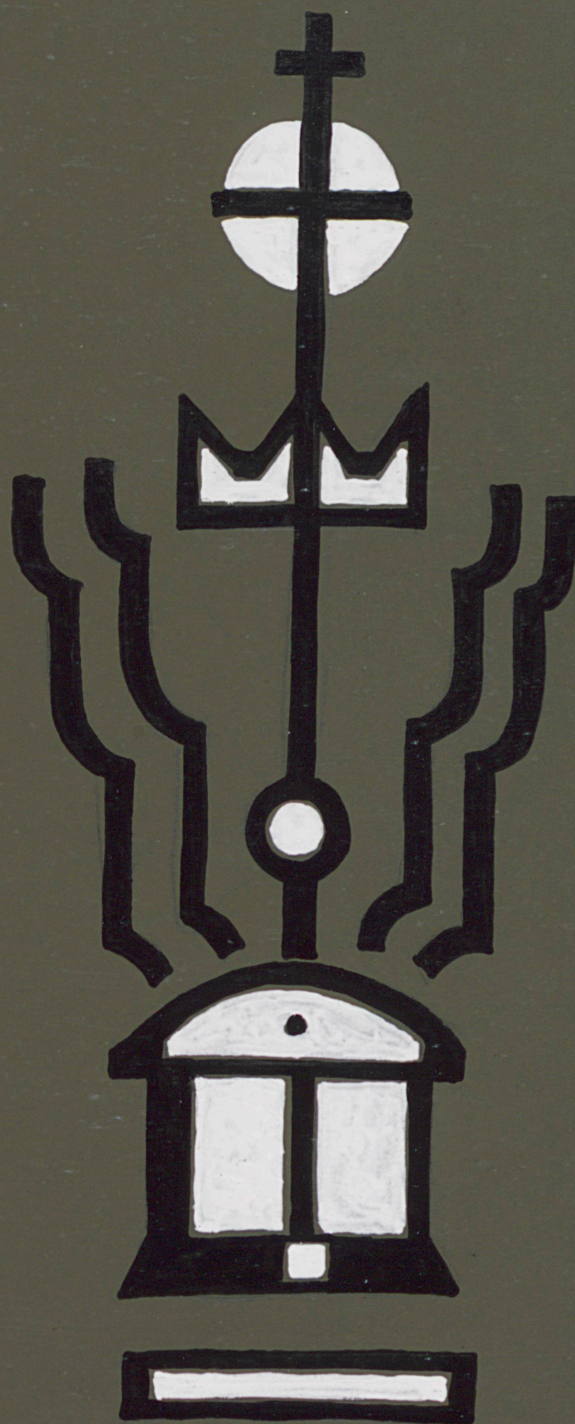
Amoritization

The total profits in relation to the payment of the outstanding debt for the monastic construction are given in the following calculations. As shown, the monastery should be free from debt and be self-sufficient in 30 years. Most secular churches without income sources are financed over a 60-year period.

(11 : 63)

PROFIT SOURCE WITH DEDUCTED EXPENSE	AMOUNT
1. CATTLE PROFIT	34,000.00
2. CROP PROFIT	31,700.00
3. MONASTERY MAINTENANCE	- 4,880.00
TOTAL EXPECTED PROFIT PER YEAR	60,820.00
TOTAL CONSTRUCTION COST LOANS LESS 245,000.00 DONATION.	1,448,400.00
YEARS NEEDED TO PAY OFF DEBT	30 YRS.

TABLE 24. ESTIMATED AMORITIZATION OF
THE PROPOSED MONASTERY.



WORSHIP

program

Space	Description	Quant.	Area
TRADITIONAL MONASTIC AREAS			
<u>Church</u>			
Presbytery	Function: Worship area for Mass and the Offices of the day. Equipment: High altar wooden crucifix, 6 candlesticks, 2 candelabrum, sacred light (over presbytery step). Finish: Best quality available.	1 Includ- ing areas below	14,000
Quire	Function: Seating area for the monks Equipment: Stalls including desks for 103 monks, and superiors, two wooden tables for novices, book storage Finish: Good quality		
Retro-Quire	Function: Seating for sick and infirm and pulpit area Equipment: Pulpitum, pulpit galleries, stalls for 20 monks Finish: Good quality		
Lay-Brothers Quire	Function: Seating for lay-brethren Equipment: Altars for De Beata Mass and Requiem Mass, 8 candles, pews for 25 lay-brothers		
Left Transept	Function: Worship area for priests' individual Masses Equipment: 9 altars, 9 sacred lights Finish: Best quality available		
Sacristy	Function: Storage for the sacred articles of worship Equipment: 2 sinks with grating and taps, storage shelves and presses for sacred ornaments Finish: Good quality	1	400

Space	Description	Quant.	Area
Burial Ground	Function: Cemetery Equipment: Wall or hedge, hard-wood crosses, inscriptions Finish: Durable	1	not part of enclosed building
		Total	14,400
<u>Cloister</u>			
Auditory	Function: Parlor area for conferences with superiors, and storage of work clothes Equipment: Notice board, 2 benches for 8 people, and space to hang 150 scapulars Finish: Durable	1	400
Reading Area	Function: Area for oral reading Equipment: Seating for abbot and statue of Virgin Mary Finish: Durable	1	not part of enclosed building
Laver	Function: Area to clean up when entering the monastery from farm work Equipment: 2 sinks with taps and clothes hanging area Finish: Durable	2 @ 100 100	200
Covered Arcade	Function: Passageway to various areas of the monastery Equipment: Finish: Durable	1	5,600
Cloister Garth	Function: Area for contemplation Equipment: Finish:	1	not part of enclosed building
		Total	6,200
<u>Chapter House</u>			
Chapter Room	Function: Area for the monastic meeting and business Equipment: Abbot, prior, and sub-prior seats, lockers and seating for 120 monks and novices	1	3,400

Space	Description	Quant.	Area
	Finish: Durable		
		Total	3,400
<u>Scriptorium</u>			
Aumbry	Function: Library work area Equipment: Book rack for 100 books, desk, chair and shelf Finish: Durable	1	120
Library	Function: Space for monastic books Equipment: 20 desks with capacity of 4, 80 chairs, and book rack space for 8,000 volumes Finish: Good quality	1	3,000
		Total	3,000
<u>Kitchen</u>			
Workroom	Function: Space to prepare food for cooking Equipment: 5 worktables, 10 benches, and storage shelves for knives, cutting blocks, etc. Finish: Durable	1	500
Kitchen	Function: Space to cook food Equipment: Large oven, 2 large burners, shelves for dishes, pans, and pots Finish: Durable	2 @ 500	1,000
		Total	1,500
<u>Frater</u>			
Dining Hall	Function: Space for dining Equipment: 10 tables with capacity of 12, 120 chairs, special abbot's table and chairs, and crucifix Finish: Good quality	1	4,000
Lectern	Function: Oral reading during meals Equipment: Wooden table Finish: Good quality	1	25
		Total	4,025

Space	Description	Quant.	Area
<u>Calefactory</u>		1	3,000
Warming Room	Function: Area for warming and relaxing Equipment: 120 chairs and foot rests Finish: Good Quality	1	3,000
		Total	3,000
<u>Dorter</u>			
Monastic Cell	Function: Area for sleeping Equipment: 1 bed, blankets, holy water stoup, 1 holy picture, and 2 clothes pegs Finish: Durable	160 @ 100 (Includes lay-brother & novice cells)	16,000
Monastic Cell Lobby	Function: Passage way to and from the monastic cells Equipment: Finish: Durable	1 (for all cells)	5,000
		Total	21,000
<u>Food Cellars</u>			
Storage Bin	Function: Storage of feed from the farm Equipment: Insulated wooden or steel bin Finish: Durable and waterproof	10 @ 800 (from Dept. of Agric.)	8,000
Refrigerated Areas	Function: Cold storage Equipment: Cooling equipment Finish: Durable	4 @ 100	400
Winery	Function: Area for wine production Equipment: 10-1000 gallon vats Finish: Durable	1	1,000
		Total	9,400
<u>Guest House</u>			
Bedroom	Function: Sleeping area for guests Equipment: Small table, bed, closet, & bookrack Finish: Good quality	2 @ 100	200
Bathroom	(Men only--women not allowed in monastery) Equipment: Water closet, lavatory, & mirror with cabinet Finish: Durable	2 @ 40	80

Space	Description	Quant.	Area
Guest House Lobby	Function: Space for conferences with monastic personnel and relaxation Equipment: 4 chairs, 1 desk, & 1 bookrack Finish: Good quality	1	200
		Total	480
<u>Necessarium</u>			
Monks Bathroom	Equipment: 10 water closets, 10 lavatories, 10 shower outlets with fixtures & 10 individual shower stalls Finish: Durable	3 @ 250	750
		Total	750
<u>Infirmery</u>			
Sick Room	Function: Area for sick and infirm monk Equipment: Bed, bookrack, holy picture, & holy water stoup Finish: Durable & easy cleaning	5 @ 100	500
Bathroom (With every Sick Room)	Equipment: 1 water closet & 1 lavatory Finish: Durable & easy cleaning	5 @ 30	150
Office	Function: Space for attending monk Equipment: Desk, chair, & file cabinet Finish: Durable	1	100
Dispensary	Function: Storage space for medicines Equipment: Shelves, oxygen tank, & tent, sterilization equipment, medicine & application equipment Finish: Durable and easy cleaning	1	250
Chapel	Function: Worship area for sick & infirm Equipment: Altar, 6 candlesticks, stalls for 10 monks, & area for storing sacred ornaments Finish: Best quality available	1	500
		Total	1,400
NON TRADITIONAL MONASTIC AREAS			
<u>Rooms</u>			
Superior's Office		1	250

Space	Description	Quant.	Area
	Function: Area for official community business Equipment: 2 desks, 2 chairs, file cabinet, typewriter, & 1 work table Finish: Good quality		
Tailor Shop	Function: Manufacture of monastic clothes Equipment: Shelves for material, drawer space, 2 chairs, & 1 hand-sewing machine Finish: Durable	1	400
Laundry	Function: Area for cleaning clothes Equipment: 3 washing machines, 1 ironing board, 1 iron, clothes drying area & shelves Finish: Durable	1	400
Printing Room	Function: Area for monastic printing Equipment: 1 hand printing press, paper storage, Latin type, English type, & 1 work table Finish: Durable	1	600
Mechanical Room	Function: Provide space for heating equip. Equipment: Hot-water heating equipment Finish: Durable	1	approx. 800
Repair Shop	Function: Area to store tools & repair monastic articles Equipment: Workbench, arc welder, and all necessary hand tools Finish: Durable	1	400
Maintenance Closet	Function: Storage for mops, & cleaning equipment Equipment: Slop sink, shelving Finish: Durable	2 @ 20	40
Storage Room	Function: Supply & equipment storage Equipment: Shelves Finish: Durable	1	800
	Total		3,690

Space	Description	Quant.	Area
TOTAL AREA WITHOUT CORRIDORS			72,245
	Addition of 20% for corridor, construction, and meditation areas. (SOURCE: Father Germain, Architect, Gethsemani Abbey)		14,480
TOTAL MONASTERY BUILDING AREA			90,415
FARM AREAS			
<u>Farm Machinery Areas</u>			
Farm Machinery Storage			
	Function: Area to protect farm machinery		
	Equipment: (essential)		
	2 Caterpillar Tractors (D-4)	2@120	240
	2 Conventional Tractors	2@100	200
	4 Flows	4@ 50	200
	4 Rises	4@ 50	200
	3 Harrows	3@ 50	150
	1 Leveler	1@100	100
	1 Drill	1@ 20	20
	1 Ditcher	1@ 75	75
	1 Seeder	1@100	100
	2 Mowers	2@ 75	150
	2 rakes	2@ 75	150
	2 Hay stackers	2@ 50	100
	2 Combines	2@200	400
	4 Wagons	4@ 75	300
	1 Manure Spreader	1@ 75	75
	2 Trucks (1½ ton)	2@100	200
	1 Pickup	1@ 80	80
Farm Machinery Repair Shop			800
	Function: Area to repair machinery		
	Equipment: Arc welder, all necessary tool storage, pit for greasing, and storage for parts and lubrication		
Painting Shop			600
	Function: Area to repaint machinery		
	Equipment: Storage shelves, air compressor		
Gasoline Storage			200
	Function: Area to fuel machinery		
	Equipment: Two 1000 gallon gasoline tanks		
Total			4,340

Space	Description	Quant.	Area
<u>Livestock Areas</u>			
Cattle Feeding Area		1	not part of enclo- sed build- ing
Function:	Area to feed cattle		
Equipment:	Water trough, feed areas, & water tank		
Feed storage (alfalfa, stacked in fields)		1	1,000
Function:	Area to keep dry feed		
Equipment:	Minimum of 3 bins		
All necessary fencing and cattle shelters		variable	
		Total	1,000
<u>Crop Areas</u>			
Granary (Monks food in Monastery Cellar)		1	3,000
Function:	Area to store grain before shipping to the market		
Equipment:	Minimum of 6 bins capacity bushell		
		Total	3,000
<u>Other Required Farm Areas</u>			
Greenhouses		4 @ 500	2,000
Function:	Area to start plants growing		
Equipment:	Heating apparatus & tables		
Lumber Shed and Carpentry Space		1	500
Function:	Area to build or repair build- ings, fences, etc.		
Equipment:	Shelves, table saw, & shelves for lumber		
Electrician Shop		1	250
Function:	Area to repair electrical equipment		
Equipment:	Shelves, and work table		
Hand Tool Storage for Garden Work		1	500
Function:	Tool storage		
Equipment:	Shelves and tables		
		Total	3,250
TOTAL FARM BUILDING AREA			11,590
OTHER AREAS			
<u>Miscellaneous Areas</u>			

Space	Description	Quant.	Area
Parking and Roadways (paved)		see map	approx. 102,000
Function:	Paved area for transportation		(cost calculated
Equipment:	Parking for 4 cars and necessary roadways		in <u>Economics of</u> <u>the Mon-</u> <u>astery</u>)

REFERENCES

Books

1. Architectural Record. Time-Saver Standards. New York: F. W. Dodge Corporation, 1946.
2. "Cistercian." Encyclopaedia Britannica. (15th ed., 1959), V, 236 ff.
3. Davidson, E. S. Forerunners of Saint Francis. New York: Houghton Mifflin Company, 1927.
4. Ernest, Louis, C. S. C. Our Brothers. New York: Scott, Foresman and Company, 1931.
5. Gethsemani Abbey. Apologia ad Guillelmum. Trappist, Kentucky: Gethsemani Press, 1948.
6. Gethsemani Abbey. Cistercian Contemplatives. Trappist, Kentucky: Gethsemani Press, 1947.
7. Gethsemani Abbey. Exordium Parvum. Trappist, Kentucky: Gethsemani Press, 1935.
8. Gethsemani Abbey. Stephen Harding's Charter of Charity. Trappist Kentucky: Gethsemani Press, 1935.
9. Gethsemani Abbey. The Spirit of Simplicity: Report to the General Chapter of the Reformed Cistercians. Trappist, Kentucky: Gethsemani Press, 1948.
10. Gethsemani Abbey. Usages and Customs of the Reformed Cistercians of Our Lady of La Trappe, Book Seven on the Disposition of Buildings. Trappist, Kentucky: Gethsemani Press, 1948.
11. Godfrey, Robert Sturgis. Building Construction Cost Data 1963. Duxbury, Mass.: Robert Snow Means Co., 1963.
12. Heppenstall, Rayner. Architecture of Truth. London: Thames and Hudson, 1957.
13. Luddy, M. Albie, O. C. R. Life and Times of St. Bernard. Dublin: Mellrey Press, 1927.
14. Marshall Valuation Service. Cleveland: Marshall Stevens Company, 1960.

15. Merton, Thomas. The Seven Story Mountain. New York: Harcourt, Brace and Company, 1948.
16. Merton, Thomas. The Waters of Siloe. New York: Harcourt, Brace and Company, 1949.
17. Ramsey, Charles George, Harold Reeve Sleeper. Architectual Graphic Standards. New York: John Wiley and Sons, Inc., 1956.
18. Raymond, M. Burnt Out Incense. New York: Harcourt, Brace and Company, 1949.
19. "Trappist." Encyclopaedia Britannica. (15th Ed., 1959), X, 134 ff.
20. U. S. Department of Agriculture. Planning the Farm for Profit and Stability. Washington D. C.: U. S. Government Printing Office, 1963.
21. U. S. Department of Agriculture. The Farm Beef Herd. Washington, D. C.: U. S. Government Printing Office, 1963.
22. U. S. Weather Bureau. Climate of the States, No. 59. Washington, D. C.: Government Printing Office, 1960.
23. U. S. Weather Bureau. Summary of the Climatological Data, Montana Annual Summary 1961. Washington, D. C.: U. S. Government Printing Office, 1962.
24. Warren, J. B. Bernard of Clairvaux. Paris: Holt, 1953.
25. Waters, Clara Erskine Clement. A Handbook of Cistercian Symbols. New York: Houghton Mifflin Company, 1886.

Personal Correspondence

26. Gerwain, J. M., O. C. S. O. Personal letter from Abbaye Notre-Dame-Des-Prairies, St. Norbert, Manitoba, Dated Feb. 14, 1964.
27. Giles, Brother William, O. C. S. O. Personal letters from Abbey of Gethsemani, Trappist, Kentucky, dated Jan. 26, 1964, Jan. 30, 1964, and Feb. 6, 1964.
28. Keiffer, Nathaniel F., Fort Keogh Livestock and Agricultural Experimental Station, Miles City, Montana. Personal Interview on Jan. 4, 1964.

29. Matthias, Father John, O. C. S. O. Personal letter from Abbey of Our Lady of New Melleray, Dubuque, Iowa, dated Jan. 127, 1964.
30. Muggli, Don W. Personal letters about Miles City farming practices, dated Jan. 17, 1964, and Feb. 4, 1964.
31. Spillane, M. Emmanuel, O. C. S. O. Personal letter from Abbey of Our Lady of the Holy Trinity, Huntsville, Utah, dated Feb. 1, 1964.
32. Surback, Father Bernard, O. S. B. Personal letter from Our Lady of Guadalupe, Lafayette, Oregon, dated Jan. 20, 1964.
33. Revenes, David, Custer Abstract Co., Miles City, Montana, Personal Interview on Jan. 3, 1964.
34. Roderick, Brother William, O. C. S. O. Personal letter from Abbey of Our Lady of the Holy Ghost, Conyers, Georgia, dated Jan. 29, 1964.



SACRAMENT



reference list

MONTANA STATE UNIVERSITY LIBRARIES



3 1762 10070111 7

NA2540

~~720.6~~

~~M76~~

K283

v.2

~~110 USE ONLY~~

