COLLECTIVE SPACES and OPTIONAL ASSOCIATIONS:
University Housing at M.I.T

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Bachelor of Science in Architectural Design
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ABSTRACT

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Francie Marie Gurney

Submitted to the Department of Architecture on January 19, 1990 in partial fulfillment of the requirements of the degree of MASTER of ARCHITECTURE.

University housing has a significant role and value to the total educational experience. It is an informal environment that can be conducive to casual social encounters, therefore fostering communication and interchanging of ideas between residents. In this thesis, I study the types of housing available on the M.I.T. campus through observations and diagrams. With intentions to further facilitate and extend interactions and optional associations among residents, I propose an energy conscious design for University housing on a site located at an edge of the MIT campus.

Thesis Advisor: Thomas Chastain

Title: Lecturer, Department of Architecture
This thesis is dedicated to

DAD,
who typed his on the tailgate
with four of us

MOM,
who commuted 250 miles for hers
with six of us
ACKNOWLEDGEMENTS

Thanks to a dedicated faculty with a shared design philosophy, the common thread of which I hope will continue to be strengthened in the future by the generations of returning students.

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and of course, w.w.
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INTRODUCTION

I have a strong personal conviction about the significance of dormitory life in informal college education. My conviction is reinforced by my semesters on and off campus, and by a year of study at a college without a residential system. For the capital investment necessary to build housing, a university should achieve desired educational goals. In my current position as a graduate resident in an undergraduate dormitory at MIT, I am especially aware of the important role the design of the physical environment has in hindering or facilitating the achievement of these goals.

The Committee on Student Environment states two main social goals which are desirable for new campus housing:

(1) “To give each student the maximum opportunity to find an individual life style that will be best suited to his own temperament, needs, and goals, and will enable him to realize his highest potential as a scholar and a person while at the same time recognizing that he can do this only in a community where others have similar rights and needs.”

(2) “To maximize the social interaction among students in a hope that through such meaningful interaction students will come to tolerate, to appreciate, and finally to learn from the individual pecu-
liarities of each other.” (Committee on Student Environment Report, 1973, p.22)

MIT offers a variety of housing types for students. Although each type has special attributes, the range of options afforded the student in his associations is limited to and somewhat dictated by that housing type whether it be a corridor, suite, apartment, or living group system. The flexibility and choice a student has within a dorm could include the different attributes of all types without restricting the student solely to one or another.

The range of informal social interactions could also extend to include residents of normally segregated housing categories. Siting the housemaster-graduate resident program as a successful one at MIT, I feel that the goals previously stated would be better accomplished if the range of informal social interactions were to be extended to include single undergraduate and graduate students, and married faculty and graduate students. This mixing could be achieved in a housing project that through its careful design, facilitates and promotes regular and effective contact among people of different ages, interests, and experience, yet at the same time avoids conflict between the various living patterns.
The first section of my thesis focuses on design intentions. There are four central issues of consideration for the design of the residential system. Evolving from extensive discussion with students from various living groups as well as faculty, references such as surveys and dormitory studies, and most significantly my own experiences and observations, these issues seem most prominent. They will serve as guidelines throughout my design process.

The middle section of the thesis is comprised of reference examples, critically analyzed to support my design stance. I have chosen the west campus New House dormitory designed by Josep Lluis Sert as my primary reference, among other dormitories at MIT.

The final section of the thesis is the design assumptions and proposal. Beginning with the program, the design is a proposed resolution of the issues considered.
PART I. DESIGN INTENTIONS
Chapter 1 Site Considerations

The site I have chosen is on the northwest edge of the MIT campus, across the athletic fields from the existing stretch of West Campus housing along Memorial Drive. The site is adjacent to the West Garage and bounded on one edge by Vassar Street. It extends over the railroad tracks as far north as Albany Street. It is a site designated for future new construction of housing for M.I.T., and includes the air rights over the railroad tracks above a height of twenty-three feet.

The nature and depth of the site allows for a complex of buildings comprised of a gradation of housing ranging from multi-family, private rowhouse type on the “community” edge at Albany street, to semi-collective housing located in the central area of the site, to collective housing at the “campus” edge at Vassar street. This gradation reflects also the degrees of security: the rowhousing having typical individual entries, the collective housing having the tight security of a single controlled entry typical of MIT undergraduate housing required for an internally open building in an urban environment. This variation in housing types allows for two “active” edges which the West Campus can not have, being “closed” to Memorial Drive with access restricted to the controlled Amhurst Alley entrances. The mix of housing reflects the different living patterns of residents and affords mobility and choice within the same complex to accommodate changing needs.
With the airrights, the access through the site is a potential connection with the northern part of campus, the future Simplex site, Cambridgeport, and eventually Harvard Square. Where the railroad has been a somewhat severe division, the access through the sight could be an active use area bordered by public functional space. The continuity will be made by a festival-size courtyard with a corresponding building that helps to define both the courtyard and the access across the site. One building will continue the Albany Street edge, a third will parallel that direction and define the northern edge of the courtyard, the fourth building defining the southern edge of the courtyard and the Vassar street line. The secondary reference level of the courtyard should be visible from both streets, inviting pedestrian crossing. A major collective space will front this level, namely the dining hall with its corresponding outdoor eating area. The access across the site should be a lively interactive place. There will be a cafe with an eating terrace at street level at the Vassar street side of the cross access, and the entry to the collective housing will also be in this location to maximize interactions.
The secondary reference level courtyard will have one side open to the long view of the railroad tracks, as the location is somewhat special and eventful with the Maine trains. There will be a promenade above the tracks, and a collective square with southern exposure not far from the outdoor eating area of the dining hall. Housing units on the lower levels of the building central to the site have entries onto this secondary reference level. The platform terraces from the thirty foot height spanning the railroad tracks to twenty feet between the two buildings to the north of the site, down to ground level at Albany street.

Parking, always insufficient in this urban environment, is beneath the terraced platform, accessed from Albany street at the northwest side of the site. Private parking courts at half a level below grade are provided for residents of the building located along Albany street. The former elevated bridge for passage from Albany street across the railroad tracks to the West Garage is replaced by access along the building sited perpendicular to Vassar and Albany streets, passing a northeast facing outdoor eating area of the dining hall.
Chapter 2 Collective Spaces and Territorial Control

This proposal attempts to extend the diversity already existing at MIT by catering to the needs not already met. The design should maximize the potential for contact, allowing residents as many choices as possible in friendships and group formations. Group associations should be optional, not dictated by physical definitions.

Beyond the private bedroom-study, there should be a hierarchy of social spaces that serve groups of different sizes. There should be small lounges near dorm rooms that could be "acquired" and personalized by a few adjacent residents or considered territory of a larger group, and at the same time equivalently sized social lounges that by their location and articulation, can be interpreted as territory for use by any resident. These implicit options of territorial control should exist for collective spaces of a variety of scales and locations. Large scale collective spaces should be open to all residents.

Students should have the choice of living in a small cluster of rooms that might foster a friendship group, or live more anonymously in a less suggestive arrangement, such as a room off of major circulation areas. These relationships of rooms to each other and to public areas are aspects of suite and corridor systems, respectively, yet here, should be options made available within the same dorm.
There are strategic locations for the most "public" collective areas. Proximity to circulation routes such as major corridors or stairs and elevators is important. Collective spaces such as these should be open visually and physically, not confined to closed contained rooms with doors. Lounges accommodating small and large groups, pingpong areas, game rooms, television corners, etc, are some functions for open areas.

Closed collective spaces are necessary also. Examples of activities requiring acoustic isolation or privacy are a library, study rooms, conference rooms, offices, etc. A student, especially one with a roommate, should have a private place to go within the dorm, as well as social, interactive areas.

Outdoor areas should be provided: small, private balconies for individual use, terraces for group use, eating areas, a large exterior court for festival use. Some of these collective spaces could be personalize and considered territory of a particular group, others remaining available for any resident. Seasonal use should be considered in locating these spaces.
The adjacent diagram has been made of a small lounge area at the entrance to a vertical circulation of New House dormitory. The hatched area represents territory of one living group, the lighter shading of dots represents territory of a second living group. The lounge, located between rooms of different living groups, is not generally personalized by either living group, as it lies in “border” territory. The same lounge that is located, as seen on the diagram on the following page, between rooms of residents belonging to the same living group is personalized by members as it is considered clearly part of their collective territory. The former example is sometimes found without furniture, whereas in the latter, one most often sees personal effects such as posters, plants, and full bookshelves.
The top diagram illustrates a lounge again found in New House. The heavy dotting represents privacies such as bathrooms or closets, the lighter dotting dorm room privacies. The rooms here are accessed through the lounge. Often, the lounge is seen as an extension of the rooms, and one will find personal furniture, rugs, a T.V., or other personal effects in the lounge. The residents will care for this collective area, yet at the same time it looses the degree of “publicness” and free use that, for example, the small unclaimed collective area at the entrance to the vertical access had (shown on the previous page).

The lower diagram is that same lounge on the previous page, but in a different location relative to territory of living groups. Surrounded by rooms of members as stated before, it has many physical signs of being a claimed territory. Although large enough only to accommodate a study table and a few chairs, or alternatively a couch, coffee table and a few comfortable chairs, it is located in a very social place and thus well used and frequented. Its proximity to the stair invites the casual passer-by to stop and chat, not a place one must intentionally visit to seek interactions. Even those students with the best of discipline in their time schedules can be lured into a break on their way or returning from somewhere.
Chapter 3  **Community Integration**

The housing complex should include other functions or uses that further extend the range of potential interactions for residents. Integration of residents formerly segregated into different housing categories broadens interactions. Freshmen not isolated benefit considerably from the readily available informal academic and personal advice of upperclassmen, and the advisory role can be rewarding in turn for the more experienced student. In the same way, integration of undergraduates with graduates and faculty, while recognizing the necessity to accommodate different lifestyle preferences, could also result in similar benefits to all parties. I have observed that children of graduate residents and housemasters receive almost excessive attention from students. It is enjoyable for the children, and seems almost therapeutic for students with pressured schedules to take breaks: a conveniently located community daycare center would surely find willing and eager part-time staffing! There are many examples of these mutually beneficial relationships among people of different ages, interests, and experience. Humans are social by nature, and certain needs are met by these interactions. Playing various roles—whether it is the undergraduate acting as “big brother” to the child of a professor, or getting assistance from a graduate student as one would approach a parent or elder sibling—seems to add a balance to school life, especially in an environment that can induce high stress levels.
Housing with options in accommodations affords a student mobility as his needs and requirements change. The difference between an average freshman and senior undergraduate is markedly more significant than that between a senior and a first year graduate student. The latter, coming to a university with no previous contacts, might appreciate a collective living arrangement that facilitated informal encounters with students in other fields, yet the option of more private apartment living should be available should his social needs change.

Academic functions can also be integrated with housing. At present, MIT separates them, but there are convincing reasons to change this policy. One, which is particularly relevant to the site chosen for this project, is ground floor use. Vassar street has considerable vehicular activity, and combined with reasons of security, the first two levels of building are not suitable for housing unless there is a considerable set back. In other dormitories with similar situations, the program of the ground floor is collective spaces and dining halls. As this design advocates collective spaces that are more integrated with rooms, there is space for other functions in the easily accessible ground floors. Uses such as open plan terminal areas for student use, spaces for daytime or evening classes, and university staff offices are a few among many appropriate uses to be incorporated.
Chapter 4 Energy Conscious Design

The orientation of the site affords an energy-efficient design. The first decision is the general orientation of the buildings. For the direct gain approach, maximizing the true south exposure is desirable, thus positioning the axis of an elongated shape in the East-West direction. The site allows for a South-East exposure, and by serrating the edge of the Vassar Street building, the number of rooms facing south is maximized while using the full depth of the industrial site. Due to the consideration of a continuity across the site, one building has been orientated perpendicular to Vassar and Albany streets, with its long axis running northwest to southeast. Normally, this orientation would present problems with excessive solar gain and glare problems due to western sunlight that is difficult to control with shading devices, but the other buildings on the site block a good amount and appropriately located trees will help to shade exposed façades.

In the Vassar Street building, passive solar heating is considered in the positioning of the dorm rooms, facing with an unobstructed view south across the athletic fields. Double height lounges are located facing primarily south east, as the direct sunlight of the southern orientation is more easily controlled in the dorm rooms. The building could be heated in zones with this organization, similar to the system
used by Goody and Clancy in the design of the energy efficient Massachusetts Transportation Building in Boston. Southern facing dorm rooms would be on a different heating zone than open collective areas and the northern rooms. Direct solar gain decreases their seasonal heating requirements, and sometimes excess heat could be channeled to areas of greater need through heat exchangers. Overhangs and trellises with deciduous vines should be provided for shading from unwanted summer sun, yet designed to allow the lower angled winter sun to pass and warm interior and exterior spaces. The shading of the vegetation is especially appropriate as the natural cycles correspond with seasonal shading requirements: deciduous vines that are in full leaf during the summer months provide maximum shading from the high summer sun, and are more penetrable during other seasons with loss of leaves when sun is desirable.

Exterior Suntraps

The climate of Boston makes the design of exterior spaces important. A comfortable outdoor space should not overheat during the warm summer, yet at the same time be bearable in the cool fall and spring weather. This means shading and air circulation for summer comfort, and heat collection and windbreaks for the extended outdoor season. During colder months, sun traps should be oriented so that morning eastern sun warms properly located exposed thermal mass
that will store the warmth and radiate it to users later in the day. The location should be out of reach of winter heat-stripping winds, or else wind breaks provided. For summer use, deciduous trees should be located to shade sitting areas and the thermal mass that now should not be attracting heat. Trees should shade from higher summer sun angles, yet allow lower spring and fall light to pass.

Cross Ventilation

Rooms should not be packed: slack space of public areas should be designed to allow for summer air flow. An opened dorm room door should allow for circulation without depending on the opened door of another privacy.
PART II. REFERENCE EXAMPLES
Chapter 5 University Housing Types

Massachusetts Institute of Technology offers its students a variety of housing types to choose from. The choices can be categorized generally into four groups. The first, a common housing type used at many institutions, is the corridor system. Examples at MIT include East campus, Baker House, McCormick Hall West, and Next House. A second type is the suite system, such as in MacGregor house. Apartment types are primarily for graduate students, as in Tang Hall or Westgate. Finally, the living group or fraternity style housing is offered by New House. This last dormitory will be the most important reference example used.

Diagram Key

Privacy (bathroom, closet, etc.)

Resident

Collective Area
Corridor Systems

East Campus represents a basic, straightforward corridor system. There are approximately 42 students per floor, a group size that students seem to find small enough to identify with, yet not restrictive. Shared facilities for the floor include a kitchen, dining area, and lounge. These collective spaces are related to the access corridor that serves the linearly arranged bedroom/studies. Considered territory of the “floor” that in most cases seems to have a strong collective identity, these areas are personalized by the group of residents. Vertical connections between floors are minimal fire stairs. This physical arrangement facilitates horizontal social interactions only, thus stratifying social groupings.
Baker House
Baker House on Memorial Drive is a second example which can also be formally classified as a corridor system, although certain physical qualities are very different than those of East Campus. As found in East Campus, the collective use areas are open to the circulation corridor, almost a widening of the access to create use dimensions. Groupings are less stratified due to the more continuous vertical link afforded by Alvar Aalto's sculptural exterior stair that supplements the minimal closed fire stairs and elevator access. Lounges tend to be very public territory of a particular floor, yet shared freely by residents of other floors. Rooms are all accessed from the major corridor, never through lounges, which are not personalized by floor members. The jogged corridor with fire doors sections a floor, yet these physical definitions do not seem to be strong enough to form social sub groupings of residents. Collective use areas for the whole dorm are located on the ground floors, including a dining hall. There is a strong dorm identity, and dorm committees that make the required political decisions.
Next house is another corridor system. Here, as in Baker house, the lounges seem to be very public and not personalized by groups of residents. There is occasional vertical continuity spatially with the double-height lounges, yet as vertical access is restricted to elevators and fire stairs, there is again a stratification. Due to the floor layouts, there are “pockets” of adjacent rooms that facilitate optional formations of informal subgroups. Collective areas for dorm-wide use, including a dining hall, are located on the ground floors as in Baker House. These areas are very open, and as in Baker, there are vertical continuities between the two ground floors of public spaces. The public lounges, game rooms, and pingpong area are located along the route from the entry to the elevator and thus visually and physically connected to the major circulation of students. They are well used, very social spaces.
McCormick Hall's west tower, the upper diagram, is also formally a corridor system, although a doughnut form rather than linear. A floor of students share a common kitchen off of the access, and depending on the personalities, different degrees of social floor unity. Common rooms for dorm wide use are located in the penthouse and on the ground floor. These areas are formally boxes of various sizes, very separate and closed, in contrast to the openness of Next house common areas. The design of these rooms inhibits multiple uses, and activities that could generate a lively atmosphere through visibility and location are enclosed in these boxes. The large living rooms are singular volumes. One resident occupying the room visually controls the entire space. There is no architectural definition suggesting smaller groupings within the larger space. There are no intermediate small lounges on the residential floors. Continuity between floors is the typical elevator and closed fire stair, discouraging informal interactions between residents of different floors.
Apartment Types

The apartment system is for graduate students, as it is assumed that more privacy is required. Choices of roommates are not necessarily optional. Tang hall, the top diagram, houses groups ranging from 2-4 students, each apartment having shared kitchen, living, and bathing facilities. Common areas for all residents are somewhat minimal: a lounge in the penthouse, and on the ground floor, closed rooms for laundry, ping pong, and music.

Westgate, the lower diagram, also has minimal common areas shared between residents of different apartments. Housing for married graduate students, it offers studio and one bedroom apartments.
MacGregor House
Suite Types

MacGregor house has a suite system. Unlike many of the other dorms, the suites are arranged vertically, and a number of suites combine to form what is termed and entry. The suites each share a lounge and cooking facilities, and the entry has a common room also. Dorm lounges for large collective activities, game rooms, etc. are all located on the ground floor.
Living Group, Fraternity Type

New House is an example of the fourth category of housing types. The arrangement is similar to a series of fraternity houses, yet with a lesser degree of obligation involved. The language houses tend to be stronger in their social unity compared with the living groups without the traditions of co-op cooking and other collective activities that parallel fraternity living. Living groups share cooking facilities, dining areas, and lounges of different sizes. Large lounges on the ground level are sometimes shared by two living groups. As living groups have different collective areas, the use and degree of personalization vary. Living group size lounges tend to be personalized by the members when they are located in close proximity to the frequently used kitchen and dining areas, or on the same level as bedroom-studies. Large lounges that are not located on the same floor as these uses tend to be more generic in nature and used less often. Small lounges clearly within the “territory” of a living group will be personalized by the group members, but when located between groups will not be. A lounge is often personalized by individuals if their bedroom-studies are directly accessible through it.
PART III. DESIGN PROPOSAL
CHAPTER 6 Design Assumptions

PRIVATE ROOM Single and occasionally flexible double bedroom studies. Noise isolation important, privacy to bathroom. Views and good daylight, as students can be expected to use at all times of day.

SMALL LOUNGES Some convien to bedroom-studies, others located near access routes. Should be hierarchially connected to more public territories, not isolated by surrounding privacies.

KITCHEN FACILITIES Open, near collective dining area. Limited to use by a small number of students, to facilitate cleaning responsibility. Located near major access area for optional interactions with students from other living groups, as meal time is good opportunity for socializing. Eating area to serve several kitchens, and a group group of 20-40 students. Open visually to main access, and well-lit by daylight. Balcony desirable, as well as double height area. MEDIUM LOUNGES to serve 20-40 students, located near eating and cooking areas.

LARGE LOUNGE For accomodating groups of 100-150, yet comfortable for use by a few smaller groups by careful definition of sub spaces that are at the same time part of the larger area. Comfortable
and warm environment, yet indestructable. Useable by groups of all ages.

DINING FACILITY Due to proximity of the site to Lobdell, has to accommodate sit-down meals for only a percentage of the residents. Room should be contiguous to Large Lounge for optional joining for large indoor functions, parties, etc. Should be located in an area where residents of other housing can easily access without going through undergraduate desk security, and ideally without complete exposure to weather en route. There should be dining areas for small groups that can be separated from the main dining area.

MEETING ROOMS, CLASSROOMS Multi-purpose rooms that can be closed for privacy and acoustic isolation for special purposes such as classes or conferences.

TERMINAL ROOMS For additional Athena cluster, located on ground two floors Glare and climate control essential.

GAME ROOM Centrally located near major access, preferably visible from main entry circulation.

LAUNDRY also located near major access. This and other areas will be shared by all residents, and can be designed for interactive purposes.
DAYCARE as residents will help to staff this facility, should be
publically located, yet far enough from studying students so as not to
be disturbing, should have ground relation, and outdoor play area.

PARKING Spaces should be provided for at least one of every
eight residents, but preferable more as the university has a shortage.

PUBLIC OUTDOOR AREAS small intimate places, small group
areas, and a large collective space for outdoor festivals, concerts, etc.
Small cafe with seasonal outdoor area for snacks, lounging...

READING ROOM near entry for magazines and newspapers.
Doubles as waiting area at entry.

LIBRARY for student use. Quiet and closed for study purposes.
Carols.

MUSIC ROOMS small for individual practice, and larger for
small group rehearsals.
CHAPTER 7 Drawings
Ground Floor Plan

1. Entry to Terminal Area
2. Mechanical and Custodial
3. Open Terminal Area
4. Recreation
5. Main Lounge
6. Offices
7. Game room
8. Elevator Lobby
9. Garden
10. Janitor
11. Elevator Lobby
12. Laundry Room
13. Front Desk
14. Main Entry
15. Bicycle Room
16. Café
17. Eating Terrace
18. Deliveries
19. West Garage
Second Floor Plan

1. Single Dorm
2. Double Dorm
3. Small Lounge
4. Kitchen
5. Eating
6. Lounge
7. One Bedroom Apartment
8. Hobby
9. Library
10. Office

11. Pingpong
12. Upper Lounge
13. Terrace
14. Lobby
15. Upper Café
16. Hobby
Third Floor Plan

1. Single Dorm
2. Double Dorm
3. 3 Bedroom Apt. Housemaster
4. 1 Bedroom Apartment
5. Small Lounge
6. Kitchen
7. Eating
8. Lounge
9. 3 Bedroom Apartment
10. Open to pingpong
11. Terrace
12. Lobby
Fourth Floor and Secondary Level Plan
Fourth Floor Plan

1. Single Dorm
2. Double Dorm
5. Small Lounge
6. Lounge
8. Terrace

[Diagram of the fourth floor plan with labeled rooms and areas.]
Fifth Floor Plan

1. Single Dorm
2. Double Dorm
3. 7 Bedroom Apt.
4. 1 Bedroom Apt.
5. Small Lounge
6. Kitchen
7. Eating
8. Lounge
9. Terrace
10. Lobby
Sixth Floor Plan

1. Single Dorm
2. Double Dorm
4. Small Lounge
5. Lounge
7. Terrace
Seventh Floor Plan

1. Single Dorm
2. Double Dorm
3. 1 Bedroom Apt.
4. Small Lounge
5. Kitchen
6. Eating
7. Lounge
8. Terrace
9. Lobby
Eighth Floor Plan

1. Single Dorm
2. Double Dorm
3. Small Lounge
Section, Vassar Street to Albany Street
Elevation, South East
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PROCESS SKETCHES
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