HOUSE VERSUS HOME: THE CONFLICT BETWEEN OCCUPANT AND ARCHITECT DESIGNED HOUSING IN A MULTI-FAMILY SETTING

by

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Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Architecture at the MASSACHUSETTS INSTITUTE OF TECHNOLOGY June, 1979

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ABSTRACT

House Versus Home: the conflict between occupant and architect designed housing in a multi-family setting

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Submitted to the Department of Architecture on May 10, 1979 in partial fulfillment of the requirements for the degree of Master of Architecture.

Multi-family housing is often built with little consideration of the people who will eventually inhabit it. Huge housing complexes are constructed whose aims are to make a profit for developers more than to supply dwellings that are sensitive to occupant's needs. This thesis explores this dilemma. It examines what issues people find most important in their housing, what occupants design when they are given control of their homes, and how this control can be fostered.

To accomplish this, four issues of space, privacy, control, and flexibility/adaptability were examined as the housing issues most important to occupants. Then, a series of existing housing projects that utilize occupant participation in various stages of the design process were analysed to test the issues and to study occupant involvement in housing. Finally, government guidelines (Minimum space standards) for multi-family housing were examined and re-evaluated to aid occupant participation and to foster these four issues of concern in housing
design.

This thesis points to a new direction for dwelling design. It advocates involving occupants in their housing by enabling them to decide for themselves the spacial configurations of their homes. It also advocates educating architects and occupants to benefit from this approach and to increase the quality and variety of the American housing stock.

Anne Vernez-Moudon, Thesis Supervisor
Assistant Professor of Architecture
ACKNOWLEDGMENTS

It is difficult to know how to thank the many people who helped me realize this thesis. Their ideas, patience, and help along the way are so much a part of the final product. Special thanks go to:

Anne Vernez-Moudon, my advisor and friend. Without her guidance and help my thoughts may never have moved in this direction. Thank you for letting me follow my ideas while giving me the foundation for that exploration.

My readers, Florence Ladd - in many ways a second advisor, Dolores Hayden, and Sandra Howell. So often I wondered where your ideas ended and mine began. Thank you for sharing your fields of expertise with me.

Cheryl Bond, my typist. Sorry I kept yelling about the margins. You did a super job!

My friends - Kathy, Bill, Nora, Denise, my roommates, and the crew at work. Thanks for your support, for not yelling back at me when I've been unbearable, and for giving me a kick when I've gotten behind schedule.

Willie, for giving me headaches when I didn't need them, using the first draft to cure insomnia, and still making me believe I was doing ok.

And my parents, a very special thank you. Without your support this may never have been written. This thesis is for both of you.
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This thesis is a dialogue for architects forced to use minimum standards in their design careers. It is also an attack on those very standards and their inhibition of new styles and approaches to the housing question. Each year, housing projects are conceived, designed, and implemented using HUD, FHA, Parker Morris, and any number of other minimum standards for multi-family dwellings. The design results of these projects tend to resemble each other in both product and process. Living rooms with a "least dimension" of 12'-0" (1) uniformly become living rooms with a standard dimension of 12'-0". What was originally meant to be a guide to ensure a minimum standard of comfort and physical domain has evolved into a rigid criteria for maximum density housing. To save space, time, and money, the standards have been interpreted as a building program for uniform design resulting in a repeatable process and often a rubber stamp solution.

What happens to the designer who wishes to break out of this mold? All too often the existing process of design ignores any attempts at new approaches which rely on the standards as a guideline rather than a rule. Some architects are convinced it is "economically unsound" to implement such ideas as flexibility (designing for change in housing plans as occupants' needs change or as new occupants inhabit a building) or adaptability (designing for change in the use of a building over time) in large scale housing projects because of the perceived necessity to
increase budgets, time schedules, and supervision time. Even a cursory examination of the American market points to a dearth of flexible or adaptable design.

Is such an approach contrary to American market needs, or is it merely that our market is unschooled in this type of design approach? A lack of experimentation in new directions does not necessarily mean a lack of desire or interest in new methods. More likely, it means both a society and profession set in their ways, unwilling to support a new market endeavor not already proven in its profitability. It is this issue of a new design approach that this thesis will address by supplying the argument for designers to strike off in new directions, giving them a basis for housing procedures different from the market norm; enabling them to involve occupants in their housing; and to exercise a greater control by both users and architects in the housing stock while relying on the framework of minimum standards for multi-family design.

Minimum standards are necessary to ensure a basic quality of housing, but they should be regarded as minimum physical standards (a guide to ensure minimum square footages, light, ventilation and privacy), rather than minimum design standards (a rigid criteria for room size, height and function). They are a framework rather than the finished product. New ideas in housing needn't preclude these standards, but no longer should design be chained to conventional channels when new experimentation in the housing stock and the housing process may lead to greater residential satisfaction and a longer life/use span of our housing. Using these standards as a framework, the following is an argument for a new approach to design.
Every country of the world has their own norms for minimum dwellings. An American market would find it impossible to accept the standards of a country such as Hong Kong. There, as many as 9,800 people are housed per acre in specific instances (2), making housing space a constant problem. In the large resettlement estates of the Mark I - IV housing blocks, 22 square feet per person is considered the accepted goal; and 25 to 35 square feet per person is good quality housing. Generally, 86 square feet will house a family of three while 240 square feet will house ten adults. With children being considered only half an adult, 240 square feet may house as many as thirteen to sixteen people. (3) Unfortunately, most people rely on much less space than the standards recommend. Squatter settlements in Hong Kong house five to six times the recommended number of people in the same square footage as the newer estates. (4) Even the estates rapidly overcrowd as families make room for additional friends and relatives.

In comparison with American expectations in housing, one soon realizes the importance of culture on the housing stock. Americans expect a minimum of 60 square feet per person in their sleeping areas alone. Add to that areas for bath, living, kitchen, and any number of other "necessities" of our culture and the result is many times greater than the Hong Kong norm. (5) Western visitors to the Orient are amazed by the difference in the standard of living between the cultures. Houses in Hong Kong are literally piled on top of each other in the squatter areas. Often activities are done in shifts reminiscent of turn of the century immigrant housing in American cities where in order for a new activity to commence, the
remains of the last one would have to be cleared away—such as removing beds and bedrolls so that the day's cleaning and food preparation could take place or rooms that would be occupied by double shifts of workers; one shift sleeping by day, the other by night. (6)

Cities such as Hong Kong are also in the chaos of being sandwiched between cultures. While the space standards and ideology of the area are primarily Oriental, a growing western influence on the thinking and lifestyle of the population is causing problems in the housing stock. Demands for improved sanitation and mechanical processes in the housing are beneficial for health reasons; but the corresponding acceptance of western furniture, organization, and space usage given the smaller housing stock pose continual problems. The poor have always had the attitude of saving everything they've ever owned, believing it will be useful someday. This has usually meant utensils or smaller objects that could be tied to walls or roof leaving the interior of the homes relatively free. (7) As the western influence gains acceptance, though, interior spaces are eaten by larger furniture and additional possessions. While the western life-style gains control, the western love of space is still an anomaly. Hong Kong citizens who view American movies delight in the scenes roving through the American homestead. As the hero walks from room to room, what begins as a few titters rapidly grows to peals of laughter at such an enormous residence for so few people.

Japan also has the dilemma of east versus west; but with this culture, accumulating space rather than possessions is the issue. As a symbol of increased status, Japanese citizens are building homes with western sized and styled living rooms appended to them. Not only are these rooms totally out of proportion with the rest of the house and with the standards of the country, but they
are also totally out of character with the needs and life style of the occupants, making them little more than show pieces. (8)

The American Market: Minimum Space Standards

With criteria for acceptable housing being so dependent to a country's culture, background, and present ideological trends, it is virtually impossible to maintain sweeping generalizations on what is a proper measure of housing standard or what issues are most important in designing a country's housing stock. Nor should a universal standard ever be an objective lest housing become universally similar and the very stimulus of diversity due to cultural differences be obliterated. Instead, it is more important to realize the inherent differences between countries, and learn from their solutions how to better implement solutions germane to our own housing needs. Much can be learned from how individual countries tackle their own housing concerns. Both their successes and failures may better help us to find new approaches to our own problems.

This thesis will examine housing in several countries which use different design approaches, but which also use the constraints of minimum standards for multi-family design of the country where that housing example is located. These examples will be used as an illustration of what could be done in an American context. As stated originally, this is a dialogue for designers working with multi-family housing using FHA and HUD minimum standards. This implies lower, lower-middle, and middle income groups though the examples and the suggestions formulated won't necessarily specify a particular income client. The same applies to the location of housing projects. While the examples studied are sometimes germane to a
specific location (culture and climate), the information gleaned from them is more for the theoretical basis of new housing design for the United States market. If something is largely climate dependent (or otherwise site specific) it will be indicated. Generally, though, this is a starting point for experimentation in housing anywhere in America, not a manual for housing design specific to any one area.

In an American context, it is necessary to recognize the restrictions of the FHA and HUD standards. These standards grew out of a need to ensure every American of a "healthful residential environment" (9) guaranteeing light, ventilation and privacy to all occupants. They remain to some extent a necessary guideline to design, especially to prevent a regression to earlier housing commodities. On examining our own residential history, it is easy to understand the development of these standards. In the 1850's, no ground rules existed for dwelling design. This, coupled with an influx of immigrants, resulted in homes that were subdivided into the merest cubicles. Interior rooms without natural light or ventilation were common. As people realized the importance of dwelling design and health control, rules were established to upgrade the living environments in an attempt to control the epidemics of the time. Still, the immigrant tide caused problems with the budding standards. As late as 1916, Prof. James Ford of Harvard wrote of the problems of Southern European immigrants bringing their primitive levels of sanitation into Cambridge's struggling housing situation.

These immigrants, bring their pastoral, tribal, sometimes nomadic habits, which include those of keeping household cattle and fowl in their dwellings and of moving away
from a home when the pile of garbage which they have thrown out the windows and doors becomes troublesome...(10)

Clearly, a more stringent standard level was required - not only now for light and air but for sanitation and basic services as well. Even at that time, Cambridge had running water and sewer systems connected to most homes; but the number of houses with windowless rooms, overly subdivided apartments, and lack of public sanitation education for the new families remained extremely low.

With the two world wars and subsequent immigration laws, the tide of immigrants to the United States has been considerably checked. The population has grown at a more reasonable, though steady, rate from within; but in many ways the standards have not changed with the changing population. Their primary objective is still to ensure light, ventilation, and privacy especially in large multi-family dwelling units, when the American population has been concerned with other issues of space, control and flexibility of design. Current United States housing trends indicate that most Americans still harbor notions of their "dream house" - a single family home in suburbia, surrounded by trees and grass, owned not rented. Coupled with this is a desire for more space. The home should be away from the center-of-things and should be situated on a minimum of 1/5 acre of land (with 1/3 to 1/2 acre preferred). (11) Despite the acceptance of the American dream, most of the families who do attain this idyllic setting only stay in the "ideal" for a maximum of five years, moving again to a more urban or centralized environment as their child rearing years draw to a close. (12) The American "ideal" home is a very real dream, yet it occupies only a short phase of the life cycle - those


(11) Bureau of Building Marketing Research. Professional Builder's National Consumer Survey on Housing (Chicago 1975)

(12) Michaelson, 36-40.

years when a person has young or growing children. As the children grow up and develop their own life styles, parents again look for less land (though not necessarily less housing space) and a more centralized access to consumer goods and services.

The Process of Re-evaluation

For all the changes in American housing over the years, the market approach has remained basically the same. Whether talking of the era before building codes and standards, or current housing dreams, land speculation is still at the root of the housing question. In the 1850’s

The ultimate housing of the Irish required an extensive process of adaptation on the part of Boston real estate. The simplest form was conversion of old mansions and disused warehouses into tenements. In many cases, boardinghouse keepers, wishing to profit by the new demand, took over properties which, after a few alterations, emerged as multiple dwellings. In other cases, a sublease system developed, whereby a contractor, usually Irish himself and frequently a neighborhood tradesman, leased an old building at an annual rental, subdivided it into immigrant flats, and subrented it at weekly rates...Solely interested in immediate income, having the welfare of neither the building nor the tenants at heart, sub-landlords
encouraged a host of evils, while the occupants suffered from their "merciless inflictions." (13)

Today, massive subdividing of building interiors may not be the issue but subdivision of the land is. Interested in profits, developers subdivide acres into smaller and smaller plots necessitating towns to require one acre, one quarter acre, or whatever is deemed appropriate, zoning to ensure some sense of privacy. In multi-family dwellings, structures rise ever higher while communal space is rapidly diminished in a quest for more units, and hence more profit, per acre.

To prevent too high a density and to ensure this light, ventilation, and privacy, building standards are still a necessity; but a necessity to what extent? While it is necessary to prevent a regression to the unhealthy housing conditions of the 1800's and even early 1900's, it is no longer compulsory to dictate the standards to such an extent around health considerations. As the population changes and grows, people have come to expect a certain level of quality in their housing. They expect a minimum health standard to be met, regardless of codes or building standards that ensure that level of housing commodity. If the need for light and ventilation is implicit in a population's housing market, need they also be explicit in the codes, especially to the extent that other issues affecting the housing stock are ignored or by-passed in the effort to preserve the tenor of the documents. When this becomes the case, the standards become a hindrance to both architects and occupants by thwarting innovations in housing design and occupant participation in the housing process. When Michaelson explored the reasons why people don't want what architects want (14) in 1968, at the crux of his argument was the issue that architects and occupants rarely
communicate in the search for housing dense populations. Somehow the real and the ideal never mesh. Part of this is due to the standards architects are forced to use, making these architects bureaucrats in their own right rather than the agents to implement a variety in the housing stock and increased occupant control over housing for the American population. What the standards have become is a benefit for the financial backers of housing development - providing a ready scale for economic justification of design rather than being a guideline or reference for new avenues of research in housing.

A new approach to implementing the standards is required. By themselves they are fairly innocuous documents - giving minimum areas and dimensions and occasionally stating that larger areas may always be used. What is never shown, though, is what the population finds important in its housing. The average American would not know the difference between a 160 square foot living room and a 165 square foot living room; but they would know the difference between the amount of privacy that room offered or how much control over its use the occupant would have. The first phase of the dialogue will be to examine what people find most important in their housing.

Once those issues important to people in their housing have been defined, one needs to examine how the standards can be implemented to accommodate these ideas. Currently FHA standards offer a few examples of acceptable minimum design in an appendix and HUD gives space, furniture, and circulation diagrams to illustrate their requirements (15); but neither give any indication of how to arrive at the final design. Somehow, the implication is to read the guidelines, shuffle them into an apartment plan and repeat the plan for the desired number of units. Nowhere does the occupant enter the process. The other side of the coin is for the architect...

to read the guidelines, shuffle them into some kind of legible outline and then take the occupant in hand to work through the housing design together, resulting in units that more truly meet the needs of the occupants while using the guidelines of minimum standards as a base.

Finally, pushing this dialogue to its extreme, is to examine the standards themselves. If a new approach to housing is to be tried, a re-evaluation of the standards should facilitate the process especially if the standards are evaluated from an occupant involved viewpoint and with the aim of allowing new experimentation in housing design.
Summary

Purpose:
This thesis is directed to architects working with minimum standards for multi-family design.

It will help enable architects to experiment with flexibility, adaptability and occupant control in housing by supplying examples of this type of design already functioning in a market context.

Space standards are culturally based, prohibiting a universal standard. This thesis deals with an American context for multi-family housing.

The Market:

The standards originated from biological considerations arising from 19th century land speculation, overcrowding and disease.

The current market expects this biological criteria to be met regardless of their being explicit in the codes. Therefore, the standards should expand to include other issues.

The market "ideal" generally implies a single family home in suburbia; yet the durability of the American dream begs for a more centralized housing stock.
Housing Considerations:

What do people consider most important in their housing?

How can design work within the context of the standards to facilitate housing experimentation?

How can the standards to re-evaluated to facilitate this experimentation?
Home is not merely an apartment or house but a local area in which some of the most meaningful aspects of life are experienced.

Marc Fried, "Some Sources of Residential Satisfaction in an Urban Slum"

When looking at housing in the United States, one can't help but notice the overall lack of variety in multi-family housing. This type of housing seesaws between the superblock skyscrapers of Pruitt-Igoe infamy or the smaller scale though equally dense projects such as the Brownsville Houses in New York City. Single family homes are constructed in endless tracks of ticky-tacky similarity. Americans seem to have the choice of tall high density or short high density living with ever increasing emphasis on taller projects.(1)

Much of the blame for this rests on the existing approach to housing design. As the system exists today, the accepted practice is to scale down the levels of choice in the housing process to fit the existing technocracy. In doing this, the housing process continually repeats the same methods of design and design ideas, thereby ensuring an economic scale of production commensurate with the current market and a product similar to the existing housing stock. What this system also effects is a rigid control over variety in American dwellings. By limiting the levels of choice in the housing process, the existing architectural profession can control any housing product put on the market; any new ideas about the housing stock; and any new avenues of research into innovative solutions. What this approach

M. Pyatok, private conversations.
Multi-Family Housing

American multi-family design alternates between high rise high density double loaded corridor design (1,2) and low rise high density (3,4 - Brownsville Houses in New York). Similar densities may be achieved in each, but low rise projects often exhibit less crime and greater territoriality patterns among the residents. (drawings adapted from O.Newman Defensible Space. page 23,43,45).
guarantees is a continued system of spoon feeding the American public with standard, market-controlled (e.g. financially acceptable) dwelling design.

An alternate approach is available by educating both architects and occupants to handle more levels of choice rather than less. In this case, one amplifies the ability of the existing system to handle more variety and more housing concerns. Notably, this increased variety could be in the form of occupant participation in the housing program. Using the minimum standards for multi-family design as a base, a new approach could be instigated that involves the occupants in the overall housing process; enables designers to construct dwellings that are sensitive to the occupants' concerns; and produces a richer, more varied, housing stock that grows directly from occupant involvement. This can be accomplished only if the standards also reflect this occupant participation, encouraging variety through spacial guidelines rather than regulations. (2)

Inherent in the variety generated from occupant participation is also a reflection of those issues most important to people in their housing. Occupants of rental units are often less concerned with maximizing square footages of their dwelling units than they are with issues of privacy - the need for personal areas; flexibility - the ability of a unit to change over time as new occupants move in or as the space needs of the inhabitants change; control - the perceived ability of an occupant to manipulate his environment; and space - areas belonging to an occupant's sphere of control, both interior and exterior to a housing unit. (3) When occupants are directly involved in the housing process, these issues, if not always explicitly met, are at least discussed and considered. Even when design is carried out without direct occupant participation, these issues should still be utilized in the
process. If the housing is designed in concert with these issues, the occupants will be better satisfied with and more responsive to their residences. Subsequent occupant control and participation in the housing is also facilitated. The following is an examination of these ideas.

Space: The American Ideal

The first issue is the trend of Americans to seek the single family ideal in their housing. (4) "America was built on the concept of the frontier. Land was limitless. Resources were never-ending. The pioneer way was to use it up, throw it away, and move west." (5) People searching for the limitless space of the American west are usually in for a cruel surprise. Our vast frontiers have rapidly been diminished by farm and grazing land, industry, and endless tracks of homes. Denver, the nation's fourth fastest growing metropolis and one of the last bastions of the great frontier, has more than doubled its population in the last 25 years to 1.7 million. Demographers predict it will swell to 2.5 million by the year 2000. Many of the farm and cattle land around Denver is being turned into homesteads to accommodate the growing population. Planned communities such as Jefferson County's Ken-Caryl Ranch capitalize on the American dream by luring people to the vast frontiers of the west. In this huge development, only one third of the 9000 acres is to become housing with the remaining two thirds delegated to park land and cattle grazing. (6) The very density of the housing - all single family detached - crammed into as few acres as possible makes the project seem like any other suburban community, not an endless frontier. The American quest for the single family home encourages such developments regardless of the environmental and probably psychological price paid for them.


(5) C. Labine. "Preservationists are Un-American!" Historic Preservation (March/April, 1979), 18.

Then, too, there is the issue of the durability of the American dream. Most Americans stay in this type of suburban/rural location for only a five year period before moving back to a more centralized area. The "image" of the ideal should be translated into something that would mesh with a more centralized region. The single family home is wanted for its pastoral imagery; but it is equally desired for its connotation of ownership and security, its space for children to play, and its land value in terms of financial value and pleasure value of gardens and lawns. If someway this could be translated into a more urban setting, the wide open spaces of our countryside would stand a better chance of preservation; and more occupants may find homes both fitting their "ideal" dreams and their real housing needs.

Condominium development in the United States has begun a trend in this direction by ensuring ownership and economic profit through ownership within a more urban/centralized environment. While many people view this as an intermediate step in the progression to a single family home - by buying a condominium, reselling a few years later at a profit, and with the profit buying a detached home - many more are finding condominiums a reasonable solution to the housing problem. United States housing figures indicate that condominium development and sales make up 50% of the new housing market - a phenomenal amount especially considering as little as 20 years ago many states outlawed their construction. Currently, though, condominiums are favored by singles, childless couples, or couples whose children are already grown and living on their own. If more condominium developments were designed for families with children, they would become a more feasible alternative to the great American sprawl. Rather than building only one and two bedroom units, a range of units could be constructed within a development providing more variety within a project.
Also, land should be provided for children's play areas, parks or recreational facilities. Equally important too is the option of land or outdoor space owned by and attached to individual units enabling condominium owners to enjoy the garden imagery sought for in suburban locations while still working within a multi-family and centralized framework.

Within the home itself, Americans also seek larger spaces than perhaps are necessary. American industry works with a 16 foot module while most European standards use a 12 foot module in housing design. Americans also take it for granted that such amenities as built-in closet space will be provided while Europeans frequently assume movable storage units. As children grow up and leave home, making the size of the family smaller, the size of the desired housing stock remains fairly constant. Bedrooms vacated by growing children will often be converted to other uses or left as "guest rooms" rather than accept smaller housing more in keeping with a family's needs. Often the necessities of single level design associated with age or the desire to be closer to children will be the mitigating factor to convince people to move to a smaller housing stock.

Europeans have a tendency to romanticize American spaciousness in housing. When thinking of our culture and the amount of land available to us, many Europeans imagine our housing stock to be commensurate with our image. Reyner Banham described our housing trends as,

Even within the house, Americans rapidly learned to dispense with the partitions that Europeans need to keep space architectural and within bounds, and before Wright began blundering through the walls

Our housing market attests to something very different, though. While the American life style may be more informal than a European one, our living style is still fairly regimented. Ask any banker or read the real estate advertisements to understand what "sells" housing and one is given an image of bathrooms, laundries, and two rooms where one would do just as well (e.g. family rooms and living rooms, etc.). Homes are still valued by the number of rooms and bathrooms they possess rather than the amount of space, especially open interior space, that forms their structure.

Personal Space: A Need For Privacy

Part of this desire for larger housing units and for the many rooms involved stems from the second housing issue of a need for privacy - a need for some area associated with individuals or family members and protected from uninvited intrusion. In an effort to protect the privacy of their housing, occupants have set up a rigid system of spacial hierarchies in their homes which has often resulted in the need for two rooms for the same function. Nineteenth century homes began this hierarchy with the system of sitting rooms and parlors. Guests would be entertained in the parlor while close friends and family would use the sitting room. Likewise a guest would have some idea of how accepted they were by the family depending on how far they would be allowed to...
"The universal plan built by speculative builders from the end of the last century onwards." The parlor was used to receive guests and callers. The living room was for family and friends. Today's family room and living room serve similar purposes, breaking the home into separate areas for family and visitors. A. Rabeneck "Housing Flexibility/Adaptability" Architectural Design(2/74), 87.
penetrate the inner rooms of the home. (12) Today, living rooms and family rooms in middle class homes have become the modern parlor where visitors are entertained and family rarely stay except for these social occasions. The family room is now the sitting room where daily activity and family living occurs. The guest permitted to enter the family room has the sense of being accepted by the family.

This effort to screen the home into public, semi-public, and private sections is really a means of ensuring privacy by creating a system of hierarchies of where family, where friends, and where visitors belong in the home. Understanding these hierarchies leads to some common sense decisions about housing design. Our culture usually defines living rooms and entries as public; kitchens and hallways as semi-public; and bedrooms, bathrooms, and workrooms as private. Therefore front doors that open directly to the kitchen or stairs to private areas that lead directly to the main entrance are rarely acceptable. Visitors are usually screened before being allowed in semi-public areas; and stairs in such a prominent location imply universal access to the private domain. Even large scale projects follow the same rules. At Pruitt-Igoe, when stair and elevator areas were placed in such a location that anyone could use them, major problems of unwanted entry, vandalism, and crime resulted. Yet, when the same area in one building was screened to ensure limited use, the crime problem rapidly diminished and more people began taking an interest in the housing. (13) Conversely, another culture may have a different set of guidelines. Puerto Rican immigrants could not understand entrances leading directly to the living room. In their privacy ordering, the living room was accessible to visitors only after they had been accepted by the family. In this case the kitchen assumed the role of parlor while the living room was only for family and better known
Privacy screening occurs within the family structure as well. Regardless of the amount of space a home entails, each occupant needs some area of their own. Sommer's findings in his book Personal Space started the research in this area, yet his work dealt mainly with a person's personal territory around themselves - the minimum and maximum distances people would tolerate others near them when holding conversations, working, or relaxing alone or in groups. This led to considerations of design to facilitate group interaction or working environments which HUD has since utilized in their circulation and furniture diagrams for minimum space design.

Equally important within the issue of privacy is a person's individual private area. This fosters a sense of security and control over one's home and leads to greater residential satisfaction. Bedrooms are the accepted domain of individual privacy, yet any place in a home felt to be special by someone meets the need. The same room may even be the private domain of more than one family member when informal schedules are maintained - such as one family that maintains a living room that belongs to the teenage members during afternoon and early evening, becomes a family room for most of the evening, then is utilized by the mother during the early morning hours as a study. No written code maintains this time schedule, yet each family member understands and honors the other members' claims to the same space.

Likewise, the lack of privacy or the sense of intrusion into a private area can prove upsetting. Students, in talking of their housing history, frequently stressed that each member of their families had his or her private space. Some, having spaces that were personal yet rarely private, expressed the lack of that needed issue.
One student from Melbourne, Australia described his home as

The entry door opened so that a caller could see into the entire ground floor space, when the door was opened. I found it very disturbing not to have a privacy barrier between my world and the outside. (15)

Others, in sharing bedrooms with siblings, sought private areas in the odd nooks of the home. All, though, expressed the need for and tacit acceptance of privacy for the family as a whole from the outside world and for individual members of the family to be separate from the rest of the home.

Control: Occupant Participation

The third and most important issue in occupant housing is the necessity of a sense of control over an individual's home. This control exists on many different levels. In its most basic form, private ownership is the major concern of an occupant. This ownership guarantees the rights and security of the occupant to mold his home environment in any manner suitable to his life style.

With the increasing trend towards rental dwellings and condominium clauses prohibiting major changes within housing units, a different image of control is needed to ensure the same satisfaction and participation in housing that control often generates. Occupants confronted with living environments that are so totally designed as to inhibit even reasonable modification to individual users' life styles are soon outmoded and abandoned in favor of
Space Standards

HUD space standards use furniture sizes, circulation, and room use to determine space sizes. Sommer's findings of distances and furniture configurations that best suit conversation use are included in the space standards.
more tolerant designs. Much of this stems from what Clare Cooper terms the "image of self" in housing. She argues that housing is a vehicle for expressing oneself to others by personalizing and controlling one's home. No wonder then that subsidized, state provided multi-family housing blocks so often fail in their attempts to provide residences. What this type of housing really offers is an anonymous, mass produced image of self. Restrictions prohibiting overt personalization and control in this type of housing make them wastelands of external supervision.

Increased occupant control over the individual housing stock fosters a greater satisfaction in that housing. As occupants take more responsibility for their environment, they also learn more about their own physical dwelling needs and satisfy many of the issues important to their housing use. Most people are willing to live with mistakes they make in manipulating their own housing because it is a means of learning about that housing; and in exercising control, they know that those mistakes may be modified at a future date. Those same mistakes made by other designers and forced on the public at large are usually not tolerated in housing.

Therefore, designers have a responsibility to foster this sense of occupant control; yet often the best intentions culminate in results opposite to those desired. The very design involved may thwart attempts by inhabitants to control their housing. One instance of this is the danger of over-design when the overall space is provided with so many artifacts or built-in components that potential changes made by the occupant are minimized. The most common pitfall in this area is the college dormitory. In an effort to cut down on space, maintenance, and vandalism, many colleges are providing rooms with built-in closets, bookshelves, desks, beds and more;
but college students respond negatively to this type of dormitory environment. In this case, the overall design itself may not be the issue. One student at the University of Massachusetts, after living in such a room became so incensed with his lack of control over the room that he ripped the desk from its holder and put his bed there instead. He reasoned that the arrangement of the furniture was alright prior to his action but the knowledge of his inability to change it when he wanted to was impossible to live with.

Russian housing of the 1930's revolved around this same theory of control with minimum space while trying to avoid the pitfalls of overdesign. At the time, much research was devoted to the new collectivization of housing where individuals would each inhabit their own "cell" for living and private space and all other activities would be collectivized - e.g. cooking, laundry, etc. In designing the living cells, it was understood that most people would spend about half their life in them so every effort was made to ensure against their being reduced to cabins or closets. Designs using both built-in and movable furniture were explored; but when built-in elements were used, there were usually movable elements as well to ensure some individual control.

Another common means of thwarting control is through excessive detail in the individual homes. Space usage is never an arbitrary decision, yet rooms are often designed to limit their ability to house different solutions. Electrical outlets or light fixtures often do more to determine a room's use and layout than occupant decisions. In considering the standard American dining room, almost universally a light fixture is placed in the center of the ceiling, virtually dictating the dining table be placed in the center of the room below the fixture. A table pushed to the side of the room would be poorly

lighted when people were seated around it.

The same is true of fireplace and window locations. Furniture is usually grouped in front of and with a view to the fireplace while it is grouped 90 degrees to a window to provide a view out and to prevent glare. Windows in front of fireplaces or too many walls with window areas create confusion in the occupant's mind, yet a single fireplace or window may determine the entire room's layout by means of their prominence of display. These elements also determine a room's use. Fireplaces connote living rooms. Only when more than one fireplace is available in a home will it be used in another type of room. Window placement also implies a room's function. High or clerestory windows are most often used in bedrooms or private areas to prevent surveillance from outside. Standard windows with sill heights of 30 to 40 inches are used in living areas. Lower windows are usually found in circulation and entrance locations.

Occupant control is a major issue in housing satisfaction, yet many users take a passive approach to their housing because they have never had the opportunity to exercise such control. Rental units especially discourage active participation by their false sense of ownership and responsibility to maintaining the status quo. As more and more of the population starts their housing career in rented dwellings before moving to individually owned units, many people are losing their ability to control the housing environment. For this reason, many designers are attempting to force a sense of control on the population by making people take responsibility for their housing.

Brute-force approaches to occupant control take many forms. At its simplest level, designers supply very personal elements that occupants will either accept or reject.
outright, with the emphasis on rejection, so that the occupant will supply a new element in its stead. The Belgium architect Lucien Kroll delights in this approach. Believing people should take an active role in their housing, he installed in La Memé, student housing at Louvain, the brightest, most wildly flowered curtains he could find solely for the reason that people would hate them and hence would take them down and replace them with something of their own choosing. Likewise his whole design approach revolved around people and their control and participation in housing. Interior column spacing was irregular so that "...les colonnes irrégulières forcent l'imagination...si les distances varient dans les deux directions sans répéter de motifs, le plan de chaque chambre sera vivant..." (the irregular columns force the imagination...if the distances vary in both directions without repeating motifs, the plan of each room will be alive...) (20) The plan of each room is also different from any other so that the students have a rich variety inherent in their environment.

Control of the housing stock may also be forced through economic incentive, such as Corbusier's workers' housing at Pessac. There, interior walls were left partially unfinished until after the houses were sold. In this way occupants were exempt from the 7% conveyancing tax levied on all finished housing. This also ensured that occupants had to take some responsibility for their environment by finishing the interiors of their homes when they took possession. Perhaps, too, this initial responsibility was the catalyst for the subsequent modification of the Pessac homes, all of which have undergone extensive change in their physical structure, by showing the inhabitants the ease with which they can manipulate their environment.

Another approach to control is through housing that
enables occupants to expand or contract their environment with a minimum of effort as their housing needs change. Prefabricated and modular houses initiate this type of control. Americans have been experimenting with prefabricated housing since the mid nineteenth century when Balloon framing taught craftsmen how to work quickly with pre-cut wood members. Mass production of pre-fabs didn't start until the late 1930's when war shortages forced rapid housing measures. In 1939, the Tennessee Valley Authority developed a house that could be built in sections, shipped over 60 miles economically, and assembled on site. While this sectional house was a response to immediate housing needs, it formed the precursor of a new industry of package design. Today companies such as Acorn, Inc. in Concord, Massachusetts, or TechBuilt homes developed by Carl Koch supply the market with package houses that can be bought in pieces, put together on the site, and expanded by additions of new modules at any future date. While they do supply the occupant with a complete, package home, they also offer a measure of control of the future housing envelope not readily available to most home or apartment dwellers.

Forcing occupant control of housing does not always succeed. Primarily unfinished apartments or homes are generally unacceptable to an American public that looks for finished products in its purchasing, often with an eye to future rather than immediate change. The large open spaces of the open-plan home are in conflict with American notions of privacy, spacial ordering, and the degree of "finish" required. Sommer noted that "Privacy for Americans is mainly a matter of visual protection against other people, but open plan housing is moving in the opposite direction." It is also difficult to force housing control in new areas without offering some guidance for its use. Large unspecified areas in homes are often viewed with dismay by potential occupants.


because of their lack of definition. With a little direction from a designer, these very spaces may enrich the occupant's housing environment by offering new directions and alternatives to conventional space arrangement.

Without some initial guidance, no new tool can be utilized to its fullest potential; and occupant control is to a large extent a housing tool. When Kroll was developing La Mémé, much of his work was spent in educating people to the possibilities inherent in their environment. Part of this education process resulted in large open spaces known as "les Granges" where students could fashion their own living environments collectively or individually as they wished. Without involving them in the process and educating them to the possibilities of such a space, though, such a new approach may never have been tried in the first place. Nor could it ever have succeeded as it has without this initial instruction.

**Adaptability/Flexibility: Change Over Time**

Equally important to housing control is the adaptability and flexibility of the housing stock - the ability of the stock to change over time.(23) Adaptable housing is a means of designing that enables buildings to change their use over time with a minimum of demolition to the structure itself. This is usually accomplished through structural systems that rely on large unobstructed spaces between supporting piers or columns. The use layout is then determined by lighter, non-loadbearing infill elements that can be removed or altered to fit new use patterns. Flexible housing applies the same idea of change over time but within a housing context. In this case, new occupants or existing tenants may change their housing environment with a minimum of disruption to themselves or their neighbors. A similar structural system

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is applied that uses structural supports with non-bearing infill elements. The infill elements are easily removed or altered by the tenants themselves or by the occupants with a minimum of assistance from building managers or personnel.

Currently, housing is designed around an image of the occupant rather than the occupant himself. If users are involved in the process, the results are often so specific to a given client and function as to prohibit future adaptation by new occupants without major internal changes. If the renovation required for new users or uses is too extensive, the building is frequently declared obsolete and destroyed to make way for new construction, often construction that repeats the same mistakes of excessive site or client specificity. One means of ensuring the adaptability/flexibility of a building is by utilizing a system of flexible, open-ended design. This enables occupants to change the character of their environment by controlling the interiors of their buildings. It also enables buildings to change use over time by making their interior layout flexible to future needs.

Flexible design often connotes a system of demountable partitions that can be moved by occupants to create individual spacial orderings in their housing. Many different systems of this type are commercially available, though the American market tends to delegate them to office use, preferring the more immobile and inflexible dry-wall and stud system. A flexible housing system may also be of a more unconventional sort. Standard housing employs basic "rules" for room function and design. These rules often thwart any attempts at flexibility and control by their excessive detail to conventional characteristics. Flexible design turns these rules into the opposite approach - e.g. where conventional standards would dictate spaces designed for one function only,
Andrew Rabeneck provided a list of ten criteria that define present housing design. The following cites that list and explores ten complementary criteria for flexible housing.

**PRESENT HOUSING DESIGN CHARACTERISTICS**

1. Spaces are generally designed for one function only and are difficult to use for any other purpose, e.g. sleeping
2. Room proportions are in keeping with intended room function
3. Rooms provided with function related fixtures and fittings, e.g. wardrobes in bedrooms
4. Lighting and socket outlets are located according to the plan function of the room, e.g. lighting related to bed position
5. Windows are designed to reflect the function of each room, e.g. small windows in bedrooms; larger windows in living rooms, with lower sills
6. Generally the provision of one living space only
7. Access to rooms other than the living room is by way of a narrow, minimal hall which cannot be used for any purpose other than circulation
8. Single door access to all room
9. Outdoor space accessible from living room only
10. Relationships between rooms generally based on shortest distance between associated functions. e.g.
    - kitchen next to dining room
    - bathroom next to master bedroom


**FLEXIBLE HOUSING CHARACTERISTICS**

1. Spaces designed for multi-use activities, accommodating more than one purpose whenever possible
2. Room proportions in keeping with several functions or rooms opened to each other to enable free flow of functions between space
3. Rooms provided with a minimum of function related fixtures e.g. wardrobes in bedrooms
4. Lighting and socket outlets located according to tenant needs
FLEXIBLE HOUSING CHARACTERISTICS, CON'T.

or in such a way to accommodate several functions but never solely in a position to accommodate only the "ideal" room layout

5. Windows are designed to provide light and ventilation and to accommodate a variety of activities in their vicinity

6. More than one living space provided through multi-use spaces

7. Circulation space is maximized to accommodate a variety of functions. Rooms accessed directly from each other without an intermediate circulation area

8. Access to all rooms may be through a variety of entrances - doors, openings, completely open wall areas to other rooms or areas. Rooms may have more than one access point

9. Outdoor space accessible from a variety of locations

10. Relationships between rooms are generated by occupant priorities - e.g. kitchen open to living area so the cook doesn't feel isolated, etc.
flexible design would utilize spaces where more than one function could occur in the same area, and so on.

In addition to providing an adaptable housing stock, flexibility can also be viewed as a market incentive. Most home buyers are primarily concerned with the rights and security of ownership. To them, a flexible floor plan is of secondary importance.

To the renter, on the other hand, flexible layout can be important as an extension of the very limited franchise he currently holds on rented property. Through the ability to create his own environment within a rented area, the renter can achieve in a different way some of the freedoms normally associated with ownership. (25)

Through flexible design, the renter and also the owner achieves a new dimension of control over his housing.

Problems arise from excessive flexibility of design. Americans unschooled in flexible design will not utilize this flexibility to re-arrange their environment. Similarly, Americans like to buy a finished product, and renters are not willing to put extra effort into homes they do not own. Even cultures that are accepting the advantages of flexible design are often hampered by flexibility in the system well beyond the normal amount desired or used by most occupants. At Les Marelles, a housing complex designed by George Maurios in France, flexible design led to a complex structural system that enabled occupants to plan their homes with a bare minimum of restraint. Ducts and conduits located in columns and along beams allowed outlets and fixtures to be placed anywhere.
The structural system at Les Marelles affords a degree of flexibility rarely found. Services are located in columns and beams. Because of this, space functions can be located almost anywhere within the structural framework.
in the apartments. Only plumbing was restricted to interior columns, but even that restriction offered some choice of location. This type of system eventually proved excessive in its design of the support services. People enjoyed the idea of planning their own apartments; yet they never needed the flexibility of services to the extent to which they were designed. Instead, excessive flexibility led to oversized beams and columns, loss of floor space due to these elements and increased costs for a system that has never been utilized to its fullest potential. Alternating service columns and beams with strictly structural columns and beams would have provided adequate flexibility while curbing costs and adding floor space.

Flexibility in design is important, but to a large extent the public must be educated to its use. At Les Marelles, users designed their apartments prior to occupancy. A model, a team of "experts," and several publications helped the occupants to understand and visualize their design decisions; yet the system has become flexible in its initial stages only. To date, few subsequent changes have been made to the homes. A better understanding of the long term use of flexibility may have generated a richer use of the process. People who really understand the advantages of a system often employ it to a greater extent to meet their changing needs. Many projects in Sweden and France have been developed with this attitude where occupants have responded positively.

(26) Most do not envision changing their apartments often, but the knowledge that they can change them with a minimum effort and disruption of their life style is valued highly. Also, the knowledge that, if a decision they make proves inconvenient it can still be modified later, is highly valued.
Flexibility

1 - service areas and storage
2 - living areas
3 - dining areas
4 - children sleep and play areas
5 - sleep areas
6 - work areas

People schooled in the advantages of flexible design will use it to suit their changing space needs. This example is from the home of an architect in Orminge, Sweden. In 1969(1), he and his family moved into the flat. In 1970(2), children areas were expanded and walls were removed to combine spaces. In 1971(3), their son started school and needed his own room. Private adult space was also needed. In November, 1971(4), the living area was expanded to open to the balcony and a new sitting area was added.
Important issues in housing design revolve around these four points of space, privacy, control and adaptability/flexibility. In order for the housing stock to meet an occupant's needs and satisfy his image of home, more effort should be made in the design process to facilitate the implementation of these issues. One method is to involve the occupant in the design process itself rather than educating them after the fact; yet Americans still shy away from this process in housing design. Colleges will occasionally enlist students to aid in dormitory development; yet by the time the dormitory is built, a whole new set of students whose priorities are often different from those students who were involved in the design team will occupy the completed building. In the public housing sector, occupant participation in housing design is virtually unheard of. This is because Americans have little basis for this new approach. The next chapter will examine a range of housing that involves occupant participation at all levels so that American architects will have a foundation for occupant involved design in multi-family projects.
Summary

The Market:

The current market approach is to scale down the levels of choice to fit the existing technocracy.

An opposite approach is to educate architects and occupants to use more levels of choice rather than less. Inherent in more choice are the issues occupants find most important in their housing.

General Considerations: Space

Americans culturally seek more than just minimum space. The American "dream" includes a single family home in suburbia, yet the durability of this dream is open to question.

Condominium developments help alleviate the conflict between private ownership and space implied only in single family homes.

General Considerations: Privacy

It is important that every person have some area within the home that is typically their own personal/private domain.

Americans have developed a system of spacial hierarchy in their homes in an effort to protect private areas from intrusion.
General Considerations: Occupant Participation

Individuals need to feel some sense of control over their housing.

Designers can easily thwart any sense of occupant control by over-designing a space with too many built-in artifacts; putting too much detail into a room; or supplying elements that dictate space use.

Designers can foster a sense of control through a brute-force approach of highly personal elements the occupants will want to change; using modular housing that can be expanded or contracted later; and educating people to the uses of control.

General Considerations: Adaptability/Flexibility

Adaptable design allows a building to change use over time.

Flexible design allows occupants to change the space configuration of their homes over time.

Flexible/Adaptable design is also a market incentive, guaranteeing buildings that may live through many generations of use and inhabitants with a minimum of disruption. They also enable renters to exercise many of the controls typically associated with home ownership.
Behaviorally, the designer builds for the way he himself would like to live or for the way he thinks others should live, rather than for the way others do live.

John Zeisel, *Architecture for Human Behavior*

In order for architects to implement occupant participation in the housing process or to at least better understand occupant priorities in housing, designers should have some notion of how such implementation has already been carried out; where it succeeds and fails; and to what extent and at what stage it should be employed for maximum benefit to both occupants and architects. For this aspect of the thesis, a range of housing projects was studied, all of which involved occupant participation and concern to varying degrees within a controlled space standard framework. Two projects, Les Marelles in France and Papendrecht in Holland, were studied that involved occupant participation in the infill aspects of the developments. Users were helped and encouraged to design their homes to suit individual and family needs. Corbusier's workers housing at Pessac, France was studied as an interim measure of occupant participation. There, the housing was architect determined; yet, over time, the occupants have extensively modified their homes to suit their own lifestyles. Finally, housing that uses strict space standards and contains fairly prohibitive restrictions as to modification by the occupants was studied. Despite the restrictions, the occupants of this housing type have succeeded in controlling their living environment through more flexible and transitory means. These examples concentrated on college dormitory environments at M.I.T. (1) and examples of elderly housing apartments analyzed in a study by Sandra Howell of M.I.T. (2).

(1) B. Ganister. "Public, Private, and In-Between. A study of dormitory residents' space utilization" (1978). Original research conducted at MIT analyzing space patterns, usage, territoriality, and personalization of McCormick Hall, an on-campus dormitory for women undergraduates.

Participation During Design

Looking at occupant designed apartments such as those found at Papendrecht or Les Marelles raises serious questions to the design profession. Here, especially at Les Marelles, one is confronted with housing units that are all different from each other; units that architects or developers would rarely, if ever, intentionally design. At Papendrecht, the apartments are more conventional in layout than those at Les Marelles; yet they still vary from the average apartments on Holland's housing market. The architect, Frans van der Werf, was required to submit apartment plans to the state in order to receive housing subsidies and before construction could commence. At that point of the project, the occupants had not yet begun apartment design. Therefore, he generated 200 potential plans for review by the building inspectors in order for the project to develop on schedule. In its final form, none of the occupants' apartments exactly matched any of the hypothetical plans, and each finished unit was different from any other there. The same was true at Les Marelles where no occupant designed units matched any other or any of the standard plans usually associated with apartment design. These two projects show that, given the opportunity to express oneself and some guidance in the process, any occupant will design housing highly receptive to his individual needs.

Architects have much to learn from this type of design. Even when occupant participation to this extent is impractical, an analysis of homes generated by this method may lead to decisions about housing that architects can use in future, non-occupant designed, homes. At Les Marelles, occupants' reasons for their design decisions were recorded during the process. These revealed an
When occupants are given control of their housing, they often create apartments that architects would never intentionally design. In this example from Les Marelles, the occupant has placed the entrance to the bedroom through the kitchen. When questioned, they responded that was how they wanted the space. The "odd" relationship did not bother them and has worked well for their family structure. Another family chose to design the daughter's bedroom as the largest in the home since she needed the space for a piano more than her parents needed the status of a "master bedroom."
interesting array of space priorities that may be applicable to more general housing design. In keeping with the first housing issue of a desire for more space, many people expressed the decision to buy floor space rather than room finishes. They felt their money was better invested in additional square footage since as time and money allowed, wall and floor surfaces could be upgraded later but additional room area might be impossible to purchase in the future.

The second issue, privacy, was considered by almost every occupant in the housing process, not only for themselves but also for the children of the family. Measures were frequently taken to ensure each child had some area of their own. When this resulted in very tiny individual bedrooms, additional children's play areas were supplied. In two apartments where children must share a room, efforts were made to visually split the space into two areas. One uses a column to divide the room into halves, yet the parents realized that natural light would be lacking in one half should the children tacitly claim separate areas. Another family sub-divided the children's room in two by means of a movable wall down the center of the room. Two entrances ensure that, should the children want separate though smaller rooms, each child may elect to have his own private domain. Many expressed the need for each child to have his own bedroom as an individual private space ("chaque enfant doit avoir sa chambre. Chaque enfant doit avoir son petit coin.").

Privacy between children and adults is also honored. Many apartments locate the parents' and children's bedrooms at opposite ends of the unit. Where bedrooms are located in the same area, another element will be inserted between parents' and children's rooms to define two separate regions. ("salle de bain marquant la séparation parents/enfants")


(4) Vernez-Moudon, 54.

(5) The following quotes are comments made by the occupants of Les Marelles during the design process.
In recognizing the need for personal space, the occupants of Les Marelles made special attempts to supply every family member with some area typically their own. Space constraints often led to innovative solutions especially for children. The occupants of apartment B used a movable partition so that their children could have the choice of one large room or two small ones. Apartment H used a column in the children's room to define two separate areas within the same room. Apartment C added a play area to supplement the tiny individual bedroom spaces.
Occupants of Les Marelles recognize the importance of privacy between family members. When bedrooms or private areas necessitated contiguous locations, some area or buffer zone (usually in the form of bath or storage areas) was placed between the rooms to separate parents and children.
This involvement with the housing process marks a level of control not normally available to occupants of multi-family housing. The fact that each apartment unit is different from the others in the project strengthens this image of control. Despite the differences it is interesting that several generalizations can be identified about the designs. While these generalizations may be specific to the French culture, similar analysis in an American context would reveal a set of informal rules about space for our own country perhaps even commensurate with those found in France. There, relationships between rooms followed a few patterns. Most felt it was important for the kitchen and entrance to be in close proximity to each other though not so close as to enter directly into the kitchen space. The kitchen was also treated as a separate space in almost all instances, but it was important that it have direct access to other areas-usually in terms of an open access without door to living or dining areas. One woman explained this as, "I'm bored in the kitchen...I don't want to be isolated." ("Je m'ennuie dans ma cuisine...Je ne veux pas être isolée.") Even those kitchens totally open to other rooms can be separated by folding doors or movable elements to ensure this idea of the kitchen being a separate domain located in conjunction with other areas.

Another generalization made in the plans is the desire of most to minimize service areas in their units in order to maximize living space. Kitchens, baths, and water closets are made as small as possible to accommodate larger living rooms; yet the occupants are cognizant of using other means to ensure against these smaller spaces becoming closets. Windows are frequently placed in both kitchen and bath to illuminate and extend the space. As mentioned before, kitchens open to other apartment areas to make them seem less constrained.
Many of these generalisations may be dependent on the French culture. Similar generalizations may arise from analysis of American occupant designed units; but these ideas should not be assumed as applicable cross-culturally.

Corridors pose a continual question to the occupants. The uses of them vary and any generalizations made solely from the plans would lead to statements about conventional single and double loaded design or the absence of the corridor by means of cluster arrangements. What is interesting instead are the comments made by occupants about their intentions for the corridor (or lack of it) in the design. One occupant designed a corridor that is 1.20 meters wide. His home accommodates two bedrooms, kitchen, and living room but no extra areas for privacy. He saw the corridor as a larger space so that it would not become a tunnel. A space for the children to play; additional room. ("pour ne pas faire boyau espace de jeu pour les enfants - pièces supplémentaires") Others became interested in Les Marelles because it offered an opportunity to abolish corridors completely ("supprimer les couloirs").

The greatest confusion arose from the smaller apartments, those with only two bays of the structure. People still felt the need to isolate bedrooms and have kitchens near the entrance; yet in feeling that each room had to be isolated from the others, they also seemed compelled to include a corridor ("chaque pièce doit être isolée, ce qui entraîne la nécessité d'un couloir"). Another occupant felt his living room to be too small because of the abominable corridor ("satané couloir"). This same person located his entrance opposite the living room but placed a wall and door - and hence hallway - to isolate the area; yet even after the fact, he still questioned his decision by asking if it was necessary to have an entry or could one enter the living room directly ("Faut-il entrer directement dans le séjour ou avoir une entrée?").(6)
Participation During Ownership

Most housing has already been designed and constructed without occupant participation. This needn't preclude subsequent user control. This level of control ranges from extensive re-design of structures such as the homes of Pessac, to smaller scale participation decisions such as furniture locations and room use. An analysis of these subsequent, often limited, occupant additions to constructed designs reveals many aspects of how users perceive their spacial environment; how they manipulate it to meet those issues important to their housing; and what designers should be aware of in creating housing without continuous occupant input during the design process.

An analysis of those projects dealing with predetermined spacial envelopes resulted in several aspects of space use and satisfaction germane to the housing issues. People tend to zone their living environment into a series of spaces. Even when as little as a single room was involved, such as in dormitory use, occupants would set up a system of areas within the room such that each area was utilized for a specific function. Residents also had some area of the room typically zoned for their own use when entertaining. This is a means of ensuring individual privacy in a tightly controlled region. Residents will protect this spacial ordering from becoming confused by insisting the specific areas be used only for the uses designated. No written code defines areas and use, but attitudes ensure their continuation. In one dorm, most residents tacitly agree that a maximum of five close friends or three lesser known people will be allowed in a room at any time. This helps ensure against people crossing function zones solely because of overcrowding. Likewise, guests who do crowd function zones and refuse
Students have very well defined zones in their dorm rooms. When asked to show where a resident is most likely to relax, eat, study, dress, and entertain visitors, all indicated specific areas in the room that they maintain for these functions. Areas for studying, relaxing, and entertaining often overlap due to space constraints; but these functions are never carried on coincidentally. In addition to these spacial zonings, most residents indicated some area of the room as being typically their own personal area when guests are present or when they want a place to relax.
hints to move to another region are shepherded out of the room - such as one resident who expressed annoyance every time someone leaned against her bureau for long periods since that was her dressing/wakeup area rather than an entertaining region. When confronted with such a stubborn visitor, she would find some reason to move to the floor lounge. (7) Elderly residents of studio apartments set up the same rules, though these usually revolve around sleeping and living areas, making sleeping zones taboo to all but the resident. (8)

Inherent in this system of spacial ordering is a sense of territoriality - the idea of defining the boundaries of one's space. "Territoriality, a basic concept in the study of animal behavior is usually defined as behavior by which an organism characteristically lays claim to an area and defends it against members of its own species." (9) Where home owners may add a fence or extend a porch, residents of defined spacial areas find other means to protect their territory. Within a dormitory, students lay claim to their environment by strewing books, clothes, and other possessions to the limits of their domain. (10) The zones within the room itself are a form of territoriality as well as a protection of individual personal space by dictating who may enter different areas of the room. Personalization also defines an individual's territory by asserting the rights of the occupant to control that particular space. (11)

Territoriality needn't be limited to the confines of interior space. Home owners legally possess outdoor space contiguous with their dwelling that they may use to assert their territory. Porches, balconies, lawns, stoops, all serve to welcome or exclude the world as the owner sees fit. Occupants of multi-family housing rarely have this additional zone. At most, these homes are provided with a balcony or small garden, but nothing commensurate with
Territoriality can be established without the protection of individual ownership. Looking again at the dormitory environment, students have established active territorial claims to areas beyond their individual rooms by their continual use and responsibility to these areas. The area immediately outside an occupant's door is generally understood to be within the territory area of that room. Other students will rarely linger in this area unless invited by the resident. Likewise, the resident ensures the continuation of this system by in some way personalizing this zone and seeing that the area stays well kept. Circulation routes reinforce this territoriality by being rigidly followed once established. The residents uniformly enter the floor from elevator or stairs, stop by the floor lounge, then continue to their own rooms past the rooms of any close friends on the floor.

The floor lounge poses an interesting contradiction. Lounges are used by each member of the dormitory living on the same floor. This would seem to indicate that they would be zones of group territoriality; yet most students expressed individual territorial inclinations toward the lounge. These lounges are also the most frequently utilized common areas of the dorm, probably because of this contradiction. Each member of the floor feels she has some claim to the lounge by being a member of the group allowed to use it, yet she also feels she must reinforce this claim through use of and participation in lounge activities. Multi-family housing should foster this sense of territoriality outside the apartment units through circulation areas that encourage individual control and common areas that belong to a well-defined group of people. This would supply the issues of larger spaces and increased control by giving additional space outside the units that could be shared and controlled by smaller
Students maintain active territoriality patterns through personalization and circulation routes. The area of the hallway outside a resident's door becomes an extension of that person's room. The student informally assumes responsibility for its decoration and upkeep. Others will rarely linger in this region unless the resident is included in the group. Circulation patterns also reaffirm territoriality and strengthen social ties. By repeating the same pattern, residents feel they have some claim to the area they traverse.
groups of residents, leaving the apartments themselves free for occupants' privacy and individual control needs.

Within dormitory housing or elderly apartments, small details often assume a greater importance than they might in occupant designed housing stock. At a very basic level, the furniture arrangement of a room becomes an important detail that residents can control. In single rooms or studio housing, the furniture provides zoning elements that create spacial ordering. These movable elements serve as screens for different areas, enabling studio apartments to become more analogous to one bedroom units.

The design of fixed elements takes on added importance, too. In both dormitory and elderly apartments, it was found that entrance areas command special attention. The entrance becomes a screening area for potential guests. Entrances that offer unobstructed views into the dwelling are unacceptable to occupants' needs. The resident sees this type of design as an invasion of his privacy by enabling anyone to visually invade the entire dwelling from the entranceway, thereby negating the whole concept of social and spacial hierarchy in the home. Occupants will often construct some kind of visual barrier near the entrance to protect their sense of privacy. Dormitory residents frequently move bookshelves or large pieces of furniture near the door to stop a person's visual access. Carried to its extreme, the visual barrier becomes a physical barrier as well. One student who greets anyone she does not know well at the door, has arranged her room such that someone passing by must enter, then maneuver around a large bookcase stacked with food, kitchen paraphernalia and other storage items before they are welcomed to the space. If they are met at the door by the resident and she makes no move to invite them further, the guest is unable to find any inviting spacial...
A way of controlling space in dorm rooms results from furniture arrangement. The rooms studied fell into three categories: Linear(1), compartmentalized (2), horseshoe - open(3) and closed(4). 3 uses furniture to create open areas within and direct visual access from the entrance. 4 uses furniture to block visual access from hall areas. 1 defines public (guest) and private areas as facing each other. The resident occupies one side and guests the other. 2 is categorized by some areas of the room being physically isolated from the rest. Usually the study area is separated by a bookcase with high elements on top to ensure visual as well as physical privacy.
Entrance areas serve to welcome or exclude visitors by the degree of visual access they provide. Unwritten dormitory "rules" indicate that an open door means visitors are welcome. A closed door implies the resident wants to be left alone. Some people, wanting to encourage welcome visitors while maintaining some sense of privacy, have used furniture to block views into their rooms (1, 2). Occupants of efficiency apartments in elderly housing projects (3, 4) are confronted with similar problems of visual access when people enter their apartments. Apartments with complete visual access on entering are rarely preferred in housing choice.
cues to suggest they venture further inside. The only cues readily visible all relate to the floor lounge and kitchen facilities - a hint that she would be more comfortable socializing with all but her closer friends outside of her room.

The same manipulation occurs with less prominent elements. In one dormitory example, a wide window sill provides the only fixed element that can be manipulated - the furniture is all movable except for a large built-in closet and bureau that offer little means of modification. This sill area is an extension of the room by being used as a bookshelf, plant stand, curtain, desk and any number of other uses depending on the needs of the occupant. Some even chose not to use it at all. In many ways, this sill provides an added territory that occupants may choose to control immediately or leave for some future modification as their space needs expand.

The location of a dwelling within a project is a detail sometimes skimmed in the design process, yet it plays an important role in how people perceive their space. Studies done with college students in overcrowded dorm rooms indicate room location and orientation may help alleviate crowded situations. Rooms that contain more windows or are light in color are perceived as less cramped. Likewise, the higher a room is in a building makes it seem less crowded, though not necessarily larger. Conversely, rooms with only minimum window areas, those dark in color, or those close to ground level are seen as more crowded and smaller despite equivalent square footages.

(14) Hall, 39-60.
Housing Modification and Standards of Acceptance

Studying the changes made to housing after occupants move into a home offers another area of consideration in the design process - that of the role established standards of taste play on acceptable housing design. In 1926 at Pessac, Corbusier sought to bring the new modern image of the international style to workers' housing. The residents of the area felt compelled to make analogies to other ideas. Referring to the houses as resembling a "Moroccan" style of architecture, the people sought to explain the new housing type. Similarly with the terraces,

The occupants found the terraces quite meaningless and, since it was imperative that they should have a meaning, they made this comparison with Arab architecture. For them, objects could not exist in their own right, they had to evoke other objects and so enter into a meaningful context.(15)

A new housing type had no place in their existence, but a new type that could be referenced to something already understood was acceptable.

A form that could not be rationalized by analogy to an existing situation necessitated modification by the occupants. Corbusier designed the Pessac homes with wall to wall window areas, yet not a single home retained this design feature. All have replaced these windows with ones of a smaller, more conventional type.

In their explanations the occupants advanced functional, rational and aesthetic reasons for having changed the original windows. But, although they always had some such argument ready to hand, in actual fact they were often motivated by quite different considerations which were based on established standards of taste. (16)

Forty years later some residents again began to consider re-modification to the wider windows, only being careful to term them "bay windows." In the time between construction and the late 1960's, society had time to accept, rationalize, and label the wider windows in a way that occupants could understand and even desire in their homes.

Any new ideas about housing need time to gain acceptance and understanding by the general public. Pessac is an example of something so new to the public eye that the occupants felt compelled to modify their homes in order to understand them. This initial modification proved the ease with which owners could change their homes and subsequently sparked a rage of re-design. Brian Taylor, in preparing an exhibition of the Pessac development for Harvard's Carpenter Center, was in error when he wrote,

one of the greatest assets of the project was its high degree of adaptability to changing needs as expressed in many physical alterations carried out by the users -- unfortunately not without considerable disfigurement of the
It is this very "disfigurement" that proves the adaptability of the project. Corbusier provided a willing vehicle for occupant participation in design by creating a housing type that has generated an active and continuous level of user response.

Other housing, in providing new expressions of lifestyle, have met with a more cautious response. In the sense of user participation, they have failed in an important issue of housing design. Homes designed by architects for single families often become tributes to that architect's ideas rather than reflections of a family's lifestyle and desires. A home designed for the parents of a friend points to this. The family agreed that they wanted a "modern" home; yet in conversations with the architect, several traditional housing images were seen to be valued. One of these was the importance of curtains to the wife as a symbol of privacy. The architect, though, convinced the family that curtains had no part in his design concept and that they would love the light and open feeling of their new home. Two years after completion, the woman still admits to not being used to the lack of privacy so much open glass evokes but claims she's getting used to it and likes it more and more. Looking into her bedroom shows the roots of her concern. There, totally out of character with the concrete block walls and the starkness of the room, are white lace curtains over the window areas. In the privacy of her own room, the woman had the incentive to exercise her right of control by bringing the new housing image back into the realm of a tradition she understands and values. In the rest of the house, she is still trying to accommodate herself to a new image rather than molding her home to suit her own needs. The house type - and probably the architect's insistence - have dampened the ability of
the occupants to exercise control over their environment.

Dissatisfaction and Design Issues

One result of the analysis was the realization that reasons for dissatisfaction in housing can be just as informative as those issues that meet the occupants' needs. One can see that when the issues of space, privacy, and control are minimized or lacking altogether, occupants will be dissatisfied with their housing. The college dormitory often shows all these flaws in the same environment. The lack of space in overcrowded rooms causes conflicts between roommates; interferes in students' ability to study; and infringes on their personal areas. This lack of privacy forces some to seek different housing. The lack of control over built-in furniture goads others into drastic measures such as the student at U. Mass.

Students polled at Berkeley cited the most common reasons for moving off campus as: (18)

1. dorms look too institutional
2. uniformity of patterns, rooms, etc.
3. suppression of individuality in rooms
4. suppression of individuality and group interaction in common areas
5. lack of individual choice

These same attitudes could apply to dissatisfaction with much of the multi-family housing being built today. Double loaded corridors and unimaginative design make many housing projects look institutional in character. Rubber stamped apartment plans and repeatable buildings create uniform patterns inside and out. Restrictions on control and modification suppress individuality within homes. An overall lack of communal areas other than

entries, circulation, and laundry facilities suppress both individuality and group interaction. Uniform apartment plans with restrictions for their modification limit any choice occupants may have about their housing.

Dormitory residents have the option of leaving, but occupants of multi-family projects are often more limited in their mobility. All the more reason to recognize these attitudes and design housing accordingly. If those elements that cause dissatisfaction in housing can be eliminated or modified to fit the existing level of housing acceptability, a better quality of design will be effected.

**Satisfaction With Smaller Space**

Despite the tendency of Americans to want more space in their housing, smaller areas may not be a major cause of dissatisfaction. More important that small space may be the way in which the space is used. In the examples studied, the spacial envelope for individual units is the same; but the treatment of space is different in every apartment. Occupants do not need the freedom of total control such as at Papendrecht and Les Marelles to create highly personal environments suited to their needs. Nor do they need unlimited space constraints to develop imaginative housing responses. The same can be accomplished within the framework of government supplied minimum standards, but certain criteria must be recognized for this to take place.

Primarily, the analysis has shown that one needs to give people the freedom and the means to express themselves in their housing. If occupants have this control, they manage to manipulate their housing to fulfill the other criteria important to their needs. Without this control, other aspects that fail to meet the issues
important to most residents are amplified and become sources of concern and constraint.

When minimum space standards are used, a few criteria should be followed to facilitate occupant control. Where possible, a minimum of built-in elements should be employed in the design so that inhabitants have the ability to manipulate their environment to its fullest potential. As few restrictions as possible should be made on space usage both in terms of pre-determined room functions and administrative determined modification restrictions. Attention to detail in the units could provide needed areas for personalization and extension while recognizing that excessive detail may lead to architectural monuments rather than areas for individual control. Finally, cognizance of room relationships, space priorities, and modification of traditional elements in occupant designed apartments may also be applied to architect designed units to facilitate the issue of control.

Indiscriminate application of the conclusions drawn in these two chapters to housing that relies on minimum standards is not enough to guarantee occupant participation. The application of the standards themselves may be enough of a hindrance to both designers and users as to negate the benefits of occupant control. Certainly, the richness of Papendrecht and Les Marelles indicates that using the framework of government standards can generate a varied housing stock. In America, though, a rigid interpretation of the standards as they are now inhibits such an approach. The next step is to evaluate the standards themselves in light of the previous occupant instigated analysis. Understanding how the standards evolved and how they should still be evolving to meet new concerns may facilitate this new occupant control in an American context.
Summary

Analysis of Housing Projects:

Examples of existing housing projects were studied that involved occupant participation and control in the housing process.

Occupants designed apartments that architects would rarely design but which suited individual needs exceptionally well.

Occupants often bought floor space over room finishes, realizing that finishes could be upgraded later as time and money allowed.

Occupant designed apartments resulted in a series of generalizations about space that can be applied to other non-occupant designed housing.

Occupants create zonings within their homes to protect their private/personal areas.

Occupants exhibit a range of territoriality inside and outside their home.

Small details assume added importance in pre-determined areas.

Established standards of taste play an important role in what the public will accept in housing. Introducing new standards may lead to greater control as occupants work to bring the new housing back into a realm they understand. It can also lead to inhibiting control by intimidating occupants with too
much change.

Dissatisfaction with a housing type can be as informative as reasons for satisfaction.

Smaller spaces may not be a problem. The way space is used is more important. The absence of built-in elements, minimum restrictions on use and modification and the ability to adapt the space to individual needs are more important than the actual square footage involved.
...immense opportunity costs or losses of potential investments are suffered by society when rigid housing systems impose inappropriate dwelling types and conditions.

John Turner, "Housing by People"

Minimum space standards have evolved as a means to protect the public from unsafe and unsanitary living environments that often result from uncontrolled land speculation and profit seeking building subdivision.(1) In an effort to ensure a reasonable standard of housing for the general public, first communities then the government began instituting a system of codes, regulations, and building standards to guarantee this minimum level of quality. As education and public expectations have come to assume at least this minimum level, the standards have remained frozen in their original intentions rather than changing to meet new areas of concern. Now, as occupants become more involved in the housing process, the standards should be re-evaluated and re-organized to accommodate this new issue. This chapter will look at FHA and HUD minimum standards for multi-family dwellings and suggest ways that they may be amended to facilitate occupant participation and control.

Evolution of the Standards

The establishment of minimum standards grew out of a need to protect the general population from poor housing conditions. America of the 1800's had no guidelines for housing quality. Immigrants provided a ready

market for any type of inexpensive accommodations. The result was a housing situation that had no rhyme or reason to its form except the necessity of housing as many tenants, and hence as much profit, as possible in the smallest amount of space.

Immigrant areas in Boston during the 1800's highlight this process. Boston is a city that grew from a series of land fills, each fill being characterized unto itself and only subsequently fitted into the city as a whole. The fill process guaranteed additional housing areas for immigrants and natives alike as the city's population rapidly expanded. The fill was carried out by individual firms, often with more than one firm working on the same area. In the Back Bay region, two firms, one a state agency and the other a private enterprise, simultaneously were given the land commission. At the end of 20 years, both firms had completed their contract, but neither had communicated their zoning intentions with the other. This resulted in many rambling streets and areas and one odd triangle of land that neither firm wanted - land that was eventually donated to the city to form Copley Square.(2) Haphazard land fill was supplemented with many existing hills and irregular contours, of which several were leveled to accommodate the fill process. These hills, coupled with sporadic and independent land growth, resulted in a system of irregular streets and plots. At one time this guaranteed spacious living and housing areas because of the unusual plot shapes; but subsequent immigration tides turned these areas into overcrowded slums.

Between 1815 and 1865, a series of pogroms, famines, and job shortages due to the industrial revolution in Europe started a wave of immigration to the United States. At the time, Boston's natural harbor served as a major port for the east coast. The city became a

(2) K. Lynch, private conversation.
S. Roboff. The North End.
primary immigration center. As new masses of immigrants either chose to stay in Boston or were forced to reside here for economic reasons, the housing market was called upon to expand to meet the growing needs. Irregular streets and land masses that had once characterized a system of commodious living soon became a speculator's paradise.

Every vacant spot, behind, beside, or within an old structure, yielded room for still another (dwelling). And eventually, to correct the oversight of the first builders who had failed to exhaust the ultimate inch, their more perspicacious successors squeezed house within house, exploiting the last iota of space. This resulted in so tangled a swarm that the compiler of the first Boston atlas gave up the attempt to map such areas, simply dismissing them as "full of sheds and shanties." (3)

Without the restrictions of codes or regulations, even developers of new buildings strove for profit at the expense of amenities. Sanitation procedures were virtually unheard of. An entire building would share a single courtyard privy while water was supplied from public wells. Light and ventilation were afforded to a lucky few located on a building's perimeter - if they were supplied at all. One housing development constructed in 1857 by Samuel Hooper consisted of two wooden buildings separated by a fourteen foot alley, each of which housed thirty-two sunless one room apartments while the alley between the two buildings contained the privies and water hydrants for the apartments. (4)


(4) Handlin, 103-104.
Speculation of this sort continued through the 1800's until two incidents provoked extensive evaluation of the housing system. The first, a series of fires in the late 1800's and early 1900's, showed how densely crowded and unsafe this type of building was. The second, the correlation between sanitation and health control after a series of tuberculosis epidemics raged through most American slum neighborhoods, sparked a series of crusades for better housing. Due to these factors, cities began evaluating the dwelling conditions of their inhabitants. Committees such as the Cambridge Housing Association and the Cambridge Anti-Tuberculosis Association, both formed shortly after the turn of the century, became self appointed building inspectors. They made extensive surveys of their city's housing factors, lobbied for better sanitation and buildings, and educated the general public as to the evils of triple decker construction, improper sanitation, and taking lodgers into the family home.

As a result of these crusades, most communities began appointing housing committees and planning boards. Cambridge appointed its first planning board in 1915 and in 1916 published its first proposed housing ordinance to regulate public building. The sixteen page report was the beginning of building codes for the city. (5) It outlined regulations for building type and classification; placement of buildings on sites; and criteria for light, ventilation, sanitation, fire and moral protection (in terms of lodgers, overcrowding, and "certain dangerous businesses"). At the heart of the ordinance was the beginning of building codes based on biological considerations - the necessity to protect the public from disease through natural light, ventilation and improved sanitary conditions.

The new ordinances curbed tenement construction for
only a short time. Soon land speculators and profit seekers began working within the building codes to develop a new form of dense housing via the development of the light shaft. This was first seen as a major improvement for urban dwellings. Such a shaft would provide light and air to interior rooms that originally would have been totally enclosed, but new problems arose from the innovation. Immigrants poorly educated in "modern" sanitary considerations used the shafts as garbage shutes and laundry areas rather than leaving them open and unobstructed for the light and air they were meant to provide. As the public began to realize the problems inherent in this idea, a new wave of interest was generated about the building codes. People now began to question how one could guarantee a minimum standard of quality in housing - one that provided healthy accommodations for any inhabitant.

In response to this concern, local and federal building codes and regulations were developed to assure a proper method of building construction, site planning, and space for inhabitants. These codes proved satisfactory until another wave of housing demand swept the country after the first world war. At that time, with the stock market crash of 1929 and the previous decision of the government to stop its housing policies in 1919, the housing market underwent serious trials. Mortgage foreclosures went from 68,000 in 1926 to 250,000 in 1932 (6) due to an escalating unemployment rate. Many citizens and immigrants alike found themselves homeless. The federal government, in the face of such pronounced housing problems, again began regulating the housing market, this time through government agencies created to ensure mortgage stabilization (HOLC - the Home Owners Loan Corporation) and to help create new homes for the skyrocketing market (FHA - Federal Housing Administration).
The FHA, created in 1934 to provide some financial guarantees to a declining market, succeeded well beyond people's expectations in its house-financing duties. When the Administration attempted direct intervention at the supply end of the housing market, the results were mediocre at best. Under a national slum clearance program, urban slum areas were to be demolished and new buildings put in their stead. The result of this program was that only 22,000 dwellings nation-wide were ever built. A program for municipally owned low-rent units was also only moderately well received. After these unsatisfying results, the agency's emphasis shifted back to its original home-financing programs and to a greater emphasis on building regulations. (7) It was these regulations that eventually led to the development of FHA and HUD sponsored minimum space standards for multi-family housing. Prior to 1950, these standards retained the original emphasis on health considerations of light and air.

In 1949, two behaviorist psychologists, Roger Barker and Herbert Wright, introduced a new theory into architectural design - that of architectural determinism or the ability of the built environment to shape, influence, or even control the actions of the inhabitants. (8) This theory gained widespread acceptance through the mid 1960's when massive urban slum clearance programs were instigated. At the time, it was believed that by removing the slums, one would also remove the social evils associated with them. Most cities suffered from this misguided notion. Boston's west end was demolished in the late 1950's to accommodate the current government center complex. Rather than ridding the city of a slum, what this accomplished was to destroy an active, thriving, ethnic community. Any "social evils" connected with the area merely spread to other sections of the city while the positive aspects of community

(7) Pawley, 41-43.

(8) Pawley, 86-87.
life were demolished with the buildings. (9)

A new area of concern was introduced in the development of minimum standards as a result of behavioral considerations. If an environment could determine a person's behavior, then some leeway should be provided in that environment to give people a choice of actions. Where possible, the "best" functional layout of a home should be determined and designed to facilitate the "best" behavioral responses. This led to designers being asked to show different furniture arrangements for rooms to indicate that the occupant had some choice over his environment. More rigidly defined functions for rooms were also instigated in the design process. A Parker Morris report of 1961 indicated this determinist approach as,

...the right approach to the design of a room is, first to define what activities are likely to take place in it, then to assess the furniture and equipment necessary for these activities, and then to design around these needs... (10)

The last addition to minimum space standards occurred around the time of Operation Breakthrough. Begun by HUD in May 1969, Operation Breakthrough was designed "to develop, test, and promote the best in technologically advanced systems for producing housing." (11) Interestingly, this new surge of industrial activity in housing also generated a new attitude toward the psychology of space. In designing industrialized homes, circulation space and room activity became a major generator of house form, so much so that HUD has since included circulation diagrams in their minimum space guidelines. (12)
HUD Standards

HUD has combined biological, behavioral, and psychological developments in their space standards. This example of row house design details light and ventilation criteria for combined areas, furniture clearances, and possible room use.
Why Re-evaluate

While the minimum standards have gone through a progression of biological, behavioral, and psychological considerations in the development to their present form (13), it is interesting that the results of their application and even the inherent meaning of the guidelines have changed little over time. A comparison of the 1971 FHA minimum standards for multi-family housing and the 1916 proposed housing ordinance for the city of Cambridge, Massachusetts, reveal little difference in the tenor of each document. The 1971 standards state as their objective:

To provide building structures and facilities for a healthful residential environment having: (1) accommodations which provide space and facilities for living and housekeeping; (2) characteristics commensurate with the anticipated rentals; (3) adequate light, ventilation, and privacy; ...(14)(emphasis mine)

The 1916 ordinance also provided detailed articles to guarantee light, ventilation, sanitation, and privacy as their primary objective (15).

Specific criteria have changed little in the intervening years. The 1916 ordinance stated in section 24, Privacy, that in every dwelling access to living rooms, bedrooms, and at least one water closet should be provided without passing through a bedroom. The 1971 standards, in section M404 - 5.2, state that the only


(15) Housing Ordinance for the City of Cambridge, Proposed.
access from a habitable room or a bedroom to a bathroom shall not be through another bedroom. (16) An exception to this is given for one-bedroom units where access from a living area to a bathroom may be through a bedroom if marketability is ensured - an exception that causes much controversy when used, as people feel their privacy is invaded each time guests traverse their bedrooms. (17)

Likewise, room sizes have been expanded somewhat but not to a great extent. Rooms in 1916 were required to have a least dimension of 7'-0" and in 1973 were required to have a least dimension of 8'-0". Similarly, the 1916 codes required that every room should have a minimum of 90 square feet of floor area and one room should have not less than 150 square feet. Modern standards present a range of square footages, but generally only secondary bedrooms, habitable rooms other than living, dining, primary bedrooms or kitchens may have less than 90 square feet of floor space. A bedroom usually has at least 120 square feet (60 square feet per person), and living rooms range from 140 to 180 square feet.

When using these minimum standards, design constraints are maximized. The architect must meet biological, behavioral and psychological criteria in his design. Likewise he must follow minimum square footages, least dimensions, spacial arrangements, privacy screenings and any number of other restrictions detailed in the codes. For this reason, it takes a lot of talent and imagination to offer new housing types and ideas while working within the limitations of the standards. All too often, though, an "ideal" solution is found that meets the requirements. This ideal is then applied indiscriminately and repetitively to a range of multi-family projects until a new set of standards are introduced. This necessitates the generation of a "new"
solution but this new plan may vary little from the original.

In 1930, the second CIAM congress (Congrès Internationaux d'Architecture Moderne) published the results of their exhibition of "Dwellings for the Poor" - October 24-26, 1929. This book, Die Wohnung fur das Existenzminimum, catalogued European minimum standard multi-family housing projects that the congress felt constituted exceptional design within the minimum constraints. Comparing one such project, the Bloomsbury design built in the 1800's, with an example of "good design" published in the appendix section of the 1971 FHA minimum standards, one sees that the intervening years have made little progress in new directions. Given the difference of improved sanitation, the two plans are virtually identical in form, layout, circulation, and organization, showing that architects are concentrating on the limits rather than the possibilities of the standards.

Since the space standards have changed so little in their tenor and specificity and the designs generated from these standards seem frozen in their approach, a new type of minimum standard should be introduced to the design profession. Changing housing trends and greater emphasis on occupant concerns and participation in housing design and control, are overshadowed by the continued emphasis of biological and space considerations. The standards should be re-evaluated to facilitate these occupant issues and interaction and so that architects can use these issues to experiment in new directions, allowing the inhabitants to gain greater control over their housing while working within the context of minimum space.
Minimum Space

Two apartments cited as good examples of design with minimum space show how little designs have changed in the intervening years. The FHA plan, published in 1971, and the Bloomsbury plan, designed in the 1800's are similar in spacial organization, access, circulation, light and ventilation criteria.
### FHA Standards

**Minimum Room Sizes for Separate Rooms**

<table>
<thead>
<tr>
<th>Name of Space(l)</th>
<th>Minimum Area (Sq. Ft.)</th>
<th>Least Dimension</th>
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<td>LU with 1-BR</td>
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<td>120</td>
</tr>
<tr>
<td>OHR(4)</td>
<td>NA</td>
<td>80</td>
</tr>
</tbody>
</table>

1. **Abbreviations:**
   - LU - Living Unit
   - K - Kitchen
   - LR - Living Room
   - Kette - Kitchenette
   - DR - Dining Room
   - NA - Not Applicable
   - DA - Dining Area
   - BR - Bedroom
   - OHR - Other Habitable Room
   - SL - Sleeping Area

2. See section M402-4.2 of the standards.

3. Primary Bedrooms shall have at least one uninterrupted wall space of at least 10 feet

4. Other habitable room (OHR) includes rooms such as dens, music rooms, libraries, family rooms, etc. See section M402-4.5 for additional provisions.

---

Minimum space standards from the Federal Housing Administration, 1971 with 1973 revisions.
### Minimum Room Sizes for Combined Spaces

<table>
<thead>
<tr>
<th>Combined Space</th>
<th>LU with 0-BR</th>
<th>LU with 1-BR</th>
<th>LU with 2-BR</th>
<th>LU with 3-BR</th>
<th>LU with 4-BR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR-DA</td>
<td>NA</td>
<td>210</td>
<td>210</td>
<td>230</td>
<td>250</td>
</tr>
<tr>
<td>LR-DR</td>
<td>NA</td>
<td>240</td>
<td>240</td>
<td>260</td>
<td>280</td>
</tr>
<tr>
<td>LR-DA-SL</td>
<td>250</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>LR-DA-K</td>
<td>NA</td>
<td>270</td>
<td>270</td>
<td>300</td>
<td>330</td>
</tr>
<tr>
<td>LR-SL</td>
<td>210</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>K-DA</td>
<td>100</td>
<td>120</td>
<td>120</td>
<td>140</td>
<td>160</td>
</tr>
<tr>
<td>K-DR</td>
<td>NA</td>
<td>150</td>
<td>150</td>
<td>170</td>
<td>190</td>
</tr>
<tr>
<td>Kette-DA</td>
<td>80</td>
<td>90</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

### Access

<table>
<thead>
<tr>
<th>Only access from</th>
<th>to</th>
<th>Shall not be through</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Habitable room</td>
<td>Bathroom</td>
<td>Bedroom</td>
</tr>
<tr>
<td>b. Habitable room</td>
<td>Habitable room</td>
<td>Bedroom</td>
</tr>
<tr>
<td>c. Habitable room</td>
<td>Habitable room</td>
<td>Bathroom</td>
</tr>
<tr>
<td>d. Bedroom</td>
<td>Bathroom</td>
<td>Another Bedroom</td>
</tr>
<tr>
<td>e. Bedroom</td>
<td>Bathroom</td>
<td>Habitable room</td>
</tr>
</tbody>
</table>

In one bedroom living units only, access to the bathroom from the living room may be through the bedroom when marketability is assured.

A required bathroom opening directly into a kitchen is not acceptable.

An only bathroom shall not be located on a separate floor (full story height) from all bedrooms of a living unit.
In reviewing and making recommendations for the standards, several issues were decided at the start. It was assumed that the recommendations would be aimed at stimulating the process of occupant control over individual housing. These occupants were assumed to be primarily renters since once they buy a home, owners possess substantial control over their dwellings. Also the number of people who are able to afford individual ownership is declining. In Britain, "the number of people who earn enough to buy a house has been halved since 1964 by the rise in interest rates and by the side effects of inflation." (18) Condominium development in the United States enables some people who would ordinarily be renters to become home owners; but, as discussed earlier, condominium clauses still inhibit occupant control in much the same way as rental units.

The second issue concerning the re-evaluation was that recommendations would be made to the standards themselves and to the resulting design process rather than to specific designs generated from the minimum constraints. Work has already been done that concentrates on specific points of design in housing units. Sandra Howell's study of elderly apartments designed with HUD standards is one reference for this type of approach. This report supplies design considerations that supplement rather than supplant the standards. She examines individual housing designs and makes suggestions for their improvement. This section of the thesis will take the opposite approach. It will suggest ways to supplement the standards in order to improve occupant control.
Finally, it is not recommended that all the considerations be used at any time. They are meant as a reference as to what could be done in re-evaluating the existing documents. They could be used in conjunction with each other or separately; but they are primarily a part of the dialogue architects may use in supporting new housing techniques and new avenues of design.

The standards should allow for more flexibility within the house form and hence more occupant control and participation. As discussed in chapter two, the idea of flexibility in the housing stock helps ensure the continued use of the building over time by making it amenable to new users and to changing occupant needs. More importantly, it also ensures greater occupant control by allowing people to determine their home's layout and use. The standards should aid this notion of flexibility by encouraging construction systems that can change with changing needs and that cause a minimum of disruption to inhabitants and neighbors when the occupant decides to exercise this control. A section of the standards should explain flexible wall and building systems and their use. In this way both architects and occupants could better understand the possibilities inherent in flexible design.(19)

Initial design flexibility may be more important than spatial flexibility over time. The tendency of our culture is not to rearrange our environment to any great extent. The initial determination of our housing envelope and the knowledge that it can be changed at any future time is valued highly, even to the extent that people may be willing to pay higher rents than they may easily afford in order to obtain this flexibility.(20)
Flexible Building

The structural systems of Les Marelles (1) and Papendrecht (2, 3) lend themselves to the concepts of flexibility and adaptability. Supports are as small as possible with large unobstructed spaces between. Infill elements are light weight, non load bearing partitions that can be removed or modified easily as space needs change.
If occupants are involved in the design process, this initial flexibility (and often subsequent flexibility by making users familiar with the construction process) is guaranteed. Projects such as Papendrecht and Les Marelles involved future occupants in the design of their individual units. This ensured different types of spaces and increased occupant satisfaction with the housing type. The construction systems employed in each also provided for future flexibility. Bearing elements are columns or piers rather than rigid, space enclosing bays. The infill elements are lighter, non-load bearing partitions that are relatively easy to remove or modify. New occupants can easily change the interiors of their apartment or may even use totally different spacial envelopes than those determined by the original design.

Housing developments should supply a greater variety of units within the same project rather than repeating a single unit plan with one, two, or three bedrooms appended. Initial design flexibility can be accomplished through occupant participation by allowing individuals to design the interior arrangement of their homes; but this may not be the most practical means of implementing flexibility. Another means of ensuring flexibility of choice is through increased variety of the housing stock. If there is a greater range of housing types available to the market, occupants will be supplied with an increased sense of initial flexibility. By being able to pick and choose among many different housing types, occupants are still exercising their ability to control the type of home they want, to choose the plan best suited to their needs, and to use the flexibility of different housing units to "design" their future home.

So many architects of housing projects are content to repeat identical unit plans in order to save money
and time of construction. Others believe that designing for the average occupant implies a single "ideal" solution. Emile Aillaud, architect of La Grande Borne in France, justified his endless similarity of units as,

"The plans of the apartments were deliberately treated in a way that may seem conventional but yet, after reflection, they have appeared to be the most rational, for the population for which they were destined. Surely, the modernistic features such as continuous spaces, laboratory kitchens, suppression of service corridors, provide vague places of seductive imagery. But at the level of the HLM population, (public housing) and in the face of the multitude to house, it seems honest to give up these pleasures, in order to satisfy an "average." (21)

Papendrecht shows how wrong these assumptions are. The project used rules dictated by the Ministry of Housing and Town Planning to form 123 federally subsidized dwellings, all of which involved occupant control over the infill elements and active participation by the occupants in the housing process. (22) The result is a community that has no identical units and no apartments that conform to the accepted dwelling design for "average" users. In addition, despite this great richness and variety, the project stayed within time and money budgets for construction. The addition of variations to the housing types and of occupant participation in the process was accomplished without the usual need for increased time and monetary needs.

(21) C. Cousineau. "Four SAR Projects: Hollabrunn, Austria; Papendrecht, the Netherlands; Les Marelles, France; Steilshoop, Germany." Unpublished paper, December 9, 1977.

Occupant participation in the process automatically ensured a variety of housing types.

People themselves have proved that they dislike living in identical housing types. The occupants of Pessac have extensively modified their homes to suit individual needs and images. Even occupants of dwellings that restrict overt modification still shape their environments in ways different from their neighbors. Inside, inhabitants use various furniture arrangements; different colors and textures of wall coverings; and dictate different uses for rooms from those of other apartments. Outside, occupants also try to make their unit unique. Owners of row houses will paint their homes different colors from their neighbor's. Inhabitants of multi-family apartment buildings will adorn their balconies with individual symbols of personalization to connote separate, and different, apartment units. Despite the similarity of developments, occupants will try to establish their own versions of unique, individual, and different housing types. If the standards allowed for and even encouraged this type of construction, occupants would not have to spend so much effort ensuring that their home be different from their neighbor's, and could instead concentrate on their individual housing aims.

The dwelling units themselves should be provided with a variety of spaces to stimulate occupant participation. The analysis of occupant designed homes revealed that a variety of spaces are valued within the units. While all inhabitants used traditional types of spaces (kitchen, living, dining, bedrooms, etc.) rather than more unconventional open plans or undefined areas, they all treated space differently depending on their needs. Multi-use areas, circulation that accommodates other uses, and spacial territories were found in these
projects. Some inhabitants wanted to abolish corridors. Others tried to minimize service areas. All point to the need for a variety of spaces to accommodate individual concerns.

The analysis of elderly apartments points to another argument for diverse spacial areas within the home. As people grow older, they often become tied to their housing environment and specifically to their individual home. In this case, the architecture of the home should act as a visual stimulus to the occupant to prevent the dweller from becoming bored, depressed or restricted by his surroundings. (23) A variety of spaces within the home itself would afford a series of different environments for the inhabitants to occupy, personalize, and control to suit his needs. In this way, too, different spaces can accommodate different functions so that the occupant may move from one activity to another by going from one space to another within the home, ensuring a change of environment and stimulus several times a day.

This attitude needn't imply additional space. The inhabitants of Papendrecht and Les Marelles all worked within controlled square footages to determine these diverse spacial areas. Likewise, apartments for the elderly, though they should probably be larger than currently specified to accommodate more of the occupant's furniture and possessions than they are now able to hold, the space itself, by being somewhat cluttered and contained aids in the process of providing a visual stimulus to the inhabitant.

Some area should be provided so that the occupant may control his housing by extending his environment at a future date should his housing needs expand. Many people are forced to move from their present housing when their needs outgrow that particular dwelling or even when the lack of control over
Extension Area

Some area appended to a housing unit can serve as future housing space. Single family homes can convert decks to porches, screened porches, and rooms as space needs increase. Such a space also serves as a territorial and personalization area for the unit. Apartments can accomplish the same conversion through balcony areas formed for that purpose.
a unit forces them to seek more flexible accommodations. If the units themselves are provided with some means of future expansion, the life cycle of the housing stock for its occupants as well as individual control by those inhabitants would be expanded.

Such an extension space may be as little as the oversized window sill in the dormitory housing studied, or it could be as elaborate as a new module added to the sectional Acorn or TechBuilt homes. More often it takes the form of some exterior space that can be converted to interior use as more space is needed. Terraces, porches, and balconies all serve such a purpose. Even if these spaces are never modified to interior areas, they still serve to visually expand the habitable space. One occupant of Les Marelles called his terrace an extension of the living room or even a second living area for use during warmer weather. ("La terrace est à la fois un second séjour et un jardin.")

Such an extension space also serves to make smaller areas seem larger. Dwellings designed with minimum standards yet accommodated with some outdoor space appear to be larger by the addition of exterior usable floor space. Smaller rooms that open to an extension area seem to encompass some of that area as well as the limits of the room itself.

This area for future expansion or modification also helps ensure the adaptability of the building. If the units can be modified easily to meet changing uses and needs, the building is better able to adapt to new criteria for its use. Thus, a lesser number of buildings might become obsolete if they can adjust to new uses. Such an extension space would guarantee some adaptability (and flexibility) of design over time, and hence may ensure a longer life span of the housing stock.
Space standards should recognize the importance of personal/private areas for inhabitants. As noted in chapter 2, occupants have a well defined need for private areas in their housing. The standards, as they are currently written, fail to take this into consideration. Minimum standards are dictated around an "average" occupancy. One bedroom units imply 2 people, 2 bedrooms imply 3.5 people, etc. (24), giving an occupancy rate of 1.5 to 2 people per bedroom. Never do the standards imply one bedroom for one person. The result is that people are forced to share what is traditionally a private domain.

If the standards are re-evaluated to accommodate a variety of spaces in the apartment units or if they afford flexibility in the form of occupant participation, this need for privacy will be met. If, however, neither of these suggestions is implemented, another approach should be used. The standards should be designed to accommodate maximum occupancy criteria so that each inhabitant is guaranteed some space of their own. Or, if an average occupancy is still to be used, some additional area should be provided within the apartment to accommodate private space needs. Then, people forced to share bedrooms may still define personal areas in another area of the dwelling without infringing on traditionally defined space zones.

The standards should allow for adaptability of the housing stock. If buildings are designed to allow for change in use over time, more buildings will be able to weather the demands of different functions in their future. In this way, less buildings will become obsolete, necessitating demolition.

Designing for adaptability also implies the economic feasibility of future conversions. Much of this rests with the structural make-up of the building.
construction system that uses minimum areas for load-bearing elements with large, unobstructed areas between the structural members would be best. Infill elements would then be of minimum weight and substance and would be easily and economically removed or modified to meet new demands.

The structural system used at Les Marelles would suit an adaptable format. Columns supply both support and service elements, leaving large, open areas between supports. New uses would not be limited by pre-determined wet walls or rigid space enclosures. Instead, the new uses could locate anywhere and in any configuration within the existing structure. The infill elements at Les Marelles are easily removed or changed. These elements are composed of party walls similar to an over-designed American drywall partition and interior panels that are 50 mm thick and can be mounted in place by small integral jacks. While some demolition would be required to change the building's use, the cost would be considerably less than if a masonry partition were used or if structural elements consisted of closed, load bearing walls rather than point supports.

Within the standards, one section should detail how adaptability can be accomplished through structural systems and their use. By providing examples of different systems and how they can aid physically and economically in the adaptability of a building, more designers may be encouraged to try this new approach. Also, some thought should be given as to how older buildings can meet this adaptability criteria. If the standards examined this aspect of change over time, more of our country's older structures might be saved from obliteration.

Standards should encourage architects to try new dwelling configurations and occupants to exercise greater control by supplying
constraints of square footages by dwelling unit - square footages per occupancy - rather than square footage and minimum dimensions per room. In the existing minimum standards for multi-family design, space is determined by individual rooms rather than for the unit as a whole. Using current guidelines, living rooms, kitchens, baths, etc., are all dictated by a minimum square footage of floor area and a least dimension of wall length. This ensures a standard set of room types regardless of occupant desires. Housing design using a total square footage figure for the entire unit would give added incentive to architectural initiative and occupant participation and would result in a richer, more varied housing stock.

As seen in the comments from Les Marelles, people often are willing to make spatial trade-offs to ensure more floor space in areas important to them. Many occupants minimized service areas (bathrooms, kitchens, etc.) so that living areas and bedrooms would have more space. Different types of space were used in the process. Circulation spaces such as hallways were expanded to accommodate other activities of children's play areas or kitchens, or they were removed completely. Other areas took on more than one function such as living rooms with offices at one end, or living spaces that included dining areas or direct communication to the kitchen. None of the units included an open-plan arrangement, though. While people were eager to manipulate their environment to suit individual needs, all retained a sense of spatial heirarchies of distinct rooms or areas.

Perhaps dictating the minimum amount of total floor area for a unit rather than minimum floor areas for individual rooms would produce a richer housing stock. At Les Marelles, apartments each using equal amounts of the structure resulted in a diversity of dwelling types well beyond what apartments designed with individual room
When occupants are given control of their own living environments the results are a rich collection of unique homes. At Les Marelles, four apartments each using five bays of the structure have resulted in five very different solutions that are well suited to the needs of the occupants who designed them.
limitations would have supplied. By allowing people to determine their own spacial needs within a pre-determined boundary condition, the occupants were able to make space decisions highly receptive to their individual needs even though they were designing within the constraints of a government supplied space framework for multi-family dwellings.

Considerations for Re-evaluation

Re-evaluating the standards and implementing these suggestions is not a solution that can be accomplished immediately. Change is something that is usually accomplished gradually, with a minimum of disruption to the existing system. If the standards are to be changed to facilitate occupant participation and control, a few areas should be examined now to determine the impact of standards on different segments of the housing market and to decide how the standards can begin immediately to encourage occupant control.

Is it possible to design the guidelines in such a way as to minimize "ideal" solutions to the existing criteria, "ideals" that can then be used repeatedly in huge housing complexes that disregard differences of site and occupant in their repetitive similarity? Can the guidelines be formulated so that designers are encouraged to start thinking of new approaches to the housing issue rather than continually employing avenues of thought and process that are out of touch with present housing issues and occupant concerns. Occupant participation in the housing process does much to ensure that these issues are met and that unique dwelling solutions are employed in the different projects; but occupant participation by itself may not be enough to encourage new thought, especially when such participation is not...
used continually and the same standards apply regardless of the process involved.

In this case, the re-evaluation should go further in encouraging new design ideas. As the standards are currently set up, the basic tenor of the document as a whole rarely, if ever, changes in context. Instead, every few years the standards are reviewed and sections are deleted or expanded depending upon existing technological (structural, mechanical, etc.) improvements. This leaves the guidelines substantially unaltered in form and content. These standards originated as a guide to ensure minimum space and healthy accommodations for occupants of any dwelling type. Unfortunately despite changing occupant needs and concerns, the standards have remained faithful to their original intent. Even the resultant designs are similar from the 1800's to today. Since this is the case, perhaps the standards are not necessary at all in their present form. They answer to criteria established in the late 1800's and early 1900's, but say nothing to the concerns of today or the future.

As they are, the standards often fail even their most rudimentary code of biological control because the dweller does not always meet the "average" occupant of the written dictum. As an indication of this, minimum standards are designed around an "average" occupancy criteria rather than a maximum occupancy rate. In this case, 1 bedroom implies 2 person occupancy, 2 bedrooms - 3.5 people, 3 bedrooms - 5 people, 4 bedrooms - 7 people, 5 bedrooms - 9 people, etc. (25); but often economic, cultural, or social reasons turn this average occupancy into a much greater density. Condominiums in South San Francisco originally designed as one or two bedroom units meant to house two to four people are being bought by immigrant families. Often several families will pool resources to buy one condominium, live in it for three to four years,

(25) Davis.
M. Pyatok, private conversations.

H. Parrish. One Million People in Small Houses - Philadelphia (New York, 1913), 10. The same process of buying housing as an investment and to increase capital has been happening for years. In 1913, workers would often buy houses in groups to obtain capital for future, larger homes.

then resell as the market price increases. With the profit, they then move to larger accommodations. In the meantime, though, this unit meant for an average of 3.5 people may hold as many as ten or more in the same space. The occupants live a very monitored life in that they are cautious not to make any changes, mar surfaces, or damage anything so as not to affect the resale value of the dwelling. (26)

Overcrowding isn't always an economic decision. As discussed in the first chapter, Oriental cultures often view smaller living accommodations as the norm and are uncomfortable with larger areas. Because someone from this type of background immigrates to a western civilization does not necessarily mean they are ready to accept a western value of space. Almost any "ChinaTown" in the United States offers examples of overcrowding and high densities in limited areas. A valid argument can often be made that economic reasons cause the density, but the cultural context of the setting should also be examined. If a person expects a certain amount of space in their culture and is used to dense housing situations, they may feel overwhelmed if confronted with more space and substantially lower densities than they have come to expect. A certain increase in space is almost always welcomed; but when the difference is more than twice the amount one is used to - as in the case of Hong Kong versus United States standards - the occupant may voluntarily choose a denser situation in order to slowly acclimatize himself to the new cultural values.

Likewise, most "ChinaTowns" or any strongly ethnic neighborhoods are located within very well defined boundaries of their cities. Once the communities begin spreading too far beyond these boundaries, they also tend to lose their rigid ethnicity. The same occurs if they allow outsiders into the region. Boston's North End
district faces this type of problem. A revitalization of the waterfront area has caused an influx of upper-middle and upper class young professionals of every ethnic background into the strongly working class Italian neighborhood. The harbor on three sides and the northeast expressway on the fourth define the North End area, preventing migration of the Italian populace into new boundary determinations. (27) The Italian section is being moved into a smaller and smaller segment of the North End, resulting in an increased density of the ethnic neighborhood. Rather than move, inhabitants of these strongly ethnic regions will accept the higher densities and smaller housing conditions in order to live with their friends and family of generation's acquaintance or, in the case of new immigrants, in order to live in a situation reminiscent of their homeland.

In situations like this, the application of minimum standards to a building area has little meaning. Those standards that accommodate the "average" have no conception of the overcrowding that results when several poor families act together to improve their status or when strong ethnic ties and cultural values allow higher densities than the guidelines are designed for. In this case, a greater amount of flexibility in the housing would be of much more use. Then, as density increased, the house form could change to accommodate the changing needs. Similarly, if the number of people occupying a dwelling should decrease in such a situation, the interior could be rearranged to allow more space for the remaining occupants.

Abolishing minimum space standards may not be the right approach either. If this were to happen, those most likely to be affected would be the poor and those in densely crowded neighborhoods since the middle and upper class population expects and commands a certain...
quality in their housing, part of which includes space. Removing the standards is not likely to affect this upper segment of society because, should this quality expectation not be met, the housing simply would not sell on today's market. Middle and upper class members are sometimes willing to make spacial concessions if the housing occupies a desirable location, offers exceptional "views", or has more than the expected amount of amenities associated with it - e.g. laundry, pools, saunas, tennis courts, etc. - but the concessions go only to a certain point after which the number of external enticements may not be enough to overrule too small of a dwelling type.

The poor or those tied to certain neighborhoods have no such leeway. While the rest of society can demand, to a certain degree, the type of housing put on the market for them, the poor are usually in the position of letting the market dictate their homes. Without the restrictions of minimum space guidelines, it is conceivable that the market could again follow the route of 19th century land speculators by increasing the number of dwellings while decreasing the unit size and then squeezing as many of these homes as possible on the smallest tracks of land. Sanitation education would probably prevent a return to the lightless, airless, hovels of the 1800's, but new technology could create a different type of blight in the super-block skyscrapers of modern design. (28)

In this case, a different type of re-evaluation would aid design using minimum standards for multi-family housing. If the standards are formulated to be more indicative of the user involved, the dense cultural and ethnic overcrowding of city neighborhoods might be alleviated. Most housing is designed with some idea of who the potential or actual client will be. Some guidelines could be provided in the standards of how to better
design for maximum rather than average occupancy when confronted with this type of client. Or, as stated before, a greater use of flexibility within the existing standard context could provide for various density situations.
Summary

Evolution of the Standards:

The standards grew out of a biological need to ensure light, ventilation, sanitation and privacy.

The standards included behavioral concerns in the 1950's when psychologists formulated the theory that the built environment shapes a person's actions.

Psychological considerations were studied in 1969 when circulation, room activity and furniture were added to space standards.

Despite these channels of thought, the standards have retained their primary emphasis on biological considerations.

The Recommendations:

The standards should allow for more flexibility within the house form.

Housing developments should supply a greater variety of housing units.

The dwelling units themselves should be provided with a variety of spaces.

Some area should be provided so that the occupant may control his housing by being able to extend his environment at a future date.

Space standards should recognize the importance of
personal/private areas for the inhabitants.

The standards should allow for adaptability of the housing stock.

Standards should supply constraints of square footages by dwelling unit - square footages per occupancy - rather than square footage and minimum dimensions per room.

Considerations for Re-evaluation:

Are the standards really necessary? They are designed to accommodate an average occupancy rather than the maximum occupancy often found in many communities.

The abolition of the standards would affect the poor but would probably have little if any affect on other segments of the population.

The standards should be re-evaluated to be more indicative of the user involved and to aid occupant participation and flexibility of design.
CHAPTER FIVE
We are seeking the future
We have traveled the old road for miles...

A. Kopp, Town and Revolution

The last four chapters have explored the issues people consider most important in their housing; have looked at existing housing projects that use occupant participation to accomplish these goals; and have examined how minimum standards for multi-family design originated and how they might be re-evaluated to facilitate occupant participation and satisfy these issues important to occupants in their homes. Each topic is a thesis in itself begging for further study and examination. Each has opened new fields of investigation and thought that helped shape a growing conviction about the standards themselves. These standards are a major hindrance to any new design approach by inhibiting architect and occupant interaction during the design process. In conjunction with the re-evaluation of the standards should also be an educational campaign to school architects, occupants, and administrators to use the revised standards and the resulting housing to their fullest potential.

The Education Process

To start this education process would be to in some way remove the stigma associated with minimum dwelling. When designs are formulated using minimum standards for multi-family housing, the implication is that the resulting units will be of a poorer quality than housing associated with the occupant's ideal. Minimum has come to connote high density, poor quality, and lower social
status than is intellectually desirable. (1) In actuality so called "luxury" apartments in prime real estate locations may only just meet minimum space requirements for square footage of the units. Minimum standards needn't bear the brunt of negative implications. As populations increase rapidly in specific areas, multi-unit minimum space designed homes may be a viable alternative to the expanding suburbs of today, especially if these developments incorporate measures for occupant participation in the housing. The tradeoff between less space with increased control may be enough incentive to put minimum design in a new light.

Increased occupant participation and control will necessitate the education of both architects and administrators (developers and regulatory agencies) that this participation needn't mean increased time and budgets and that occupant participation can be an integral part of the design process rather than an addendum to the fact. Papendrecht offers such a foundation. 123 clients worked with the architect to create as many unique dwellings within the project. The amount of diversity and the user participation had little effect on the building schedule. The project ran on schedule and within the projected time frame. (2)

Papendrecht also offers a unique education lesson to the architect. Despite such a huge amount of occupant input, the project is still very much the creation of the architect, Frans van der Werf. The facades offer a variety of colors and forms as determined by the users. Likewise, the outdoor spaces bear the distinct marks of individual control. These two things coupled with the individual dwelling layouts make the residents feel they have helped create their own housing. Yet, the project always reads as a coherent development, the successful product of the designer's efforts. Individual diversity

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(1) Deciding on Density (June, 1977).

Papendrecht

Papendrecht is an excellent example of occupant participation in the design process. Occupants had control of their individual housing units and of many of the facade elements. Despite the extent of occupant involvement, the project remains very much the creation and design of the architect. The occupant control added a richness to the architect's ideas and framework rarely found in a project designed by architects alone.
serves to add even more life to the region as a whole.

Les Marelles is not as successful in its results, though it does provide an equally enlightening education example of the pitfalls of participation. In this case, poor site selection and inadequate advertising campaigns confused prospective buyers. This particular housing concept is best adapted to an urban environment; yet it was constructed in 1975 in a semi-rural area 25 km outside Paris, thus requiring major commuting time for its clientele. The advertising also discouraged interested buyers who could not envision the concept of individual design. All of the ads focused on the theme of designing your own house (Aux "Marelles" vous achetez des m² et vous créez vous même votre appartement - At "Marelles" you buy square meters and create your own apartment). The site offered no clue as to how this could be accomplished. Maurios designed the structure and left the infill to its future occupants, the same concept as applied to Papendrecht; but Les Marelles presented only a skeleton for this future clientele. Van der Werf designed his housing in conjunction with the occupants such that when the project was completed, it was also fully occupied. Maurios designed and built his framework then had to rely on the new occupants to design around the existing shell. The result was that people, when confronted with this huge skeleton more reminiscent of a parking garage than a housing complex, were at a loss as to what the housing would eventually look like. While the concept of flexibility and complete control was seductive in the advertising, when faced with the fact of a monolithic support system, most people were unable to envision or plan their future home.

People need some sort of guide to aid their housing selection and design. In the case of Les Marelles, had a sample apartment been constructed at the site
Les Marelles used the same concept of occupant participation in the design process as Papendrecht but with very different results. Here, the structure never reflects the interior diversity of the units. The exterior presents an expressionless monolithic housing facade similar to many architect designed housing blocks.
illustrating the flexibility of the system, more people may have been induced to try the new technique. By virtue of example, they could have visualized how the concept worked. As it was, only seventeen apartments were actually owner designed. For financial reasons, the sponsor finished the remaining units in a more traditional manner so that marketing of the apartments could be escalated. At Papendrecht, the occupants worked on their units while initial construction was starting. These occupants were never confronted with a brutal, empty structural shell before they began design of their homes. They were part of the whole process rather than an addition to the technical completion of the architect's idea.

A third area of education would be to school occupants and architects in the use of flexibility. A section of the standards that outlines flexible structural and infill construction systems and their use could educate occupants and architects to what flexible design entails. By themselves, though, the guidelines won't offer enough of an example to stimulate flexibility. A complementary volume added to the minimum standards could be supplied to explain existing flexible design projects; the process that led to their implementation; how and at what stages occupants were involved; and where the projects both succeed and fail in their process and results.

The examples analyzed in this thesis offer a starting point for such a study in that both successful and unsuccessful examples were examined. Les Marelles points out the problems that are caused by excessive flexibility in the system. Costs are increased due to repetitively used oversized structural members; tenants are baffled by the open areas of the structure and are often unable to picture living in such a place; and the resulting apartments never fully utilize the amount of flexibility available in the design.
Likewise, another approach, the PSSHAK (Primary Support Structures and Housing Assembly Kits) projects in England, expose the opposite problem. While these projects are advertised as being a system of flexible housing for the occupants, they are actually very limited in their diversity. The theory behind this type of design is similar to both Papendrecht and Les Marelles: design a shell, then allow the occupant to determine his own living environment. In this case, though, the occupant's decisions are controlled. The "shell" consists of loadbearing brick cross-walls pierced "at strategic points" with openings for access or to increase unit size. The floor is cast in place concrete. Outside walls are cavity-wall brickwork with window openings. A pitched roof completes the form. Electrical and mechanical service points are pre-determined as are conventional radiator heating units. The flexible part consists of a kit of vertical ducts, partitions, doors, cupboards, bathrooms, and wc's that are put in place after the occupant determines the dwelling's layout. The shell is so constructed that the inhabitant is prevented from personalizing the facade of his home. Supervision during the planning of the apartment layouts prevent occupants from infringing on Parker Morris space standards for multi-family design. The excentricities of Les Marelles' solutions are not possible in this case because people are controlled by rigid space guidelines. The sizes of the units themselves are pre-determined according to these same standards. Fixed services already dictate most spaces, and solutions other than those conforming to acceptable Parker Morris designs are virtually impossible. The flexibility of the approach may only be an illusion of the designer. The expense of the system may not warrant such limited results.

Papendrecht exposes an excellent use of flexibility in the design process. By allowing occupants to formulate
their own housing units, the project offers a degree of occupant control rarely found. Unlike Les Marelles, the clients/occupants were selected well in advance of completion of the shell which ensured the project would be fully operational rather than trusting a fluctuating housing market. The shell also allows for future changes between units or for changes in use with a minimum of difficulty or annoyance to the inhabitants.

Another type of flexibility is when the house itself easily allows for changes over time to accommodate changing occupant needs. Pessac shows this where the community of worker's houses has been so modified over time that little remains of their original austerity. It is the housing type to a large extent that generated this modification by allowing people to change both interior and exterior elements to meet their own ideas of what dwellings should be. This original response has generated over fifty years of continual flux in the forms, showing that flexibility of the housing stock needn't be limited to one or two modifications over the life span of the building.

Educating the Administration

The agencies that administer the standards should be educated to encourage these new approaches to design. Re-evaluating the standards may not be adequate if the people who enforce them have no concept of the goals involved. Currently, the standards are a hindrance to new design. The American architectural profession is locked into conventional methods to the exclusion of all else, even to the extent that new ideas are often treated as heretical and branded as only for the unconventional of society. Our country has provided a rich background for experimentation in alternative life styles and the architecture subsequently generated from them. The
Oneidans in New York, the Inspirationists in Iowa, the Shakers in Massachusetts, all had their own version of Utopia and developed new housing types to match their ideals. Today's communes and cults continue this search for a better life and living style; yet our society generally disapproves of such endeavors because they do not conform to accepted life-style/housing types. No wonder that so little experimentation is being done here when the only reference to such is in a form contrary to our country's ideological standards.

Along more conventional lines, American housing is sorely lacking in experimentation. Most of the examples for flexible design and occupant participation come from European contexts. In our own country, it is the individuals who carry on new research rather than the market oriented developers of our multi-family homes. Any number of individual responses of new housing types can be found across the country. In recent years, a rash of books have made these isolated crusades against conventional design something of a cause célèbre (e.g. Handmade Houses by Art Boericke and Barry Shapiro, Shelter by Shelter Publications, All Their Own: People and the Places They Build by Jan Wampler, and any number of others). In larger housing units, new communes or those interested in autonomous living often pool resources to form new architectural types. Other than these individual efforts, our housing stock seems chained to conventional means and methods that are often strictly financially oriented.

By educating the agencies that patrol the minimum standards to new ways of design, more experimentation may be achieved in the United States market. The examples of existing projects and their use will start the process. A team approach to administration of the standards may also help. Currently, the housing process is divided

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C. Cooper. The House as Symbol of Self (Berkeley, 1971).
into segments of the architect, the occupant, and the administrator. The architect conceives the design; the administrator (the agencies implementing the standards) ensures that the design meets current market and government specifications; and the occupant eventually inhabits the result of the architect's ideas and the administrator's control. If the "administrator" consisted of a team of architects, occupants, and administrators to review and implement the standards, more leeway would be inherent in their interpretation. Likewise, if the "architect" consisted of the designer with a team of occupants and administrators to participate in the process, both occupant and administrator would gain a better understanding of new housing concepts and might more readily accept their use.

Educating the Occupant

Increased occupant participation and control can only succeed if all members of the design profession allow it to. Without help from architects in the design process and administrators in implementation, the occupants will remain solely a client for a finished product. Whether this will be the case, or whether occupants will demand more integration into the design phase, the education of the occupant is sorely lacking. By the time a person reaches an age to enter the housing market, he has had no schooling as to what to expect. His whole housing education has been the house or houses where he was raised, his neighborhood, and the homes of friends and family. It is rare that a person is exposed to house forms beyond his immediate cultural and economic heritage. As a result, people who find themselves searching for their first housing situation rely solely on this limited experience of house types.
To counteract this, the education of occupants should start much earlier than when a person first begins "house-hunting." Schools across the country teach home economics, shop, social studies and elective courses at grade and secondary school levels. In addition to a standard curriculum of sewing, mechanical drawing, etc., should be a segment on housing. What does a house/home entail? What are your expectations in a home? What type of house do you live in? What do you think of when one mentions an apartment, a brownstone, a high-rise, a Victorian...? What does the housing market offer? What are building codes and regulations? What can you do about your housing? And any number of other issues.

By exposing people early in their education to what they can expect from a housing market and how they can work to expand that market, they will be better prepared to participate in housing in later years. There is no limit on how soon this education should be started. Many communities are schooling grade school children to examine and explore their housing environment. Birmingham, Alabama, began a "Downtown Discovery Tour" for sixth graders in 1978 as "an architectural treasure hunt. Children are encouraged to search for decorative details, including cornices and terra cotta moldings, that distinguish the old buildings." (7) Other communities use similar means of letting children learn about housing. In Colorado Springs, children in the fifth and sixth grades began by studying wrought iron fences in their city and have ended by creating a field study course in 19th century homes. In Cambridge, Massachusetts, Vision, Inc., has produced an audio-visual introduction to the built environment for fourth through eighth graders. Termed "Street Smart," the package explores textures, patterns, and buildings as well as how these things change and how they can be preserved. San Francisco, Chicago, Savannah, and many other communities are also

(7) K. Burke. "So when's history class?" "You just had it," Historic Preservation (March/April, 1979), 36.
using walking tours, drawings and lectures in architectural
details to heighten children's awareness of the built
environment.

Children taught in this way, carry this awareness
through to later life. Most of these programs are spon-
sored by preservation groups in an effort to make children
understand the importance of older buildings so that, in
later years, they will think twice before they let these
buildings be demolished. The same type of program could
apply to the housing market, too. Children could be
taught about the different types of homes available to
them so that in later years they might be less eager to
condemn and more willing to try those homes different from
the ones they grew up in.

The End: A New Beginning

It would be nice to say, "Follow these recommendations
and all your problems of multi-family housing will be
solved;" but life is never so simple. There is no easy
solution to the restrictions of minimum standards. There
are no hard and fast rules or explicit results. This can
only stress a need for greater occupant participation in
the housing process; increased flexibility and control
over the housing stock; a re-evaluation of the design/
space guidelines; and a new education process for archi-
tects, administrators and occupants to make these recom-
mendations possible. This gives examples of how this has
already been accomplished and poses avenues for the start
of such an approach in our own country. With that, this
segment of the dialogue comes to an end. Hopefully it
will be continued in other conversations as more archi-
tects and designers join the search for new ideas to
expand our housing vocabulary.
Summary

The Education Process:

Architects, administrators and occupants should be educated as to the use and possibilities inherent in minimum space standards.

Examples of housing using flexibility, occupant participation and control that both succeed and fail in their efforts should be provided to architects and occupants to better understand and use these concepts.

Educating the Administration:

Housing experimentation in the United States is often regarded as suspect rather than as a welcome addition to a stagnating market.

The administrative agencies should consist of a team of architects, occupants and administrators so that each member can better understand new ideas within the framework of government space standards.

The architect should be aided by the administrators and occupants so that these latter two groups may better understand, accept, and utilize new approaches to design.

Educating the Occupant:

Occupants should be educated about the housing available to them and their role in the housing market before they enter that market.

The education process should be started in grade and
secondary schools.

Grade schools across the country have started this approach via preservation societies, educating children about the value of older structures.
In the fall of 1978, I conducted a study of dormitory resident's space utilization in MIT living groups that resulted in a study of how students organize and perceive space and what conclusions can be made that may apply to housing design. I was interested in testing the two hypotheses: that every person needs some form of a personal/private space in their dwelling and that people will start organizing and grouping the space within their dwellings to create hierarchies of space. Where spaces are very small, many functions may take place in the same area; but people will usually isolate one space visually or perceptionally for themselves to accommodate this need for a personal place. The dorm analysis was chosen for several reasons, not the least of which is the availability of many different rooms/dwellings to be examined easily. It also represents the necessity of housing a variety of functions within a single space. Dorms mark a person's first essay into living on one's own while still having some constraints of room and furniture.

The Dormitory:

The dorm chosen as a test case was McCormick Hall, an all women's dorm housing approximately 250 students on the west side of campus. It is a dual tower structure with a central court. Dorm common areas are found primarily on the ground floor, basement, and top floor of each tower. The two residential towers were designed in the 1960's. The west tower was designed and completed first. This tower is arranged in a corridor fashion. East tower floors are arranged in two suites which share floor access but have separate suite entrances. The west tower formed the basis for the study.
There are seven floors in each tower. The top and ground floors are reserved for common areas shared by the dorm as a whole. Each residential floor or suite manifests its own identity, and people tend to live on a particular floor or suite because it matches the life-style of the student.

Occupant Participation:

Here, the residents of two floors in the west tower were interviewed and the use of floor areas was observed. The floors were chosen for reasons of my familiarity with at least some of the residents on each floor and for their differences from each other — one being fairly outgoing and communal, the other being fairly quiet and individual.

The rooms offered a high degree of flexibility. Their only built-in furniture is a bureau and closet located against the entrance wall. Approximately 156 square feet (12' x 13') of usable floor space remain. The dorm supplies a standard range of furniture which residents supplement in various ways. Restrictions prohibit students from nailing objects to the walls, painting surfaces, or otherwise marring finishes; but residents do have personal options of decorating, using the furniture supplied or their own, changing the room arrangements, and even choice of room type and location. This flexibility enables students to begin ordering the space in their rooms to suit individual needs.

Three levels of spacial organization were studied: individual rooms, residential floors, and areas in the dorm shared by all. These yielded three concepts of organization: personal/private space, individual territoriality, and group territoriality. The personal/private space was always located within the confines of an individual's room but the two concepts of territoriality often shared the same areas and functioned simultaneously.
References:


Papendrecht

Papendrecht is a multi-family housing complex located in The Netherlands. Designed by Frans van der Werf, the project holds 123 occupant designed apartments within an architect designed/government approved framework.

The System:

Papendrecht uses a concept of private and public courtyards as a basis of the design. Each unit has two exposures, one to each type of court. The public courts are access areas. The private ones house garden and play regions. Pedestrian streets link the two. Vehicles are allowed only on street areas outside of either type of court.

Twenty to thirty dwellings ring a courtyard. These dwellings are made of concrete structural modules, 4.80 meters square. Support piers are .20 x 1.70 meters long and are separated by 3.10 meter spaces. The structure as a whole retains an east-west direction regardless of its relation to individual courtyards. Slanted roofs complete the structure which varies between two and four stories in height.

Occupant Participation:

Housing units were originally defined on the basis of municipal requirements. This resulted in 108 dwellings of two to five rooms each. As occupants were involved, this changed to result in 123 units.

Once occupants had determined where their unit would be located, they were free to start designing the infill elements. Occupants were provided with a basic design
sheet of their unit at 1:20 scale. The architect had two meetings with each occupant, about two weeks apart, where they would discuss the design sheet and the occupant's decisions. After the second meeting, finished drawings were made for the unit.

Occupants were free to design their living space to meet individual needs. The only restrictions to design involved party walls, service ducts, and stair location which were determined before this phase of the project started. All other infill elements were at the discretion of the inhabitant.

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Les Marelles

Les Marelles is a multi-family housing project located in the Val d'Yerres, France. Designed by George Maurios, it was originally meant as a project that enabled people to buy differing amounts of square footage depending on individual needs. Then, the occupants would design their own units. In actuality only seventeen units were ever completed using this concept. The rest were finished according to conventional reasons to speed marketing of the project.

The System:

Les Marelles uses a system of hollow concrete beams and columns with concrete slab floors. The hollow supports carry service ducts, enabling occupants to design their units with a minimum of restrictions. Columns are .75 meters square and are separated by 3.90 meter spaces. Infill elements are either a sturdy version of the American dry-wall system (for party walls) or light weight demountable partitions with integral jacks (for interior unit division).

Occupant Participation:

Occupants visit the site and select a square footage for their units. After selection and a small down payment the occupant has four weeks to finalize the design of his unit. A 1:10 scale model is used to enable people to visualize their units. Video tape records every design decision. And a price information package allows dwellers to understand the costs incurred in their design decisions. Sociologists and psychologists help the occupant at this point in the process. The architect does not enter again.
until the end of the design process. This resulted in units that were very different from standard architect designed homes. However, the units were highly responsive to individual needs and work well within that context.

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