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MOVEABLE INTERIOR WALLS

A Feasibility Study for Utilization of Moveable
Interior Walls in Military Quarters

by

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CONCEPT

"All people are builders, creators, molders, and shapers of the environment; we are the environment."¹

CHAPTER I

Introduction

As is the case in any situation where one commodity must satisfy the needs of many, military quarters fall somewhat short of the present day needs of military families, although the quarters do adequately meet the following physical criteria Amos Rapaport set forth for housing to be successful. Military housing is "socially and culturally valid,"² and in so doing mirrors the repetition and boredom that is representative of tract housing today. Housing should be "sufficiently economical so that the greatest number can afford it."³ In the recent past, this criteria was so well met by the low housing allotment that it was an economic hardship for many to live off base where equivalent housing cost much more. Now, with the increased housing allowance, base housing is not the bargain it once was, particularly for higher ranking officers. Adequate housing should "ensure the maintenance of the health of the occupants,"⁴ a requirement which base housing fulfills very well in the case of physical well being. The end result may not be quite so adequate in the case of mental health. The final objective Rapaport mentions is "minimum of maintenance over the life of the building."⁵ As a rule, military housing is well maintained, but due to the practice of always taking the lowest bid for materials and appliances (some of which the lower cost correlates

with lesser quality) the military sometimes pays more in repair and maintenance than if a medium priced but better quality item had been purchased.

But there is one objective that Rapaport fails to mention: for housing to be successful it must fulfill a individual family's need not only in physical dimensions, but in psychological areas. "Solutions to housing are much more varied than biological needs, technical devices and climatic conditions."⁶ Therefore, it is a mistake to act as though man were one thing and his house another. A man's home represents an intregal part of his personality, his perception of the world around him, how he will relate to others, and in some instances his ability to cope. "Man's sense of space is a synthesis of many sensory inputs: visual, auditory, kinesthetic, olfactory, and thermal."⁷ Military families vary greatly in age, size, background, interests, lifestyles, and by virtue of these variances have different spatial needs. There should be a basis in standardized housing to express these individual spatial differences so that the house truly becomes one's own.

Americans seem to have a dream house symbol that is not necessarily functional. It should be surrounded by trees and grass, and be private and isolated. The individual stresses novelty and change as an essence and fences symbolize security and prestige as well as privacy. It is interesting to note that even children who have lived only in apartment buildings draw single unit homes when asked to draw

a house.⁸ Although military families as a whole find the quarters adequate, and do many unique and interesting arrangements within the existing floor plans, many prefer to own or rent their homes to meet their specific needs and to further express their individuality. Families may sacrifice the convenience, camaraderie, safety, and maintenance of base quarters due to the lack of flexibility in design of existing housing. Off base housing is presently the only alternative to the problem.

The Problem

"If provision of shelter is the passive function of the house, then its positive purpose is the creation of an environment best suited to the way of life of a people . . . a social unit of space."⁹ With this purpose in mind, it is my contention that the installation of moveable interior walls in military quarters could do much to lessen the scope of problems faced by today's mobile family. Moveable interior walls would afford each family the means to individualize their "social unit of space," thus enabling them to better fulfill both their physical and psychological spatial needs.

Since there is a lack of proven theory in the area of spatial environment, and its effect on the individual involved in the space, the rationale for the problem is defined by the personal opinion of the author. After having lived in military quarters, the following problems have been identified: a need for space to fit the individual family's needs; a need for space to accommodate changing spatial and environmental needs; a need for space to pursue special interests; space adequate to utilize existing furnishing; and a space which takes into consideration various cultural and ethnic influences.

Individual family need

The first problem is a disregard for suitability of living space to the individual family's needs. Given the present housing allotment system, floor space and number of rooms increase with rank, and to some degree, with number of children. For example, a man with a son and a daughter is authorized a three bedroom house; whereas a family with two children of the same sex is allotted a two bedroom house unless the children are spaced five years apart. This effects mostly young families for floor space also increases with rank. By combining these criteria, rank and number of children, with luck and time of arrival on base, however, it is entirely possible for a Lieutenant with no children to occupy a three bedroom house while a Captain with two girls or two boys could be quartered in a two bedroom house with over two hundred square feet less living space. This situation is an obvious unfairness. One family is extremely crowded while the other probably has not furniture (nor need for it) to utilize their living area and are disinclined to buy sufficient furniture for the house since the situation could be reversed with their next assignment. Under the present system nothing can be done about the total floor space problem, but perhaps with the different design schemes possible with the introduction of moveable walls, the number and size of rooms could be changed to better utilize the area.

Changing spatial and environmental needs

Another problem every family faces is changing spatial needs within the family while occupying a single set of quarters. The military neighborhood as a whole is quite young with a much higher birthrate than a civilian

neighborhood, where young and old families are interspersed. The probability of moving in with one child and moving out with two or more is high. As the house can change minimally with the growing needs of the family, the family is either forced to move off base incurring extra expense and disruption of family life, or to endure the situation until a new assignment is issued. Since the trend is toward longer assignments, the period for enduring could become quite lengthy, and since any physical need is also a psychological need, it could be a real source of tension for the family members. Research done by Edward Hall shows that overcrowded animals suffer from circulatory disorders, heart attacks, and lower resistance to disease.¹⁰ There has been an increase in these diseases in recent years, possibly due to the population boom. The increase is due not only to overcrowded conditions at the community level, but are affected most by the prevailing conditions found in the individual family unit. Walls serve the purpose to screen us from overcrowding up to a point. Then, research shows us that when several individuals are crowded into one room, the walls cease to be a source of protection and press inward on the individual.¹¹ With moveable interior partitions, space could be divided in a way more meaningful to each family.

More leisure time

In later years, the opposite trend takes place. Families are faced with youngsters leaving home and areas of space are used intermittently or not at all. While this is not nearly the problem that increased family membership is, space could be better utilized if rooms could take on new dimensions. Existing bedroom furniture might be used in a small guest room and the added area provide space for increased communal living areas, new hobbies,

and other interests. The American family, especially the woman in this age group with decreased family and community responsibility, is faced with more leisure time than ever before, and the military family is no exception. In the military, jobs are often not eight to five or even on a regular schedule. Frequently there are long periods of work alternated with periods of complete freedom from from duty. Often the husband is completely absent from the family unit for a few days to a few months. To fill in some of this free time, space is often desired for a hobby or special interest such as painting, pottery, ceramics, crafts, woodworking, or sewing. While these diversions and pastimes add dimension to the quality of our lives, they also require considerable space and are more rewarding when the person can enjoy them in some degree of privacy. A special interest area is especially nice in the case of lengthy or messy projects that are disruptive to family life if the only available work space is the dining room table. More time can be devoted to actual pursuit of the project instead of wasting time getting out and putting away at each work session. In the instance of painting, where lighting is essential, a special area is a must.

Utilization of existing furnishings

Another problem facing families on the move is trying to fit existing furnishings into various sized rooms. It sometimes seems new quarters are deliberately designed to differ in dimensions from older quarters and a standard twelve by twelve foot carpet can not

be used in a ten by twelve foot living room without damaging or cutting the carpet. In the past, the practice has been to proportion furniture to the space available. Perhaps a more practical method in our transient society would be to proportion space to the individual family's set of furniture. If this approach to design were used, a family would be more assured of being able to utilize their living room furniture in the living room. If a family knew they would always have a given amount of floor space with which to work, and could utilize it however best suits them, they could plan their furnishings better than is now possible when floor space, room size, window height and size, and ceiling height all vary from move to move. Since the amount of floor space would increase with rank, families could plan future additions to their present collection of furniture without having to buy make-do furniture for quarters larger than their needs (or obtain whatever is available through the Housing Office) and could buy better quality furniture with the knowledge they would always be able to use their investment without it having to be stored. From an economic point of view, this more adaptive design scheme should be very attractive to the military family. Up to this point, the emphasis has been on the advantages of always being assured the possibility of having the same design scheme from move to move. As most husbands will readily contend, wives are not always satisfied with the same furniture arrangement, and frequently desire change. The same flexibility of design which offers security that the furniture will fit the dimensions of the room also offers unlimited design possibilities for the more creative and restive personality.

Cultural and ethnic influences

The last major issue which is ignored is the variable needs of different families. Just as families have different priorities for disposing of their incomes, so do they have different priorities for spending their living space. For example, in a single family house, there is a link between behavioral patterns and the form the house will take. Variations in eating attitudes dictate whether the home should have a dining room or a large enough kitchen to accomodate the family's dining. Recently, the trend is toward cooking and eating outside and a more casual attitude toward the majority of family meals.¹²

"Research has shown that people with different attitudes and ideals respond to varied physical environments in different ways. Responses vary from place to place because of changes and differences in the interplay of social, cultural, ritual, economic, and physical factors."¹³ For many years we have ". . . failed to accept the reality of different cultures within our national boundaries. Negro, Indians, Spanish American, and Puerto Ricans are treated as though they were recalcitrant, undereducated, middle class Americans of northern European heritage instead of what they really are: members of culturally different enclaves with their own communication systems, institutions, and values."¹⁴ It is important that these differences be preserved and self expression in their immediate environment is one of the most obvious areas which has been overlooked and undermined by standardized housing. In certain cultural and ethnic groups, particularly those of northern European descent, a good deal of privacy is desired and

even essential to the individuals health and state of mind. Other groups such as the Italian and Jewish sectors view the family as a closely knit group (this group extends out of the immediate family through relatives into the neighborhood) and much more communal space is desirable.¹⁵ While these cultural differences are evidenced mostly in strongly segregated neighborhoods in densely populated areas in civilian life, military neighborhoods truly are the melting pots of America.

If our own cultural differences are not enough, foreign influences are infused by overseas assignments, exchange programs, and a higher incidence of inter-marriages than the population at large. It is worthwhile to look at some of these national differences, and compare different cultures with whom we come in contact to our own at this point. For the sake of brevity we will only discuss the varying concepts of privacy in America, Germany, England and France. Americans find privacy behind closed doors: for conferences, private conversations, business, study, resting, sleeping, dressing, and sex. In America, the open door denotes availability.¹⁶ The German's carry privacy one step further by correlating privacy with visual contact. If you can see into his room, you are in his room and if uninvited, are violating his sense of privacy. Germans have a strong need for visual privacy. They regard open doors as sloppy and disorderly, whereas closed doors offer them safety and protection of the ego.¹⁷ The majority of English people (middle class and above) are still raised mainly in nursery situations. They may have a room of their

own for a time, but they do not really expect or need one. Therefore, the British do not require a working space or cubicle, as do Americans, but have developed an internal set of barriers to shut the world out mentally when privacy is desired. For the English, to be overheard is to intrude on another's privacy. In America, the privacy of the bedroom is mostly the women's prerogative; in England, it is the man's domain. The English male is also more fastidious about his clothes which is a complete role reversal in our culture.¹⁸ Cultural values such as these are likely to change over a period of time which reinforces the argument for more spatial flexibility. The French use their houses for their families only, and use the out of doors and cafes for entertaining. Homes are for the private use of the family, and are often crowded with privacy barriers less strict than in the other cultures mentioned.¹⁹ We "... learn from the study of culture that the patterning of perceptual worlds is a function of not only culture, but of relationship, activity, and emotion. Because of these differences, cultures often misinterpret each others behavior."²⁰ It is particularly important for members of the military community to be cognizant of these differences in our relationship with different countries for in our contact with them, living daily in their environment, we can do much to strengthen our alliances or to alienate our host country. These cultural differences and exchanges are part of the essence of military life and should be preserved and not amalgamated into a standard norm. The individual's concept of his spatial environment is a primary source of expression for these cultural differences.

Before ending the discussion of cultural differences, we should touch upon the two traditions of concentrated settlement, for they too affect the individual family unit and its concept of space. In the first tradition, the whole settlement is the setting for life, and the dwelling merely a more private, enclosed, sheltered part of the living realm. In the second concept, the dwelling is essentially regarded as the total setting for life, and the settlement as connective tissue, almost waste space to be transversed and secondary to the family living unit.²¹

Latin and Mediterranean towns are typical of the first type, and closer to home, the Italian, Jewish, Negro, and Puerto Rican segments of our society fall into the first category. Anglo-American cities are more typical of the second type with Los Angeles, where only houses and backyards are really used, being an extreme example.²² This concept of secondary space to be transversed shows strongly in our lack of urban planning and placement of railyards, junkyards, and other utilitarian concerns in reference to our living area.

These problems are diverse, yet are often inter-related, and while no one family incurs them all, it would be a rare instance if if a military family would not have been forced to cope with at least one of them.

Granted the military has a case for standardization in housing,

but the use of standardized elements need not produce standardized or monotonous housing. If a module is used as the standardized element, it can be used in a variety of design schemes. There are certain aspects of housing that could be standardized even more than is done at present; for example, ceiling heights, distance of the top of windows to the ceiling. If care were taken to always have the same height of ceiling and the same drop from ceilings to window tops, draperies would fit lengthwise, and panels could be inserted or deleted to adjust to varying window widths. Some elements of standardization give comfort, security, and dependability, and used in conjunction with moveable walls, would give a different house for each family's unique needs.

The military architect has conquered, to a large degree, the problems concerning the organization of a building to be functional, yet to be pleasing to the eye. However, the same architect often fails to take into consideration the total concept of space, and how it will affect the individual person, both indoors and out, at work and at leisure, and the effect of the product upon the sensory perceptions of not only individuals, but different segments of our society, and even our culture as a whole.

At this point, a psychological approach to design theory can make a positive contribution. In a psychological approach, materials, mechanical systems, even form and function to a certain degree, must be considered as secondary contributions to space, and the

primary concern: how it will affect the person and his ability to function in the given space. The theory does not seek to minimize the importance of the above concerns, but endeavors to inter-relate them to achieve the goal of defining space in such a manner that man may freely move, breathe, feel, and live in that space; a space in which he has been the ultimate concern--a space which he can dominate--not one which dominates him or makes him feel uncomfortable or insignificant.

Architecture should relate to the needs of man. Man should not conform to architectural trends. True, architecture will change as civilization and the functions of buildings become more complex, but care must be taken not to lose sight of the fact that the most dynamic definition of space will be one in which man can function, enjoyably and well, within the dictates of his cultural background.

Focus of the Study

This study will investigate the feasibility of utilizing moveable interior walls in military quarters to alleviate the spatial problems encountered by military families. Feasibility is usually defined as cost, design, maintenance, manufacture, and installation. However, in this study feasibility will be viewed as a two fold element. First, the prime consideration will be to assess the attitude of the potential users toward the idea of flexible partitions; and secondly, to evaluate their aptitude for effectively designing their own living space.

The first objective of the study is to ascertain if the attitude of military personnel is favorable or unfavorable toward the concept of moveable partitions in military quarters. Indeed, the first question to be asked is will the concept sell: will it be viewed as desirable by most military personnel? Will the reactions vary from senior grade officers to junior grade officers? Are younger families more or less receptive to the idea? Are moveable partitions viewed as a creative challenge or just one more headache to be endured during moving? Under what conditions do flexible partitions become useful or critical and for what types of people?

The next objective is to verify that personnel have sufficient aptitude and experience to design their own living space effectively, and to see if there is enough variation in design to warrant installation of flexible partitions.

The final objective of the study is to see if the flexibility of design offered by moveable interior walls will increase the desirability of military quarters.

It should be mentioned at this point that some families prefer to live off base for reasons not related to the quality of housing offered by the military. Reasons for such decisions include a desire to get away from military environment, restrictions, and regulations; preference to live in neighborhoods that are more diverse in age and occupation; location of housing in relation to schools; and, in the case of the working wife, in an area mutually convenient to both

working members of the family. Off base housing has become more attractive and feasible to many due to the increased housing allotment. Therefore, it is necessary that the military offer competitive housing comparable to the quality found in the surrounding area.

CHAPTER II

Method of Study

Sampling method

A random sample study was made by polling a proportionate number of the four groups eligible for base housing at Vance Air Force Base, Oklahoma: field grade officers, eighteen contacted; company grade officers, eighty-six contacted; noncommissioned officers, seventy-six contacted; and officers participating in the pilot training program, sixty contacted. The total population of the base is approximately one thousand working men, 73 per cent of which are married. The two hundred fifty interview schedules were mailed to one hundred twenty-five married couples which comprised 20 per cent of the personnel eligible for base housing. Of this figure, 32 per cent of the couples currently live in base housing while 68 per cent reside in the Enid area. The population percentages must be viewed as approximate due to the extreme mobility factor found in an Air Force base. The couples were selected by use of a random sample table, personnel Social Security numbers, and a computer. The return sample was comprised of: field grade officers, six returned (33 per cent); company grade officers, forty-eight returned (56 per cent); noncommissioned officers, fifteen returned (15 per cent); and student officers, sixteen returned (27 per cent). On base personnel return was 45 per cent as opposed to 28 per

cent for personnel living off base. The total sample return was 33 per cent. Since the return ratio was appreciably higher for on base personnel and company grade officers, the results of the survey are slightly biased in favor of these two groups.

Data collection method

The interview schedule was composed of a demographic section, nine closed-end questions, six open-end questions which were designed to measure the attitude of participants, and a design exercise to measure participants ability and desire to change their living environment. (See Appendix for an example of the survey schedule.) The questionnaire had the official approval of United States Air Force Headquarters, Washington, D. C., and was assigned Survey Control Number 74-29.

Vance Air Force Base was selected for the study area for a variety of reasons. Vance Air Force Base is not a representative base, but a rather unique one; therefore, it offered a more concise study situation for this particular survey. Vance Air Force Base is a small Air Training Command base which has a high proportion of young officers in the student pilot program. These young people by and large do not live in base housing at this time, but will as they pursue their careers, and should be the group most representative of future trends and attitudes concerning military housing. At the same time, since this group is so newly married, and limited in experience of coping with various

housing problems, they may also have the most difficulty adequately accessing future living situations. Vance Air Force Base also has over a two to one ratio of officers to enlisted personnel which is unusually high, but makes the majority of the over-all base population eligible for military housing. The base quarters are adequate at Vance Air Force Base, and fairly competitive with housing in the surrounding area, both economically and by standards of construction. The author has lived in the area for five years in four different locations, including base housing, and has first hand knowledge of the pros and cons of both living situations under consideration. But it is the actual construction of the quarters themselves that make Vance an ideal test base. The quarters are Capehart housing which means they have no interior walls that contribute structurally to the house which makes it a feasible base to actually test the theory.

Statistical Analysis Plan

The data obtained by the survey schedule was divided into eight independent variables: location, rank, age, sex, job, years of service, number living in house at the present time, and number living in home when you were a child; and one hundred eight dependent variables and coded to form a frequency distribution table. The computer program used to obtain the frequency distribution was CHISQ & LCHISQ. This program is designed to utilize data recorded

by observation to produce bivariate frequency tables and their related statistics which include cell percentages, expected cell frequencies, Chi Square, and probability. The data manipulation options include data listing, naming of variable categories, and reassigning of codes in the input data.

CHAPTER III

Discussion and Conclusions

The form the discussion of the data collected will take is a frequency distribution table of all the questions on the interview schedule and an analysis thereof. A Chi-square table for selected questions and demographic data will be included. Some questions in the survey were peripheral to the basic assumption and are not discussed in relation to Chi-square.

As can be observed from the Chi-square tables, few significant relationships emerged, and no one variable was significantly related to the basic questions asked. Therefore, the discussion of the Chi-square questions will be somewhat tenuous, but based on the results of this study, the following relationships can be argued.

TABLE 1
PERCENTAGE DISTRIBUTION FOR ALL QUESTIONS

Question	On Base		Off Base		Total ^a	
	%	N	%	N	%	N
1. Do you live on or off base?	43%	36	56%	47	100%	83

2. List advantages and disadvantages of living in your present home.						
<u>Advantages</u>						
1. Economic	58%	21	32%	15		
2. Proximity	89%	32	--	--		
3. Quality-Community and Unit	53%	19	--	--		
4. Quality-Community	--	--	57%	27		
5. Quality-Unit	--	--	72%	34		
<u>Disadvantages</u>						
1. Economic	14%	5	25%	12		
2. Unit Inadequacies	75%	27	43%	20		
3. Quality-Community	39%	14	--	--		
4. Proximity and Community Quality	--	--	62%	29		

3. To what degree are you satisfied with your present living area?						
1. Very Satisfied	19%	7	44%	20	33%	27
2. Satisfied	61%	22	33%	15	45%	37
3. Neutral	19%	7	17%	8	18%	15
4. Unsatisfied	0	0	7%	3	4%	3
5. Very Unsatisfied	0	0	0	0	0	0
<u>Explain why: Space</u>						
1. Very Satisfied	36%	13	36%	17	36%	30
2. Satisfied	8%	3	34%	16	23%	19
3. Neutral	25%	9	17%	8	21%	17
4. Unsatisfied	22%	8	12%	6	17%	14
5. Very Unsatisfied	8%	3	0	0	4%	3

^aParticipants could give multiple responses for certain questions. A total percentage will not be given in these instances.

TABLE 1---Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
<u>Explain why: Room Arrangement</u>						
1. Very Satisfied	17%	6	43%	20	31%	26
2. Satisfied	25%	9	40%	19	33%	28
3. Neutral	33%	12	11%	5	21%	17
4. Unsatisfied	22%	8	2%	1	11%	9
5. Very Unsatisfied	3%	1	4%	2	4%	3
<u>Explain why: Appearance</u>						
1. Very Satisfied	22%	8	47%	22	36%	30
2. Satisfied	44%	16	36%	17	40%	33
3. Neutral	28%	10	13%	6	19%	16
4. Unsatisfied	6%	2	4%	2	5%	4
5. Very Unsatisfied	0	0	0	0	0	0
<u>Explain why: Privacy Outdoors</u>						
1. Very Satisfied	3%	1	38%	18	23%	19
2. Satisfied	31%	11	19%	9	24%	20
3. Neutral	28%	10	21%	10	24%	20
4. Unsatisfied	31%	11	11%	5	19%	16
5. Very Unsatisfied	8%	3	11%	5	10%	8
<u>Explain why: Privacy Indoors</u>						
1. Very Satisfied	17%	6	62%	29	42%	35
2. Satisfied	47%	17	21%	10	36%	27
3. Neutral	25%	9	11%	5	17%	14
4. Unsatisfied	11%	4	2%	1	6%	5
5. Very Unsatisfied	0	0	4%	2	2%	2
<u>Explain why: Landscaping</u>						
1. Very Satisfied	11%	4	28%	13	21%	17
2. Satisfied	33%	12	30%	14	31%	26
3. Neutral	44%	16	15%	7	28%	23
4. Unsatisfied	11%	4	26%	12	19%	16
5. Very Unsatisfied	0	0	2%	1	1%	1

TABLE 1--Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
4. How do you foresee your family's size changing during the next five years?						
1. Larger	44%	16	70%	33	59%	49
2. Smaller	8%	3	0	0	4%	3
3. No Change	47%	17	30%	14	37%	31
5. In what ways do you expect the size of your family to be effected?						
1. More Children	44%	16	72%	34	60%	50
2. Children Moving Away	6%	2	2%	1	4%	3
3. Remote Duty	19%	7	13%	6	16%	13
4. Relatives Living with You	6%	2	2%	1	4%	3
5. Friends Visiting	6%	2	6%	3	6%	5
6. Live-in Household Help	3%	1	0	0	1%	1
7. Other	6%	2	6%	3	6%	5
6. Will your answer to #5 require alteration in your present living space?						
1. More Room	30%	9	51%	22	43%	31
2. Less Room	3%	1	0	0	1%	1
3. No Change	50%	15	40%	17	44%	32
4. Change Existing Rooms	17%	5	9%	4	12%	9
7. To what degree are you and your spouse social or private people?						
<u>Self Social Index</u>						
1. Very Social	0	0	2%	1	1%	1
2. Social	37%	13	32%	15	34%	28
3. Neutral	37%	13	40%	19	39%	32
4. Private	26%	9	21%	10	23%	19
5. Very Private	0	0	4%	2	2%	2

TABLE 1--Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
<u>Spouse Social Index</u>						
1. Very Social	6%	2	4%	2	5%	4
2. Social	25%	9	28%	13	27%	22
3. Neutral	42%	14	45%	21	43%	36
4. Private	25%	9	15%	7	19%	16
5. Very Private	3%	1	9%	4	6%	5
8. Where do you go in your home when you want to be alone?						
1. Kitchen	0	0	15%	7	9%	7
2. Living Room	14%	5	17%	8	16%	13
3. Bedroom	61%	22	55%	26	58%	48
4. Bathroom	8%	3	15%	7	12%	10
5. Den	19%	7	19%	9	19%	16
6. Outside	3%	1	4%	2	4%	3
9. What areas of your home are used the most?						
<u>Used by Adults</u>						
1. Kitchen	31%	11	28%	13	30%	24
2. Living Room	86%	31	72%	34	78%	65
3. Bedroom	31%	11	11%	5	19%	16
4. Dining Room	19%	7	21%	10	20%	17
5. Den/Study	11%	4	19%	9	16%	13
<u>Used by Children</u>						
1. Kitchen	6%	2	4%	2	5%	4
2. Living Room	69%	25	23%	11	43%	36
3. Bedroom	36%	13	32%	15	34%	28
4. Dining Room	17%	6	6%	3	11%	9
5. Den/Study	3%	1	15%	7	10%	8

TABLE 1--Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
<u>Used by Adults and Children</u>						
<u>Together</u>						
1. Kitchen	11%	4	6%	3	8%	7
2. Living Room	83%	30	33%	18	59%	48
3. Bedroom	8%	3	2%	1	5%	4
4. Dining Room	19%	7	11%	5	15%	12
5. Den/Study	0	0	17%	8	10%	8

10. In what areas do you most frequently entertain?

Close Friends

1. Kitchen	11%	4	11%	5	11%	9
2. Dining Room	50%	18	23%	11	37%	29
3. Living Room	86%	31	76%	36	81%	67
4. Den/Family	14%	5	11%	5	13%	10
5. Outside	0	0	2%	1	1%	1

Small Groups

1. Kitchen	8%	3	9%	4	9%	7
2. Dining Room	31%	11	17%	8	24%	19
3. Living Room	94%	34	76%	36	85%	70
4. Den/Family	0	0	4%	2	2%	2
5. Outside	3%	1	2%	1	2%	2

Large Groups

1. Kitchen	11%	4	11%	5	11%	9
2. Dining Room	33%	12	23%	11	28%	23
3. Living Room	81%	29	62%	29	72%	58
4. Den/Family	6%	2	2%	1	4%	3
5. Outside	8%	3	2%	1	5%	4

TABLE 1--Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
11. How do you usually entertain your friends?						
1. Cocktails	39%	14	32%	15	35%	29
2. Dinner	67%	24	77%	36	72%	60
3. Large Party	14%	5	9%	4	11%	9
4. Other	36%	13	23%	11	29%	24
12. Have you ever wanted to design your own home, or part of it?						
1. Yes	92%	33	89%	41	90%	74
2. No	8%	3	11%	5	10%	8
13. If you could add rooms to your present home, which rooms would you add and how large?						
<u>Room</u>						
1. Bedroom	33%	12	32%	15	33%	27
2. Den/Study	44%	16	43%	20	44%	36
3. Limited Use Areas	28%	10	34%	16	31%	26
4. Garage	8%	3	2%	1	5%	4
5. Storage	11%	4	9%	4	10%	8
6. Bath	22%	8	17%	8	20%	16
7. Dining Room	33%	12	26%	12	30%	24
8. Family/Living Area	28%	10	17%	8	23%	18
9. Basement	3%	1	2%	1	2%	2
<u>Dimensions</u>						
1. 0-99 sq. ft.	33%	12	29%	14	31%	26
2. 100-149 sq. ft.	50%	18	43%	20	47%	38
3. 150-199 sq. ft.	39%	14	11%	5	25%	19
4. 200-249 sq. ft.	8%	3	22%	10	15%	13
5. 250-299 sq. ft.	25%	9	11%	5	18%	14
6. 300-349 sq. ft.	6%	2	2%	1	4%	3
7. Over 350 sq. ft.	22%	8	38%	18	30%	26

TABLE 1--Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
14. What other changes to your house would you like to see made?						
1. Larger Interior Areas	36%	13	47%	22	42%	35
2. Outdoor Improvements	50%	18	26%	12	31%	30
3. Improve Interior Quality	56%	20	36%	17	45%	37
15. Would you be willing to make any of these changes yourself if the Air Force provided materials?						
1. Yes	69%	25	68%	28	68%	53
2. No	31%	11	32%	14	32%	25
<u>Identify Which Changes^b</u>						
1. Enlarge Interior Areas	28%	7	32%	9	30%	16
2. Outdoor Improvements	36%	9	14%	4	27%	13
3. Improve Interior Quality	28%	7	32%	9	30%	16
4. Any Within Capability	20%	5	32%	9	28%	14
<u>Will Not Make Changes^b</u>						
1. Time Factor	18%	2	7%	1	12%	3
2. Lack Skill	18%	2	0	0	8%	2
3. Military Restrictions	9%	1	7%	1	8%	2
16. Do you feel that adjustable interior walls could help create a better living situation for your family?						
1. Yes	69%	25	58%	26	63%	51
2. No	31%	11	42%	19	37%	30
<u>Why Favored^c</u>						
1. Adjustability	58%	14	77%	20	66%	34
2. Creativity	36%	9	27%	7	31%	16
3. Better Utilization of Space	58%	14	35%	9	45%	23

^bPercentage is based on number of positive and negative responses, not the total possible in each category.

TABLE 1--Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
<u>Why Not Favored^c</u>						
1. Physical Inadequacies	36%	4	42%	8	39%	12
2. Constraining in Space Available	55%	6	58%	11	56%	17
3. No Present Need	45%	5	27%	5	33%	10
17. Floor Plan ^d						
<u>Change Number of Rooms</u>						
1. Add Rooms	70%	19	37%	14	53%	33
2. Delete Rooms	11%	3	30%	11	22%	14
3. Change Traffic Pattern	52%	14	57%	21	55%	35
4. No Change	22%	6	30%	11	26%	17
 <u>Change Size of Rooms</u>						
1. Communal Areas						
a. increase	19%	5	32%	12	26%	17
b. decrease	44%	12	27%	10	34%	22
c. remain the same	37%	10	41%	15	39%	25
2. Private Areas						
a. increase	52%	14	44%	16	48%	30
b. decrease	26%	7	33%	12	30%	19
c. remain the same	22%	6	22%	8	22%	14
3. Functional Areas						
a. increase	22%	6	22%	8	22%	14
b. decrease	44%	12	65%	24	56%	36
c. remain the same	33%	9	14%	5	22%	14
4. Kitchen						
a. increase	--	--	--	--	58%	37
b. decrease	--	--	--	--	0	0
c. remain the same	--	--	--	--	42%	27

^cPercentage is based on number of positive and negative responses, not the total possible in each category.

^dPercentage is based upon the total number completing the floor plan, not the total sample. Sixty-four responded to the floor plan, nine-

TABLE 1--Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
<u>Privacy vs: Sociability</u>						
1. Communal Areas						
a. increase privacy	59%	16	65%	24	62%	40
b. increase sociability	30%	8	30%	11	30%	19
c. remain the same	11%	3	5%	2	8%	5
2. Private Areas						
a. increase privacy	41%	11	22%	8	31%	19
b. increase sociability	15%	4	24%	9	20%	13
c. remain the same	44%	12	54%	20	49%	32
3. Kitchen						
a. increase privacy	--	--	--	--	55%	35
b. increase sociability	--	--	--	--	9%	6
c. remain the same	--	--	--	--	36%	23
<u>Plan Execution</u>						
1. Detailed Plan	--	--	--	--	36%	23
2. Semi-detailed Plan	--	--	--	--	36%	23
3. Roughed-in Plan	--	--	--	--	28%	18
4. Disregarded Physical Properties	--	--	--	--	32%	21
<u>Plan Quality</u>						
1. Creative	--	--	--	--	32%	20
2. Transitional	--	--	--	--	46%	29
3. Standardized	--	--	--	--	22%	15
<u>Aptitude</u>						
1. Excellent	19%	5	3%	1	9%	6
2. Good	26%	7	24%	9	25%	16
3. Satisfactory	41%	11	46%	17	44%	28
4. Poor	11%	3	22%	8	17%	11
5. Unworkable	4%	1	5%	2	5%	3

TABLE 1--Continued

Question	On Base		Off Base		Total	
	%	N	%	N	%	N
18. Additional Comments ^e	--	--	--	--	41%	34
1. Suggestions	--	--	--	--	32%	11
2. Not Enough Space	--	--	--	--	12%	4
3. Felt Confined by Fixed Facilities	--	--	--	--	12%	4
4. Difficulty Visualizing	--	--	--	--	6%	2
5. Housing Adequate	--	--	--	--	9%	3
6. Admitted No Aptitude	--	--	--	--	12%	4
7. Explanation of their Plan	--	--	--	--	18%	6

^ePercentages, in this instance, are based on the forty-one per cent of the total sample who made comments.

Discussion of Percentage Distribution

Proximity was the most frequently mentioned advantage for living on base, with economic reasons being second. For personnel living on base, the quality of the living unit and the surrounding communal area was the least important reason for choosing military quarters. People residing off base, however, listed the quality of the living unit as the most important advantage for living in the surrounding area. While community quality and economic advantages were also important, the greatest single advantage to living off base was the choice of individual home selection.

Seventy-five per cent of the on base personnel polled listed the inadequacies of housing units as a disadvantage to living on base. Community inadequacies were mentioned frequently, while only a few saw economic disadvantages to living in military quarters. Off base personnel found the greatest disadvantage to living in the surrounding area was the distance to be traversed to reach base facilities and job location. A fair number found inadequacies in their living units and a lack of communal quality, while several found there were economic disadvantages to living in town.

On the basis of this distribution, we can hypothesize that people are presently living in military quarters in spite of their quality, not because of it. In overall satisfaction of living area, fifty-three per cent of on base residents rated themselves fairly well satisfied. However, eighty-three per cent of personnel residing off base rated

their area as satisfactory or above. These results demonstrate an awareness of the need for changing and improving their living area, but personnel seem to be conditioned to accept the limitations of standardized housing.

As is to be expected in a young sample, a significant number foresee future additions to the size of their family. However, less than half of those planning to enlarge their family felt they would require more room in their present home. They predicted they would make no changes or would utilize the existing rooms in a different way.

There was no significant distribution in the sociability evaluation question, nor significant variation in rooms used for privacy by on and off base personnel. As was expected, the living room was the most frequently used area, by both children and adults, with the bedrooms and dining areas next most frequently used.

There was no relationship established between location and the style of entertaining in the home. Both groups entertained most frequently in the living room, with the dining area the second most common choice. It is interesting to note that less than ten per cent of both groups chose to entertain outside which is a much lower figure than one would have predicted. Perhaps the fact that the questionnaire was received during November when the weather was inclement had a bearing on this variable. Inviting guests to dinner was the most popular form of entertaining; informal cocktails and miscellaneous forms of entertaining were distributed about equally; but very few couples gave large parties. Again, there was no relationship between choice of location and lifestyle.

The sample as a whole evinced a strong desire to design their own living area. Over ninety per cent expressed this interest, and nearly seventy per cent of the sample stated a willingness to make improvements in their present living area themselves if the Air Force would pay for the materials. Those not willing to make their own improvements cited the time element involved in such projects, military restrictions, and a lack of skill in this area, as reasons for their lack of enthusiasm. But most of the sample was willing to make such changes as enlarging interior areas, improving the quality of the interior, and any outdoor improvements that were within their ability. On base residents were more interested in outdoor improvements such as increased outdoor storage, enclosure of the carport area, more sidewalks, patio areas, and fences. Ideas for improving the interior quality included making the kitchen more private, painting, paneling, and wall-papering walls, different lighting fixtures, and adding fireplaces. Off base residents mentioned enlarging interior areas more frequently, specifically adding baths, dens, cabinets, and built-in features.

While the majority of the sample polled wished to increase their floor space, there was no one room mentioned appreciably more than any other. Bedrooms, dens or studies, limited use additions such as playrooms, workshops, or enclosed porchs, and separate dining areas were the most frequently mentioned. Only six per cent expressed a desire for more storage space.

As was anticipated, a significant number responded favorably to the concept of moveable interior walls, and the idea of being able to

manipulate their interior space at will. A higher percentage of on base personnel was receptive to the concept, though off base residents responded well also. Of the sixty-three per cent who responded favorably, sixty-six per cent saw advantages such as long term adjustability, i.e. adjusting room size to different families' needs as well as adjusting room size and number to fit individual family's changing needs; and short term adjustability to accommodate different situations such as relatives, guests, holidays, and entertaining. Increased creativity was mentioned by thirty-one per cent, and forty-five per cent noted that moveable walls could better utilize the space available. Of the thirty-seven per cent who did not favor adjustable walls, the main observation was not enough space in present quarters to adequately utilize them, while others objected to what they termed physical inadequacies of moveable walls, the prime concern being a lack of soundproofing. Yet another group, though smaller, saw no need for manipulating their present living space, and conjectured no further.

Of the total sample, seventy-six per cent participated in the design exercise, and percentages mentioned in this section are based on this figure, not the total return. Of on base personnel, seventy per cent demonstrated in their plan a strong desire to sub-divide existing living space. Since the Capehart quarters at Vance Air Force Base have no definite dining area, this was the room most frequently added. Off base residents exhibited a tendency to delete existing rooms, and in both groups, approximately fifty per cent changed basic traffic patterns within the house.

In comparison with the size of the existing rooms in the quarters, the tendency was to decrease the size of the communal areas slightly, and enlarge the area of the private rooms often sacrificing the size of functional areas in so doing. The overall percentage varied from sixty-one to eighty-eight per cent that did change the size of each area in some manner. It is important to note that fifty-eight per cent increased the size of the kitchen, while not one decreased it.

A desire to increase privacy in communal areas was indicated by sixty-two per cent, while thirty per cent increased the sociability of this area. Only eight per cent made no change. The private areas warranted less concern in this category as thirty per cent increased the privacy of bedrooms, and only twenty per cent increased the sociability index of this area. In the kitchen, fifty-five per cent increased the privacy of the area, while only nine per cent made the area less constraining. With this distribution in mind, it would seem the open bar area-kitchen design scheme, that is found in most Capehart housing, is not a popular plan. Open area kitchens are more feasible when facing an informal dining/family room, not the major communal area.

The physical execution and quality of floor planning ability exhibited by the sample was quite good in light of the fact the majority probably have little previous experience in this area. Creative design schemes were constructed by thirty-one per cent of the group, transitional schemes by forty-six per cent, and twenty-three per cent presented fairly standardized plans. However, it is important to remember that

even though a significant portion of the sample presented fairly traditional plans, the number changing the size of those standard rooms in some way represented ninety-two per cent of the group.

As could be predicted as representative of a random sample, a strong bell curve was achieved for the aptitude shown by the subjects. Excellent plans were presented by nine per cent of the group, twenty-five per cent constructed good plans, forty-four per cent of the plans were satisfactory in design, seventeen per cent were poorly planned, and five per cent were unworkable as drawn. Even so, some of the unworkable plans were also the most creative as the subjects ignored physical limitations and drew exactly what they wanted into the plan. With a little counseling, the unworkable plans could be turned into creative design schemes.

It must be noted that the designation of floor plans into the five aptitude categories represented a value judgment made by the author. The following criteria were used in making these judgments: creativity; feasibility of plan to family situation, i.e., number of children; a satisfactory flow of traffic and utilization of space; regard for physical properties such as windows, doors, and fixed facilities; and overall quality of plan.

Thirty-four of those interviewed were interested enough to offer additional comments which included suggestions for improving base housing, noted the lack of available space in existing quarters, mentioned feeling confined in design plan by fixed facilities, had difficulty visualizing the floor plan, felt housing was adequate as designed, admitted no design aptitude, or gave an explanation of their floor plan.

TABLE 2

CHI-SQUARE FOR SELECTED QUESTIONS AND DEMOGRAPHIC DATA^a

Question	Total	Location	Rank	Sex	Age	Job	Years of Service	Number in Household	No. Home as Child
Chi-Square									
	%	N							
16. FAVOR MOVEABLE WALLS									
1. Yes	63%	51	N/S	N/S	N/S	N/S	7.59033	N/S	N/S
2. No	37%	30							
Why Favored ^b									
1. Adjustability	66%	34	N/S	5.39931	N/S	N/S	N/S	N/S	N/S
2. Creativity	31%	16	N/S	N/S	N/S	N/S	N/S	N/S	N/S
3. Utilization of Space	45%	23	3.96544	N/S	N/S	N/S	N/S	N/S	N/S
Why Not Favored ^b									
1. Physical inadequacy	40%	12	N/S	N/S	N/S	3.74893	N/S	N/S	N/S
2. Constraint	57%	17	N/S	N/S	N/S	N/S	N/S	N/S	N/S
3. No present need	33%	10	N/S	N/S	N/S	N/S	N/S	N/S	13.42672
17. FLOOR PLAN ^c									
Aptitude									
1. Acceptable plans	78%	50	N/S	N/S	N/S	9.41938	N/S	N/S	N/S

^aAll χ^2 significant @ $P > .05$; N/S = not significant.^bPercentage, in this instance, is based upon 63 per cent favorable and 37 per cent unfavorable response.

TABLE 2--Continued

Question	Total	Location	Rank	Sex	Age	Job	Years of Service	Number in Household as Child
Chi-Square								
% N								
17. FLOOR PLAN--Continued ^c								
<u>Change Number of Rooms</u>								
1. Add rooms	53%	33	4.49875	N/S	N/S	N/S	N/S	N/S
2. Delete rooms	22%	14	N/S	N/S	N/S	N/S	N/S	N/S
3. Change traffic pattern	55%	35	N/S	N/S	N/S	N/S	N/S	N/S
4. No change	26%	17	N/S	N/S	N/S	N/S	N/S	N/S
<u>Change Size of Rooms</u>								
1. Communal areas	61%	39	N/S	22.08246	N/S	17.80611	N/S	19.15247
2. Private areas	78%	49	N/S	21.40179	N/S	17.94762	N/S	N/S
3. Functional areas	88%	50	N/S	N/S	N/S	N/S	N/S	N/S
<u>Change Privacy Index</u>								
1. Communal areas	92%	59	N/S	N/S	N/S	N/S	N/S	19.71581
2. Private areas	50%	32	N/S	N/S	N/S	N/S	N/S	N/S

^cPercentage, in this instance, is based upon the total number completing the floor plan, not the total sample. Seventy-six per cent responded to the floor plan, 24 per cent did not.

Discussion of Chi-Square for Selected Questions

Favoring moveable walls related to years of service

A preference for moveable walls seems to increase with the number of years spent in the service. Possible reasons for this could be a need and increased desire for more flexible spatial arrangements; families are complete, but changing needs may require either more or less area; and having gained more experience by coping with various housing situations, both on and off base, during different assignments.

Advantage of adjustability related to sex

Females in this sample expressed a stronger awareness of varying families' needs, changing needs within a single family, and seemed more willing to change their environment to meet different circumstances than did the male segment of the sample.

Advantage of better utilization of space related to location

On base personnel seem to feel that the space available in present quarters is not being utilized to the best advantage and that moveable walls could help eliminate this problem. Off base residents expressed the opinion that the design scheme was adequate more frequently than did those presently residing in the quarters.

Disadvantage of physical inadequacies related to job

Couples in the flight training program mentioned physical inadequacies

related to moveable walls more than did personnel permanently assigned to the base. They seemed specifically worried about the lack of solidity and soundproofing which they associated with moveable walls. Perhaps due to a higher percentage of them living in apartments with inadequate construction, soundproofing, et cetera made them more aware of poor design and its limitations, but less able to imagine good design schemes and varying structural components.

No present need for moveable walls related to size of family as a child

There is a relationship, it would seem, between the size of the family in which a person was reared, his acceptance of a given environment, and his desire to change it. Apparently, the larger the family size, the more easily one accepts the sharing of both communal and essentially private areas of the home.

Floor Plan: Desire for additional rooms related to location

The relationship between those living in base quarters, and those desiring to add a room to their present living area, is significantly high. This is perhaps due in part to the lack of a separate dining area in the Capehart quarters, and the generally crowded conditions of said quarters.

Floor Plan: Changing size of private and communal areas related to rank and age

There is a significant relationship between age and rank, and

changing the size of communal and private areas, but not necessarily changing the privacy index of either area. All groups tended to increase the privacy of communal areas. Apparently the younger segment of the sample increased the size of the communal area, then enclosed it; while the older portion of the sample simply increased the size of the private areas. Further, it is interesting to note the high correlation between the Captains and Staff Sergeants groups and the twenty-four through twenty-nine age group. A significant number in each group allowed the communal area size to remain the same, but increased the size of the of the private areas, obviously sacrificing storage and functional space to accommodate the needs of a growing family. The degree to which these four tables are supportive of each other evinces an extremely strong relationship in this area, and graphically illustrates the author's contention that there is an inherent need for each individual family to be able to manipulate their spatial environment.

Floor Plan: Changing size of communal areas
related to the number in household

Small families seem to have a greater desire for larger communal areas than do families with three or more children. This could be due in part to the higher percentage of younger families who presently live in small apartments; but, the implication is families composed of two to four persons prefer more room in which to be together, while larger families need more room in which to be alone. Larger families also

require more private space since the trend is away from grouping too many children in one room.

Floor Plan: Changing privacy index of communal areas related to number in household

Small families (two or three members) showed the strongest inclination to increase the privacy of communal areas. Medium sized families were fairly evenly divided, some increasing privacy, some increasing sociability, and the rest making no change. Larger families, composed of six or more people, tended to increase the sociability index of communal areas. When we compare the two tables, changing size of communal areas and changing the privacy index of communal areas, we find small families desire more communal area, but do not necessarily desire a more sociable arrangement of that area. Larger families, by necessity having less communal area with which to work, wish to make the area less constraining by increasing the sociability index. In both of these tables, the sample of the large family group is inadequate in size. In future studies, it will be interesting to see if the relationship remains the same.

Aptitude: Acceptable floor plans related to job

According to the X^2 table, only sixty per cent of the students polled submitted acceptable design schemes, none of which fell into the excellent category. Personnel permanently assigned to the base submitted a significantly higher percentage of workable plans. Perhaps this is

due only to a lack of experience, but it would appear a substantial number of students would require assistance in coping with spatial design schemes.

Conclusions

After considering the data, one finds the results demonstrate a felt need for individual manipulation of spatial environment. The percentage favoring moveable interior walls as an implement to achieve this end was sufficiently strong to indicate an awareness of this need and a definite desire to change the environment. Since the last portion of the survey consisted only of open end questions, it is important to note that the sample identified nine different situations in which they felt the moveable walls concept could help them develop a better living situation for their family.

These situations fell into three main categories: increased adjustability for varying family needs for both long and short term circumstances; increased creativity potential and individualized living area; and better utilization of space available, and fixed facilities, within the living unit. More than three quarters of the respondents that completed the floor plan design problem produced workable plans, many of which were fairly standard plans, but enough different in size and room arrangement from the current plans offered by military quarters to warrant the installation of moveable walls on a test basis after a satisfactory design for the wall has been conceived.

However, one must not forget the portion of the sample who did not wish to design their own living area. Perhaps a feasible solution would be to have housing units so constructed that a standard floor plan could be incorporated into it, and set up for those not enough aware of design problems and implications, or simply not interested in spatial design. At the same time, there could be housing available that offered unlimited design potential by having only fixed facilities in place, and give complete freedom of choice in placement of interior walls. For the larger group that fell between personnel who were creative and competent in dealing with design solutions, and those disinterested in the manipulation of interior space, perhaps walls with only dimensional mobility would be a good interim step. Basic traffic patterns, storage areas, and even the number of rooms could be already established, but by adding or taking away modules, rooms could be changed in size at will.

In summary of our concluding points, a need for varying spatial designs was both suggested and affirmed by the test group. The solution of moveable interior walls was predicated, and it achieved a high degree of acceptance. Personnel showed both sufficient aptitude and interest to adequately cope with the design problems logically expected in the concept offered for individualizing manipulation of the spatial environment.

Limitations of the Study

The main limitation of this study was a lack of time to pursue all the implications of the data gathered. The insufficient time element

was mainly due to problems encountered while trying to obtain official military permission to proceed with the study.

The second limitation of the study was the size of the sample. A poor return rate was received, possibly due to poor timing in sending the questionnaire, and the unavailability of military channels by which to send the interview schedule. Hopefully, the next situation in which this study is conducted will afford the opportunity to implement an interview situation in conjunction with the design scheme problem, thus eliminating any possible misunderstanding of the concept.

CHAPTER IV

Projected Studies Related to Concept

This thesis and study must be viewed as only the first step in realizing the goal of moveable interior walls in military housing. Other geographic areas must be studied; the design concept must be tested to check feasibility in present housing; and if not feasible, its usefulness will be confined only to future housing constructed by the military. The newer styles of Capehart housing could readily be converted to the more flexible design scheme, but many of the older structures and Wheery housing would not be economically feasible to attempt to renovate in this manner. Future studies could include various designs of the actual wall, and see what variations it would be possible to utilize. For example, could the walls be painted by the individual occupants; could there be a variety of materials used such as wood and plastic paneling, walls that could be wallpapered, have wainscoting, or half walls; what varying modules could be used to increase flexibility and still maintain a feasible amount of standardization? Will the cost be appreciably higher than standard walls used today, and if so, can the cost factor be overcome by easier installation and fewer maintenance problems? Or could recycled products (paper, wood, glass, et cetera) be utilized to provide an economical

product with a short term use, perhaps even for single occupancy utilization? Could the walls be designed in such a manner that installation could be handled by the occupant, or would the Maintenance Division be responsible for initial installation? For the concept to be most flexible, the walls should be so simple to move that the occupants could redesign their environment at will, and the requisiting of additional walls or the removal of unneeded walls an easy project, not involving excessive paper work and long waiting periods.

At moving time, moveable walls could greatly expedite matters. Presently, the house must be thoroughly cleaned by the occupants, then Maintenance comes in to make any necessary repairs and to repaint the interior of the house. By the time the new tenant moves in, the house is no longer clean. With moveable walls, the majority of the maintenance work could be done at a central area while the occupants can be cleaning the house more thoroughly and quickly without the encumbrance of walls. As repair work is usually minimal, the house would remain much cleaner for the new occupant. Since the same walls would not necessarily be used in any given house, walls would always be ready to install and the time lag from one family moving out to the next one moving in would be shortened considerably.

While this study is concerned only with military housing, moveable interior walls could be utilized in any situation of standardized housing where the function of the building is changed with increasing frequency. In addition to military housing, moveable walls could be

utilized in student housing on campuses; apartment complexes could rent by total floor space instead of by number of rooms; urban renewal projects would have a creative solution to cultural architectural differences; and office buildings would become much more versatile. With the increased mobility of today's society, the concept could be utilized in tract homes and even in custom homes, because no family's needs remain static, but are constantly changing. At present, renovation of housing by removing or changing permanent walls is very costly, and walls with a built-in removeability factor seem very feasible.

Adaptability of Concept

The concept of moveable walls is not new. The Japanese walls open and close as the activity changes, and the same space is used for different functions through the manipulation of semi-mobile screens. The American utilization of space relies on corners and edges to define space, and maintains a separate space for each different function.²³ The concept introduced in this thesis lies somewhere between these two distinctively different concepts of space. The walls are permanent enough to establish a secure spatial feeling, but are also mobile enough for man to change his spatial dimensions freely should the need, or mood, arise.

Moveable interior walls will add individuality to standardized housing by allowing unlimited design scheme possibilities. The fact that walls may be added or removed at will during the occupancy of a

given house allows the family to adapt their space to permanent needs such as the arrival of a new baby as well as such infrequent needs as additional flow of space for a large party. Probably no member of the family will appreciate the availability of fluid space as much as the wife who will now have the ability to control the design of her own kitchen.

The range of design possibilities for moveable walls is limited only by a lack of imagination and creativity on the part of the designer. In essence, moveable walls can be utilized in any situation where individual spatial needs dictate a change in the definition of a given space.

FOOTNOTES

¹Robert Sommers, Personal Space (Englewood Cliffs, N. J.: Prentice Hall, Inc., 1969), p. 7.

²Amos Rapaport, House Form and Culture (Englewood Cliffs, N. J.: Prentice Hall, Inc., 1969), p. 129.

³Ibid.

⁴Ibid.

⁵Ibid.

⁶Ibid., p. 46.

⁷Edward T. Hall, The Hidden Dimension (Garden City, New York: Doubleday Company, Inc., 1966), p. 171.

⁸Rapaport, House Form and Culture, pp. 132, 134.

⁹Ibid., p. 40.

¹⁰Hall, The Hidden Dimension, pp. 24-28.

¹¹Ibid., p. 175.

¹²Rapaport, House Form and Culture, p. 131.

¹³Ibid., p. 46.

¹⁴Hall, The Hidden Dimension, p. 173.

¹⁵Nathan Glazer and Daniel P. Moynihan, Beyond the Melting Pot (Cambridge, Massachusetts, and London, England: The M.I.T. Press, 1963), p. 54.

¹⁶Hall, The Hidden Dimension, p. 127.

¹⁷*Ibid.*, pp. 126-28.

¹⁸*Ibid.*, pp. 130-34.

¹⁹*Ibid.*, pp. 134-37.

²⁰*Ibid.*, p. 171.

²¹Rapaport, House Form and Culture, p. 40.

²²*Ibid.*, p. 46.

²³Hall, The Hidden Dimension, pp. 140-41.

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APPENDIX

Interview Schedule

The first section of the appendix contains a copy of the interview schedule (with cover letter) which was mailed to one hundred twenty-five couples at Vance Air Force Base.

Selected Floor Plans

The appendix also includes selected floor plans found in Capehart Housing. These were obtained from Vance Air Force Base Housing Office for the express purpose of comparing the original floor plan with the occupants design scheme to ascertain how much actual change of design occurred. Due to the time element, one floor plan was distributed to the entire sample. In future studies, every effort will be made to match the appropriate floor plan i.e., the dwelling in which he presently resides, to each individual participant which approaches the problem in a more realistic manner.

23 November, 1973

-54-

Dear Participant:

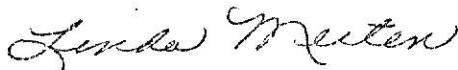
I am a student doing graduate work in Interior Architecture at Kansas State University and as part of my thesis project, am conducting a survey of 125 married couples at Vance AFB. This study has been authorized by Headquarters US Air Force and has been issued Survey Control Number 74-29.

The data collected in this survey is entirely confidential and will be used only by me in my thesis and by Survey Control personnel for the Air Force. The information that you are asked to furnish will remain completely anonymous and individual data will not be used as this is a data summerization, or group, study.

The topic of the survey is concerned with your feelings toward your residence. I ask that you please complete the questionnaire, place it in the enclosed envelope, and return it, by base distribution or personally to your Survey Control Officer, Lt. George Nigro, Quality Control in Personnel. If you have any questions as to the authenticity of the project, Lt. Nigro can be reached at extension 7500 or 7249. Additionally, I'll be in the Enid area November 29 and 30 to answer any questions.

Thank you for your effort and, as an Air Force wife, I hope the results will have some impact on future housing.

Sincerely,



Linda Merten

The purpose of this questionnaire is to assess personnel attitude toward alternative design schemes for military housing. The first portion of the survey will ask for information about your life style, and the last part will deal directly with your feelings toward certain design schemes. Your answers are very important for the completion of this study, so please answer each question completely. Both you and your spouse have a questionnaire. Please do not compare answers until after completion of both sections of the survey. Please do not change any answers as your individual response is very important. Any additional comments you wish to add at the end will be welcome.

Address _____

Rank (or spouse's rank) _____ Age _____ Sex _____

Job assignment _____ Years of service _____

Number living in house at present time _____

Number living in home when you were a child _____

1. Do you live on or off base? _____

2. Please list the advantages and disadvantages of living in your present home.

Advantages _____

Disadvantages _____

3. To what degree are you satisfied with your present living area?

(The numbers represent degree of positive or negative reaction. One is very positive, three is neutral, and five is very negative.)
Please circle one number in each category to indicate your response.

Very satisfied 1 2 3 4 5 Very unsatisfied

Explain why:

Plenty of space	1	2	3	4	5	Too little space
Good room arrangement	1	2	3	4	5	Poor room arrangement
Attractive appearance	1	2	3	4	5	Unattractive appearance
Enough privacy outdoors	1	2	3	4	5	Too little privacy outdoors
Enough privacy indoors	1	2	3	4	5	Too little privacy indoors
Enough landscaping	1	2	3	4	5	Too little landscaping

Other reasons (describe) _____

4. How do you foresee your family's size changing during the next five years?

- a. Larger ()
- b. Smaller ()
- c. Staying the same ()

5. In what ways do you expect the size of your family to be affected? Check appropriate answers.

- a. More children ()
- b. Children moving away ()
- c. Husband assigned remote duty ()
- d. Relatives living with you ()
- e. Friends visiting for extended periods ()
- f. Live-in household help ()
- g. Other _____

6. In what way will your answer to #5 require alteration in your present living space? _____

7. Some people enjoy spending much of their time alone and are considered private people. Others prefer companionship most of the time and are social people. To what degree are you a social or private person?

Social 1 2 3 4 5 Private

To what degree is your spouse a social or private person?

Social 1 2 3 4 5 Private

8. Where do you go in your home when you want to be alone? _____

9. What areas of your home are used the most?

- a. By adults _____
- b. By children _____
- c. By adults and children when they are together _____

10. In what areas do you most frequently entertain?

- a. Close friends _____
- b. Small groups _____
- c. Large groups _____

11. Do you usually entertain your friends by:

- a. Inviting them for cocktails ()
- b. Inviting them for dinner ()
- c. Inviting them for a large party ()
- d. Other _____

12. Have you ever wanted to design your own home, or a part of it?

13. If you could add rooms to your present house, which rooms would you add and how large would they be?

Room _____ Size _____

Room _____ Size _____

Room _____ Size _____

14. What other changes to your house would you like to see made?

15. If you lived in base housing, would you be willing to make any of these changes yourself if the Air Force provided materials?

Yes _____ No _____

If yes, please identify which changes: _____

The next two questions deal with the feasibility of adjustable interior walls, i.e. walls that can be painted and moved around to accomodate different family situations. They are not folding walls and their appearance will be similar to standard interior walls.

16. Do you feel that adjustable interior walls could help create a better living situation for your family? Yes _____ No _____

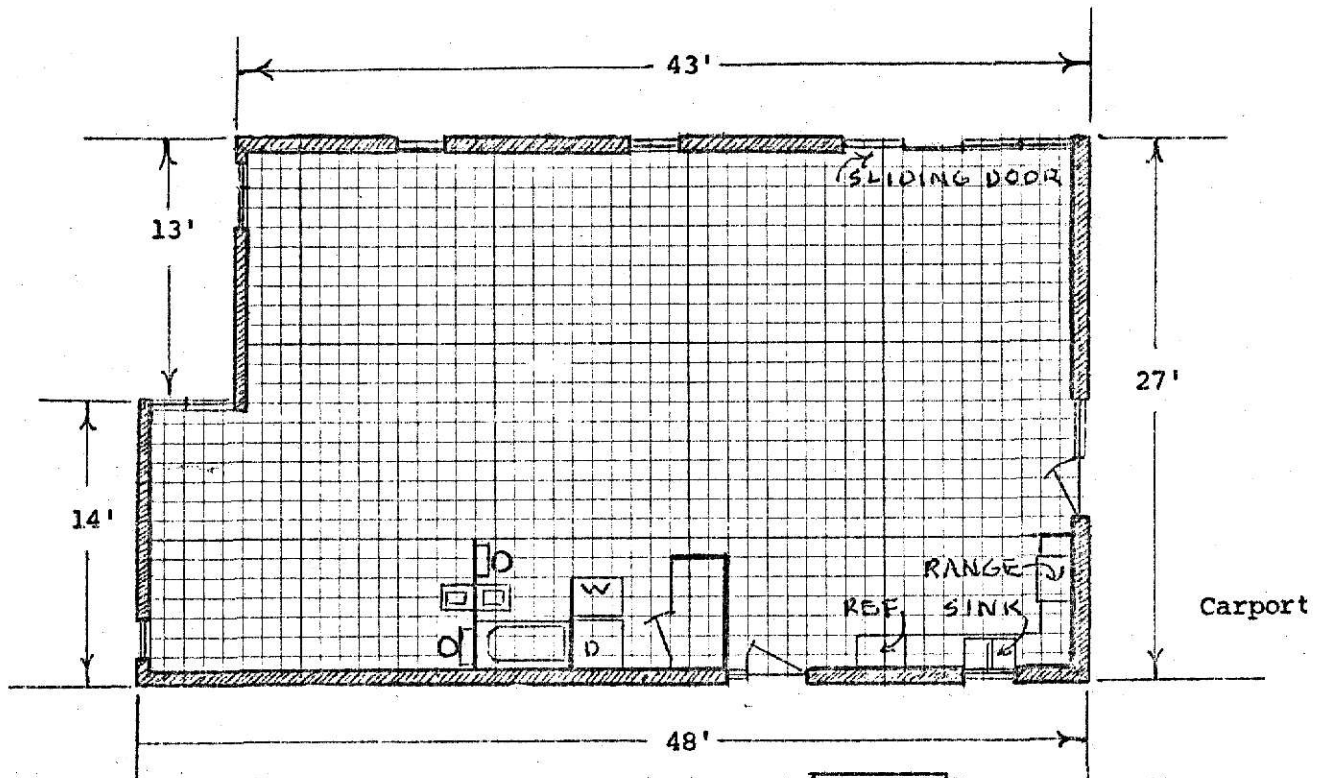
If yes, how? _____

If no, why not? _____

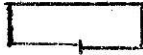
**THIS BOOK
CONTAINS
NUMEROUS PAGES
WITH DIAGRAMS
THAT ARE CROOKED
COMPARED TO THE
REST OF THE
INFORMATION ON
THE PAGE.**

**THIS IS AS
RECEIVED FROM
CUSTOMER.**

17. Here is a floor plan that is found at Vance AFB which shows only exterior walls and fixed facilities. On the plan, please draw where you would place interior walls to create a floor plan that is suitable for your family. Please do not change the size of the house or move walls that are already drawn in. One square equals one square foot. Disregard interior wall thickness and use a single straight line to denote walls. Please use a pencil in case you change your mind or make an error.



Total area: 1231 square feet

Closet: 

Wall: 

Normal depth: 2 1/2' - 3'

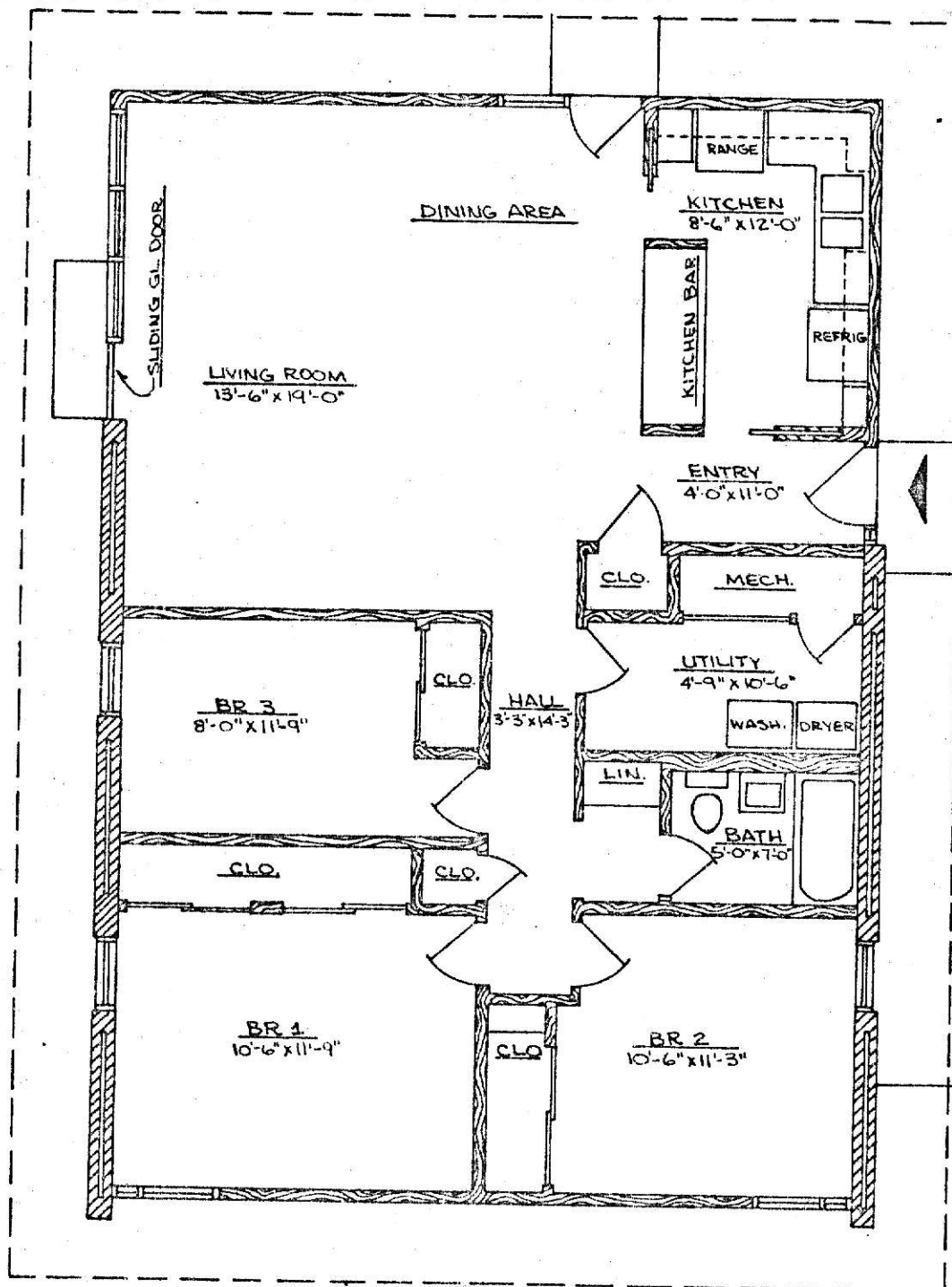
Doorway: 

18. Additional comments: _____

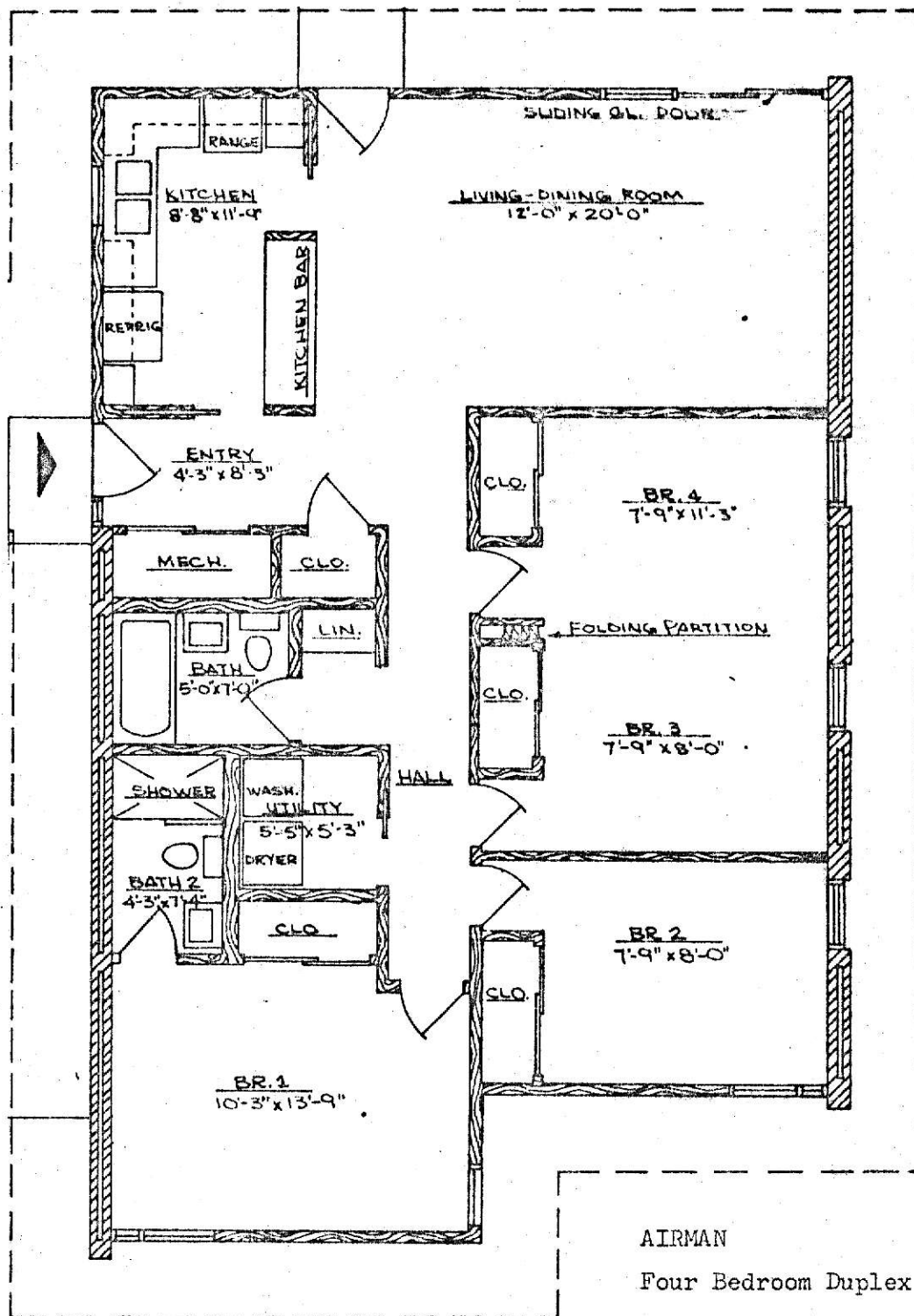
ILLEGIBLE DOCUMENT

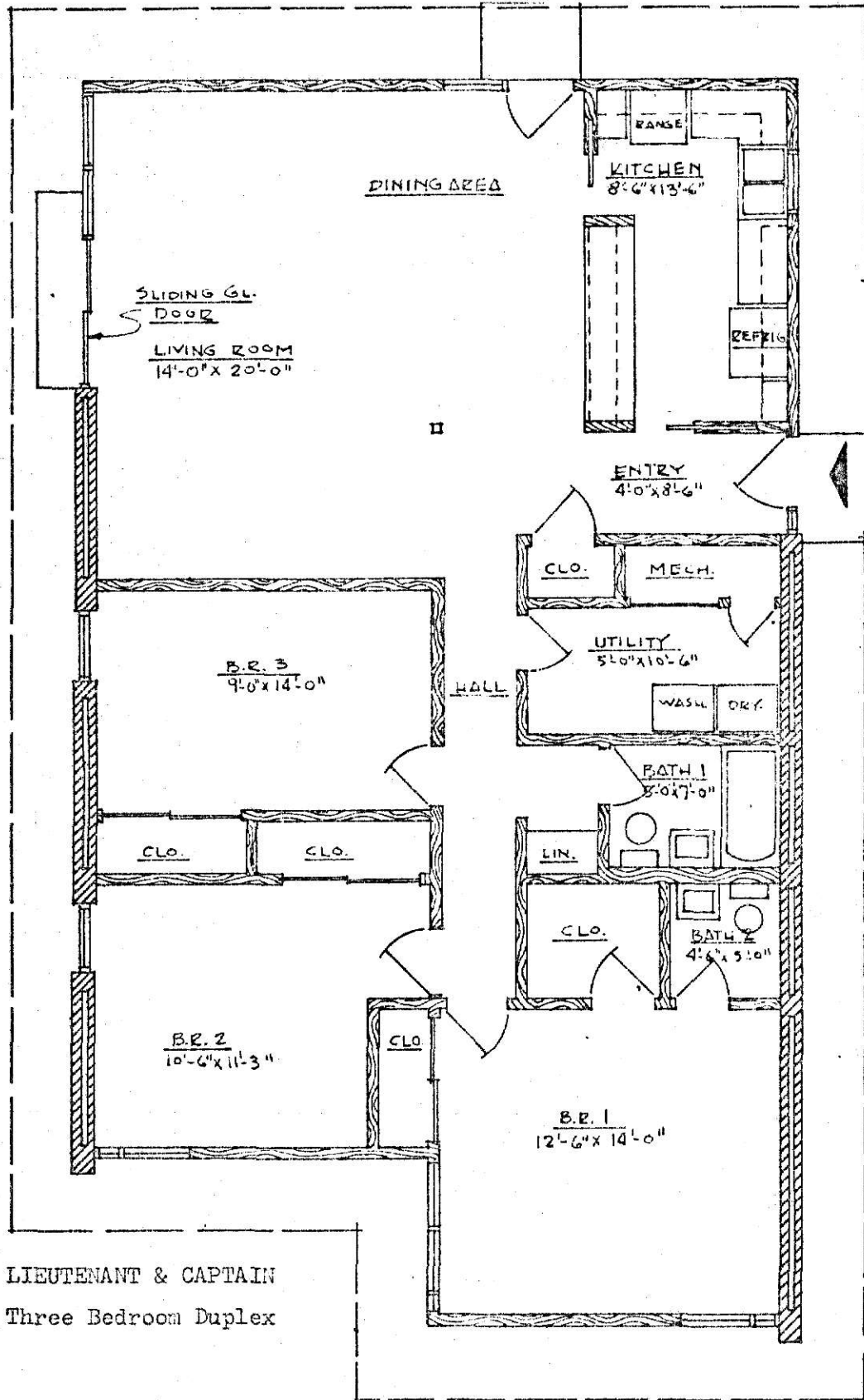
**THE FOLLOWING
DOCUMENT(S) IS OF
POOR LEGIBILITY IN
THE ORIGINAL**

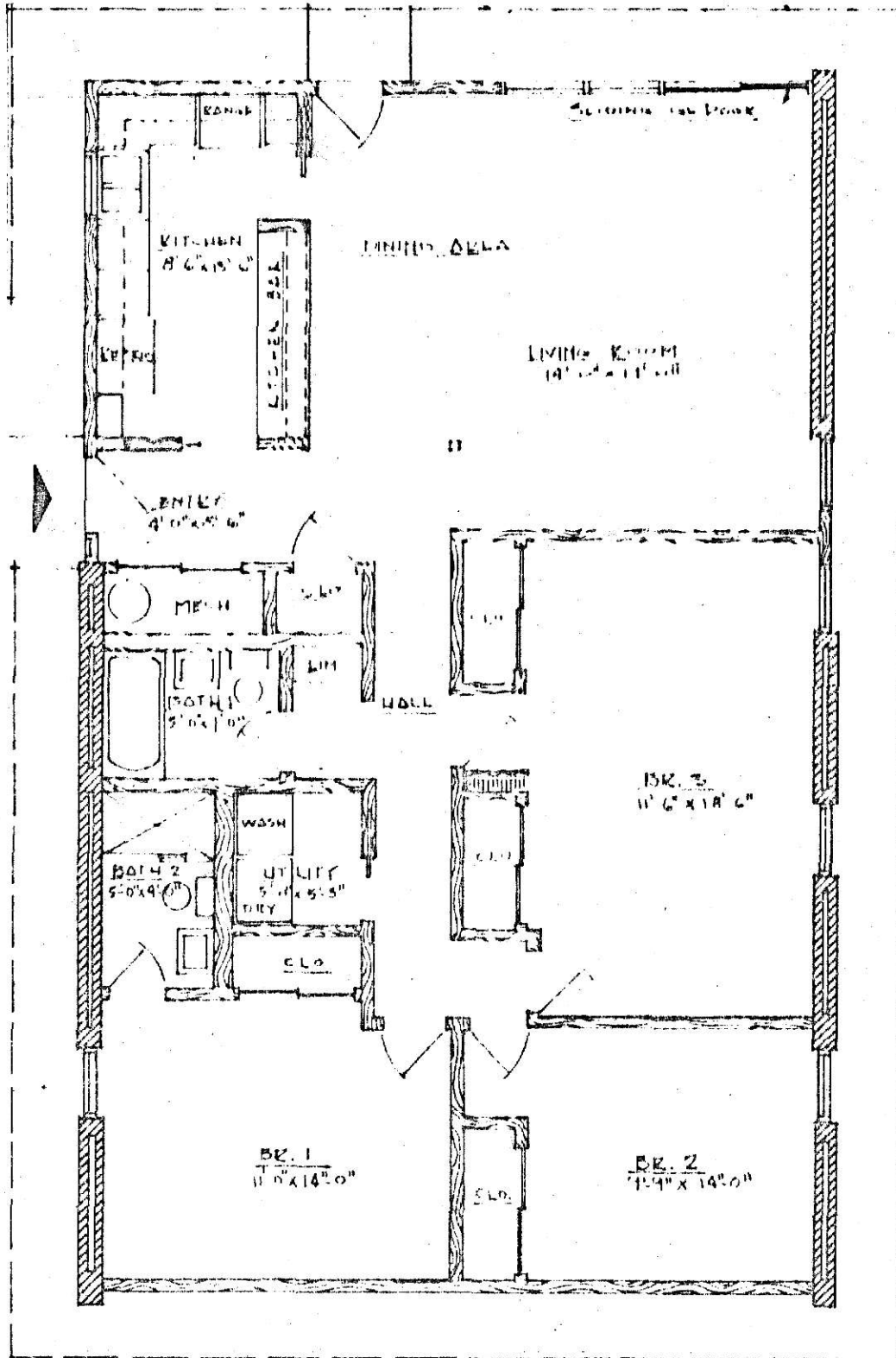
**THIS IS THE BEST
COPY AVAILABLE**



AIRMAN
Three Bedroom Duplex

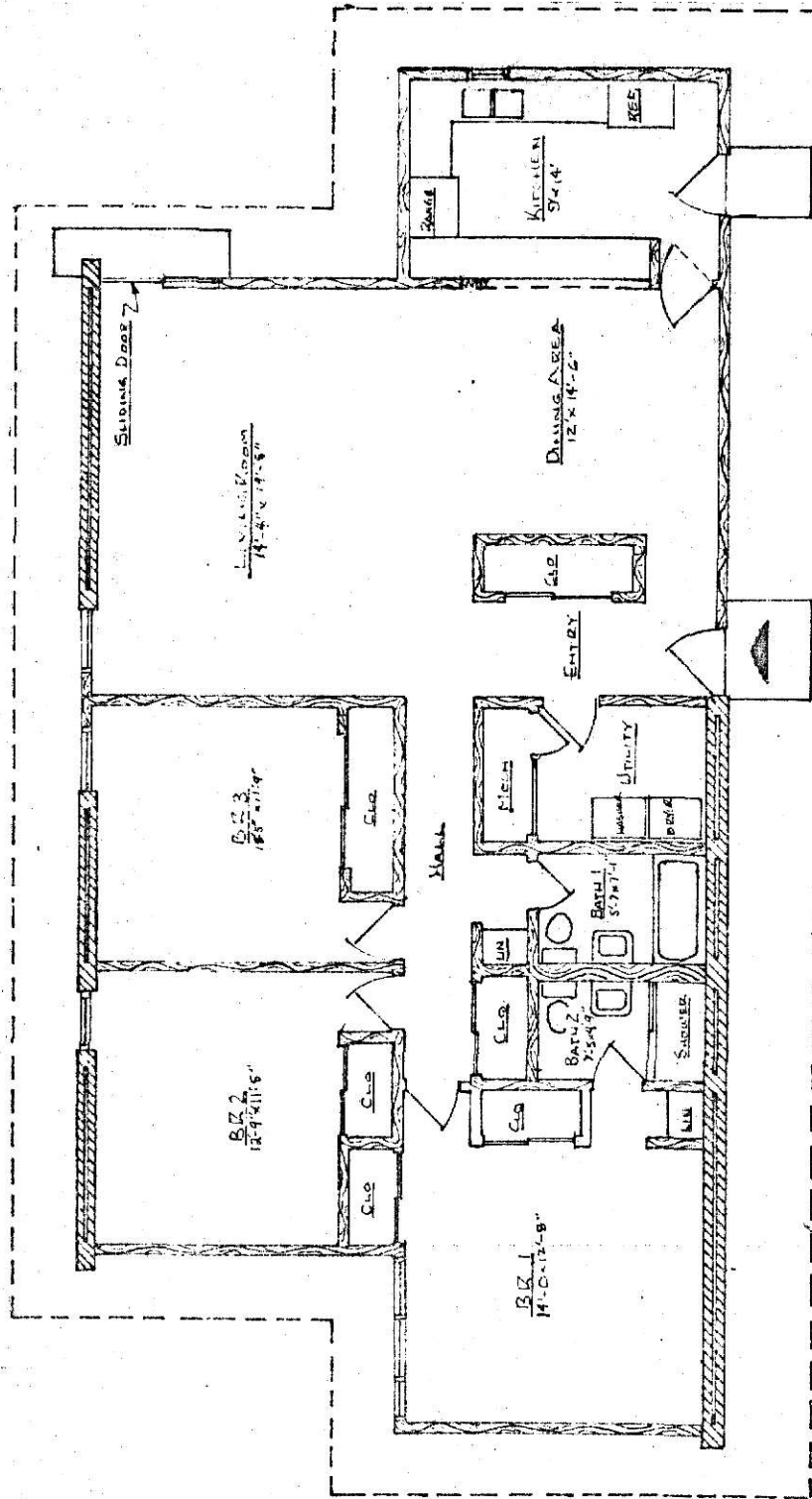




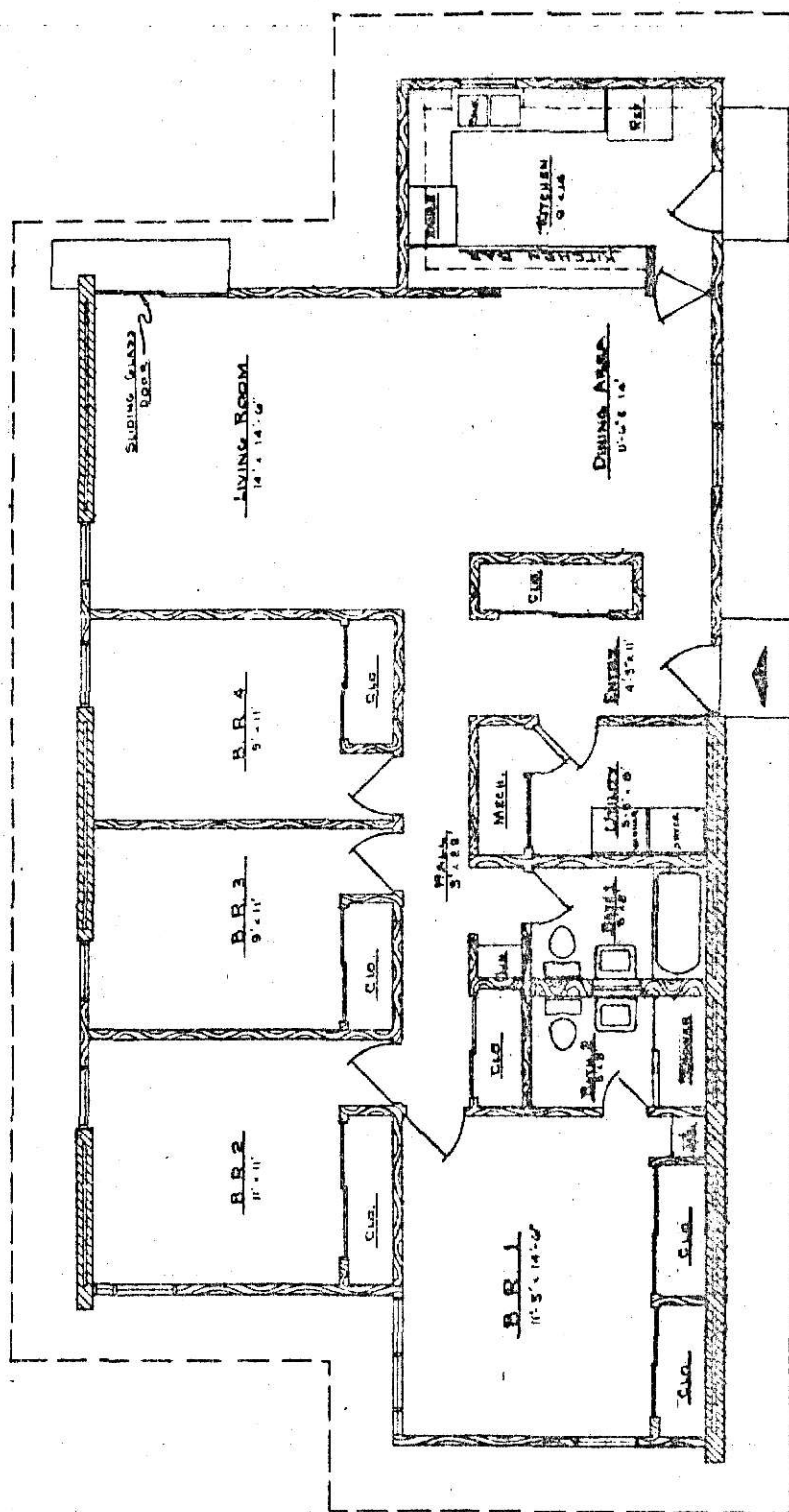


LIEUTENANT & CAPTAIN

Four Bedroom Duplex
(Folding partition divides third bedroom)



MAJOR & LIEUTENANT COLONEL
Three Bedroom Dwelling



MAJOR & LIEUTENANT COLONEL
Four Bedroom Dwelling

MOVEABLE INTERIOR WALLS

A Feasibility Study for Utilization of Moveable
Interior Walls in Military Quarters

by

Linda Baldrige Merten

B. S., Kansas State University, 1967

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARCHITECTURE

College of Architecture

Department of Interior Architecture

KANSAS STATE UNIVERSITY

Manhattan, Kansas

1974

ABSTRACT OF THESIS

This thesis investigates the feasibility of utilizing moveable interior walls in military quarters to allieviate the problems encountered by military personnel. Feasibility in this study is defined as the attitude of potential users toward the idea of flexible partitions, their aptitude for effectively designing their own living space, and their desire to change their spatial environment. This study is not concerned with the economic or design aspects of the concept.

There are several inter-related problems in standardized housing, the most prevalent one being the present system of housing allotment by privilege of rank rather than by a family's specific needs.

Many families are faced with changing spatial and environmental needs while occupying a single set of quarters.

Different families have different priorities for using available space. Various cultural and ethnic influences enter in here as well as differing needs for privacy and communal interaction.

A very real problem for every military family is trying to fit existing furnishings into new and various sized rooms.

A random sample study was made by polling a propoortinate number of four groups eligible for base housing at Vance Air Force Base: field grade officers, company grade officers, noncommissioned officers, and student pilots. The sample was obtained by use of an interview

schedule mailed to one hundred fifty married couples.

After considering the responses, one finds the results demonstrate a felt need for individual manipulation of spatial environment. The solution of moveable interior walls achieved a high degree of acceptance which indicated both an awareness of this need and a definite desire to change the living area to fit individual family needs. Personnel showed sufficient aptitude, and interest, to adequately cope with the design problems logically expected in the concept offered.