

REDESIGNING A ONE BEDROOM MARRIED STUDENT APARTMENT  
FOR CHINESE RESIDENTS

by

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A MASTER'S REPORT

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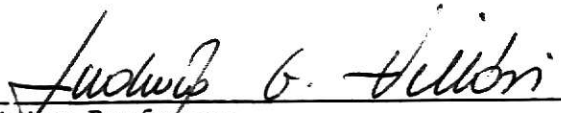
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## Chapter 1

### INTRODUCTION

One of the major concerns in the field of environmental design has been the lack of understanding of user needs by the design professionals. The anthropologists and environmental psychologists have been aware of the problems which lie between the planners/designers and the user group. Porteous wrote that "most of the planners, architects, and officials had no living experience of the conditions for which they were legislating and planning, yet there was little opportunity for the expression of consumer opinion or for cooperation between planner and consumer" (1977, p.311). This statement accounts for the failure of high-rise public housing projects of the sixties (Bell et al., 1978; Michelson, 1968). Hall, an anthropologist, explained the problem from a cultural standpoint. He stated that lower class blacks for example had difficulties in their adjustment to city living in the white dominant society (1966).

Housing, as well as food and clothing, is one of the basic needs of human beings and plays an important role in every person's life. To insure people's well-being, it is necessary for environmental designers, including architects and interior designers, to understand different cultural backgrounds. Hall, taking the Imperial Hotel in Tokyo as an example, stated that the success of Frank Lloyd Wright as an architect "was due to his recognition of the many different ways in which people experience space" (1966, p.49).

The need for cross-cultural studies of housing has become great in the United States because of the complex structure of the society. As Rapoport mentioned, "different cultures and subcultures coexist in

our cities, with the consequent need for different housing and settlement patterns" (1969, p.12).

This study deals with university housing, more specifically, the married student apartment in which foreign students reside. The number of foreign students in the United States has been increasing considerably. It was reported that there were around 33,000 foreign students in 1953 (Du Bois, 1956). The number increased to approximately 150,000 in 1973 (Unesco, 1976), and today, there are well over 300,000 foreign students in the United States (Shearer and Glen, 1981).

University housing officials now are accomodating many more foreign students than in the past. It is doubtful, however, that the students' needs have been fulfilled with housings originally designed for Americans. Hull, in his study of foreign students in the United States, reported that some students stated lack of personal privacy, lack of general comfort in lodging and insufficient or inadequate supply of furnishings and/or household items as problems related to lodging (1978).

In this study, Chinese culture in Taiwan will be considered because: (1) there are a considerable number of students from Taiwan in the United States, (2) Taiwan has been westernized in many ways yet it has a distinctive culture, especially distinctive eating habits, (3) in general, orientals are smaller than Americans in body measurement, thus it is hypothesized that the physical comfort of Taiwanese students is not fully satisfied in an American standard housing.

The objective of this study is to redesign a one-bedroom married student apartment of Jardine Terrace at Kansas State University, Manhattan, Kansas. The focal point of the project will be the kitchen-dining area, with special attention to cultural use of space.

### Significance of the Study

The study is meaningful in three ways. First, it will provide for a better understanding of another culture. Second, it will aid environmental designers in understanding the difference in user needs so that the environment can be more pleasant to a wider range of people. Third, it will provide guidance in developing a standard for university housing for foreign students from Taiwan.

### Assumption and Limitations

The assumption is that the redesigned apartment will be more convenient for Chinese residents in preparing food and will increase their level of satisfaction with the apartment.

Due to the difficulties in collecting and analyzing data from all the cultural groups residing in Jardine Terrace, the study is limited to Chinese culture only. The subjects also are limited to a small number of ten. Therefore, the collected data do not reflect opinions of all Jardine residents.

The project is only a hypothetical one. In actuality, the rehabilitation of the building will not occur in the near future. It is hoped, however, that the study will provide information to those who work with or for foreigners.

### Definition of Terms

**Aesthetic**-- A resident's subjective opinion towards the appearance of a living space in regard to color, shape and texture.

**American standard housing**-- A living space which was designed and built for American use, including the physical measurements of architectural elements.

**Anthropometric--** Measurements of the architectural elements in relation to the human body measurements.

**Chinese wives--** Wives who were born and raised in Taiwan and whose husbands are also from Taiwan. They may or may not be students themselves.

**Ease of maintenance--** A resident's evaluation of the cleaning ability of architectural facilities.

**Eating habits--** Methods of cooking and eating, including kinds of food and amount of food taken, practiced by most members of a cultural group.

**Foreign student--** A nonimmigrant university student who entered the United states with student status, and who has been permitted to enroll as a student.

**Functional--** Capable of serving the purpose for which it was designed.

**Kitchen wall--** Wall space above a counter top and below wall cabinets.

**Social--** The way of entertaining guests practiced by most members of a cultural group.

## Chapter 2

### REVIEW OF LITERATURE

#### Cultural Use of Space

The cultural influence upon house form is well recognized by looking at the houses of primitive societies which have not been influenced by Western cultures. Many of these examples were given in Rapoport's book, House Form and Culture (1969). Rapoport focused on primitive and vernacular architecture and stated that house form is the consequence of a whole range of socio-cultural factors rather than the results of any single factor or physical forces. He considered the socio-cultural forces as primary and believed that other factors such as climatic conditions, construction methods, available materials, and technology were secondary factors that influenced the house form. King's discussion (1975) was consistent with that of Rapoport. He described the city and residential development of a British colonial society in India from the mid-eighteenth to the mid-twentieth centuries and concluded that cultural, as well as social and political factors, determine the responses to environment.

The different use of a kitchen space determined by culture were reported in a cross-cultural study of the social functions of housing (Belcher and Vazquez-Calcerrada, 1972). The authors, comparing the houses of rural Georgia, Puerto Rico, and the Dominican Republic, found that most of the cooking was done in the yard in Dominican Republic, while all of the American houses in the study had a kitchen. The houses in Puerto Rico had kitchens either in a house or in a structure separate from the house. Other authors found that food preparation was totally different between India and America because the ways of doing things and equipment used differed (Rapoport and Watson, 1968). For example, there was an 8-inch difference in height

of kitchen counters in the two countries. Another interesting example about the kitchen was given by Hall (1966):

Even Le Corbusier's great buildings at Chandigarh, capital of Punjab, had to be modified by the residents to make them habitable. The Indians walled up Corbusier's balconies, converting them into kitchens (p. 101).

### Eating Habits of Chinese

In general, Chinese food is praised by both American and Chinese authors (Chao, 1949; Hess, 1974; Hsu and Hsu, 1977; Anderson and Anderson, 1977). Chao described Chinese food along with detailed recipes in her book written mainly for American readers.

The literature implies several points regarding the eating habits of the culture. First, the cooking equipment and utensils differ from items used in the United States. Chinese recipe books may support this point. For instance, the wok, bamboo steamer, large cutting board and large knife are introduced as main kitchen utensils used; stir frying, deep frying and boiling all are done in a wok (Hwang, 1976). Second, because of the numerous procedures involved in Chinese cooking, maintenance of kitchen might be more difficult for Chinese. For example, one of the most popular cooking methods, stir frying, is the main cause of oily stains on the counter top surface and kitchen walls. Third, the eating behavior of the Chinese people is a social phenomenon. Chao wrote:

The typical family meal has several dishes all served at the same time. In families, in shops, and on the farm, people eat together and share a little of several different dishes, and never have one dish belonging to one person.

The dinner is already served when the dishes are on the table. Each person just eats a chopstickful of this, then a morsel of rice (the rice bowls are always individual), a chopstickful of that, then a morsel of rice from his own particular bowl, a spoonful of the common soup, and so on, quite casual-like. The result is that you feel you are all the time carrying on a friendly conversation with each other, even though nobody says anything (pp.4-5).

Hsu and Hsu (1977) wrote that "Have you eaten?", which parallels "How are you?" is a common expression in Chinese.

One might wonder if Chinese people who live in America eat like their counterparts in Taiwan. There is no direct answer for this question. However, some sociological studies suggest that Chinese immigrants, especially first generation ones, do not assimilate with American culture easily (Weiss, 1977; Yao, 1979). Anderson and Anderson (1977) support the point of view, stating:

There is no question .... of Chinese food disappearing— even in these Chinese communities abroad. Milk and ice cream, candy and bread may add themselves to the diet, just as Chinese restaurants have added themselves to the occidental food scene, but the Chinese retain far too much pride in and awareness of their food tradition to lose it (p. 375).

#### Housing Needs and Satisfaction in Jardine Terrace

Two recent master's theses of Kansas State University reported the satisfaction level and territoriality of Jardine Terrace residents. Sanders (1979), studying satisfaction/dissatisfaction of U.S. citizens and non-U.S. citizens, wrote that following noise and no shower, U.S. Citizens disliked the small kitchen, small space, lack of storage space, no heat control, bugs and parking, while non-U.S. citizens disliked the furniture, small refrigerator, bugs, no heat control, absence of snow removal and no air conditioner. However, she reported that most respondents were satisfied with the Jardine housing facilities in general.

Chen (1979), in her study of territorial behavior in Jardine Terrace, found that foreign residents tended to defend the privacy of their apartments by using doors and blinds more often. She also found that most respondents felt that kitchen-dining area was too small, that the bedroom was adequate, and that the space of the living room was a little less than enough.



## Chapter 3

### METHOD AND PROCEDURE

A one-bedroom married student apartment in the Jardine Terrace Complex at Kansas State University, Manhattan, Kansas was selected for the project. It was redesigned based on related literature and interview data collected from Chinese wives.

Jardine Terrace is an on-campus student housing facility. The complex consists of 576 apartments: 192 two-bedroom and 384 one-bedroom, either furnished or unfurnished. A typical furnished one-bedroom apartment includes stove, refrigerator and built-in cabinets for kitchen area, table, four side chairs, two lounge chairs, divan, coffee table, table for lamp, floor lamp, and table lamp for living and dining area, and bed, desk and dresser for bedroom (Fig. 1).

#### Interview of Chinese Wives

Instrument. Forty questions were developed for the interview. The questionnaire consisted of items related to the functional, social, ease of maintenance, aesthetics, anthropometric and safety aspects of the kitchen-dining area of the apartment, plus demographic questions such as a subject's age, height, address and length of stay in Jardine Terrace.

The questionnaire was administered for pre-test purposes to three Chinese wives living in two-bedroom apartments in Jardine Terrace. Data received from the pre-test were used to draw up the final questionnaire (Appendix A). The questions with asterisks involve visual materials used in the interview procedure (Appendix B). The actual forms of the materials are described below.

1. PLATES I-III, XXII-XXVIII

drawn on 8 ½" x 11" poster boards.

2. PLATES IV-XIII, XVII-XXI

drawn on 8 ½" x 5 ½" poster boards.

3. PLATES XIV-XVI

matt boards were cut to the actual sizes.

4. PLATE XXIX

small samples of each material were cut and mounted on 8 ½" x 5 ½" poster boards.

5. PLATE XXX

small samples of cabinet finish, curtain, wall and floor materials were cut and mounted on 8 ½" x 11" poster boards.

6. PLATE XXXI

small samples of drapery, upholstery, wall and floor materials were cut and mounted on 8 ½" x 11" poster boards.

7. PLATE XXXII

two 3/4 " dia. x 36" balsa wood sticks and a matt board were used to measure the adequate heights for a subject.

Sample selection. Twelve Chinese couples and families were living in Jardine one-bedroom apartments at the time of the study. Ten wives were selected at random. Of those selected, three have children, one had resided with her child until very recently, and one has no children but has been a babysitter of three children eight hours a day, five days a week.

Procedure. The interviews were conducted during the third week of October, 1981 at the subjects' residences. The subjects were called in advance for interview appointments. All subjects agreed to participate in the study.

All interviews were conducted in Chinese. Translation of the questionnaire was checked by two Chinese students. The interviewer prepared one set of questionnaires for each subject. The subject was asked to answer each question orally and express her opinion freely. Her responses were recorded by the interviewer on the questionnaire. A typical interview session lasted thirty to forty minutes.

### Related Literature

Besides the interview results of Chinese wives, the following resources were referred to in the design procedure:

1. Literature cited in Chapter 2.
2. Architecture, interior design and building construction books.
3. Minimum Property Standards for Multifamily Housing and Rehabilitation Guide for Residential Properties.

Minimum Property Standards for Multifamily Housing (HUD, 4910.1) were set by the Department of Housing and Urban Development to define a minimum level of acceptability in multifamily housing. The use of a minimum standard alone, however, will not necessarily achieve an acceptable or desirable end-product. The standards describe those characteristics in a property that will provide present and continuing utility, durability, desirability, economy of maintenance, and a safe and healthful environment (p. iii).

Rehabilitation Guide for Residential Properties (HUD, 4940.4) was developed by the Department of Housing and Urban Development. The purpose and intent of the guidelines are to provide an acceptable minimum criteria for residential rehabilitation and to assure improved housing at a cost that present neighborhood residents can afford.

The Jardine Terrace apartment complex was built between 1957 and

1963 and some features of the one-bedroom apartments do not meet Minimum Property Standards for Multifamily Housing which was revised in 1979 and used as a guide for newly constructed housing. Both standards described above authored by HUD are referred to in the design procedure of this study. Standards used in the study are cited in the following section.

#### Room Size (4940.4)

- Minimum area of living-dining-kitchen of one-bedroom apartment shall be 220 sq. ft.
- Minimum area of bedroom in one-bedroom apartment shall be 110 sq.ft.

#### Kitchen (4910.1)

- Each living unit shall include adequate space to provide for efficient food preparation, serving and storage, as well as utensil storage and cleaning up after meals.
- Minimum frontage of kitchen fixtures and countertops shall be as follows:
  - sink—24"
  - counter top, each side—18"
  - range or cooktop space—21"\*
  - counter top, one side—18"\*\*
  - refrigerator space—30"\*\*\*
  - counter top, one side—15"\*\*
  - mixing countertop—30"
- \*A range burner shall not be located under a window not within 12 in. of a window. Where a cabinet is provided above a range, 30 in. clearance shall be provided to the bottom of an unprotected cabinet, or 24 in. to the bottom of a protected cabinet.
- \*\*Provide at least 9 in. from the edge of a range to an adjacent corner cabinet and 15 in. from the side of a refrigerator to an adjacent corner cabinet.
- \*\*\*Refrigerator space may be 33 in. when refrigerator door opens within its own width.
- Required countertops shall be approximately 24 in. deep and 36 in. high. Clearance between base cabinet fronts in food preparation area shall be 40 in. min.
- Required countertops may be combined when they are located between two fixtures—stove, refrigerator, sink. Such a countertop shall have a min. frontage equal to that of the larger of the countertops being combined. This combined counter may also be the mixing counter when its min. length is equal to that required for the mixing counter. Countertop frontages may continue around corners.

- Minimum shelf area shall be 30 sq. ft.
- Minimum drawer area shall be 6 sq. ft.
- Wall cabinets over refrigerators shall not be counted as required shelf area.
- Shelf area above 74 in. shall not be counted as required area.
- Inside corner cabinets shall be counted as 50 percent of the shelf area, except where revolving shelves are used, the actual shelf area may be counted.
- Drawer area in excess of the required area may be counted as shelf area if drawers are at least 6 in. in depth.

#### Light and Ventilation (4940.4)

- Kitchen shall have artificial light provided. Ventilation shall be provided by either mechanical ventilation, or if by natural means-- 5 percent of floor area but not less than 3 sq. ft. area.

#### Counter Top (4910.1)

- Top material shall be phenolic laminate, vinyl plastic covering, linoleum, ceramic tile, stainless steel or other material suitable for its intended use. At least a 3 in. back and end splash shall be provided against all abutting vertical surfaces which are not water and grease resistant. When back splash is omitted, joints at the juncture of counter top and vertical surfaces shall be tight and sealed.

#### Range Hoods (4910.1)

- Range hood shall be at least as long as the range, shall be at least 17 in. wide, and the bottom of the hood rim shall be not more than 30 in. above the range top.

#### Electrical (4910.1)

- At least two 20 ampere circuits shall be provided to serve receptacle outlets in the kitchen and dining area together in each living unit.
- Permanent lighting fixtures, wall switch controlled, shall be installed in kitchens, dining rooms, bathrooms and halls.

#### Presentation Method

The drawings of existing and redesigned apartments were presented to subjects in the following manner.

Existing apartment;

1. floor plan
2. electrical plan
3. reflected ceiling plan
4. kitchen elevation

Redesigned apartment:

1. floor plan
2. furniture schedule
3. electrical plan
4. reflected ceiling plan
5. kitchen elevation
6. kitchen section
7. section details
8. product design—dining table
9. product design details

A sample board of the redesigned apartment, which consisted of samples of floor materials, wall materials, surface materials, furniture, and upholstery materials also were presented.

## Chapter 4

### INTERVIEW RESULTS

The interview results are tabulated in Appendix C (Table 1-40). Findings and implications of the results are discussed in this chapter.

#### Functional Aspect

Kitchen and dining space layout. Most respondents considered the L-shaped kitchen more functional than the existing one wall type layout. None of the respondents selected the U-shaped kitchen. The prevailing opinion was that the U-shaped kitchen was unsuitable for a limited space. Only 10% of the respondents preferred the one wall type layout, indicating that the existing layout is not considered as functional as the L-shaped one (Table 1).

Half of the respondents preferred separate kitchen and dining areas. Sixty percent liked the solid wall with opening, twenty percent liked the solid wall with folding door, and twenty percent liked a screen as a partition separating the two spaces (Tables 10.1 and 10.11).

Lighting for the kitchen and dining area. The position of the light fixture in the dining area was considered to be inappropriate by all respondents. (Table 2.i, Fig. 4). Seventy percent of the respondents have a supplementary light fixture in the dining area, typically a table top lamp (Table 2.ii). Of these, 42.9% used the table lamp furnished by the housing department, and the rest provided the fixture themselves (Table 2.iii). This fact, however, does not imply a need for a portable light fixture in the dining area. As indicated in Table 2.iv, none of the respondents preferred having a table top or floor lamp in the dining area. Most respondents (70%)

preferred a ceiling mounted pendant light for the area. Twenty percent liked a wall mounted sconce while 10% preferred a ceiling surface mounted light fixture. Survey results imply a need for improved lighting in the dining area.

On the other hand, all respondents considered the placement of the existing light fixture in the kitchen functional (Table 3.i). However, if they had a choice, all respondents preferred a recessed light fixture under a wall cabinet to the existing wall mounted fluorescent light fixture. Forty percent of the respondents indicated a need for a ceiling surface mounted light fixture in addition to the recessed light fixture (Table 3.iv).

Function of the dining table. Results of the survey indicated that the dining table was used for numerous activities. Many respondents used the table as a supplemental work space for mixing and kneading, studying, reading, writing, and typing. Some people used the table for housework and hobbies such as ironing, cutting fabrics, sewing, drawing, playing cards and games (Table 4.i). Some respondents were not satisfied with the table when these activities took place (Table 4.ii). The inadequate height of the table, the uneven surface due to the leaves, and the lack of clearance under the table while a leaf was dropped were the major complaints of the respondents.

Comparison of the kitchen-dining areas in Taiwan and in Jardine Terrace. Most respondents considered the lack of an exhaust fan as an undesirable feature. Other major complaints related to the insufficiency of the kitchen-dining space in general (Table 5). Some of the desired features were not considered in this study. For example, one respondent pointed out that the range top was unsuitable for a wok, and another claimed that there was no floor drain in the kitchen area. These features are rather unique to their culture and may not be suitable for people from other cultures.



Some features of the kitchen in Jardine Terrace did elicit positive responses. For example, many respondents liked the oven. Few traditional kitchens in Taiwan have this facility because the home cooking seldom requires it. In regard to the anthropometric aspect, an unexpected response came from a person whose height was 161.5 cm. She said that the counter top height in Taiwan was so low for her that she had to bend over, therefore, she liked the height of the counter top in Jardine Terrace.

Kitchen facilities. All respondents indicated a desire for an exhaust fan in the kitchen. The Chinese cooking method requires ventilation and makes this item indispensable. Eighty percent of the respondents did not want an electric stove because the open flame of gas stove is more suitable for Chinese cooking. Sixty percent did not consider a dishwasher as a necessity for a small family. While all respondents wanted a garbage disposal, some individuals indicated a need for more storage space, a double sink and a microwave oven (Table 7).

A double sink was preferred by all respondents if kitchen space was expanded. If the kitchen space is to remain as is, 20% of the respondents still preferred a double sink, and another 20% of the subjects preferred a larger single sink. However, 60% of the respondents indicated that they did not want to sacrifice work space in the kitchen for a double or a larger single sink and would be satisfied with the 14" x 18" single sink currently in the apartment.

### Social Aspect

Dining furniture. All respondents invited their friends for dinner once every three weeks or less on the average (Table 11). For entertaining guests, the table shape preferred by a total of 70% of the respondents was

either round or oval. However, none of the respondents preferred these types of tables when not having guests. Seventy percent of the subjects preferred a square table while 20% of them preferred a rectangular one (Tables 12 and 13).

Eighty percent of the respondents appreciated the flexibility of the dining table for entertaining guests (Table 19). All respondents indicated they usually do not have enough chairs for guests (Table 20).

Kitchen space layout. Sixty percent of the respondents have used the kitchen with friends. Seventy percent considered that a L-shaped kitchen was most convenient with friends' presence, 20% liked the kitchen as is, and 10% liked a U-shaped kitchen (Tables 14 and 15).

Living area as a supplemental dining space. Most respondents indicated they sometimes served meals in the living area when entertaining guests due to the insufficiency of the dining space (Tables 16.i and 16.ii). All respondents usually placed the dining table at the corner or against one wall (Table 17). All of them moved the table toward the living area when accomodating guests, and 90% of them put the table leaves up. Almost half of them considered the move troublesome (Tables 18.i, 18.ii, 18.iii and 18.iv). These responses indicated a need for more dining space.

#### Ease of Maintenance

Kitchen wall and floor protection. Sixty percent of the respondents had some protective materials on the kitchen wall and 30% had such materials to protect the surfaces from oily stains. Self adhesive plastics were put on the existing steel kitchen wall by many respondents. Carpets and towels were used as protective materials for the floor (Tables 21.i, 21.ii, 22.i and 22.ii).

Cleaning ability of the kitchen facilities. Many respondents had never cleaned the broiler because they had never used it. The counter top, kitchen floor, faucet, and sink were cleaned quite often. On the other hand, the range, oven, broiler, kitchen wall and fluorescent light fixture were seldom cleaned (Table 23).

The respondents indicated that the counter top, counter top corners, kitchen floor, faucet, sink, and cabinet doors were easy to clean, while the range, oven, and broiler were listed as hard to clean items (Table 24).

### Aesthetic Aspect

Physical appearances of the area. The existing dining table has a wood-like laminated plastic top of a beige color. It is rectangular in shape and has four legs. The dining chairs have vinyl upholstery. Most respondents thought the dining table and chairs had plain looks (Table 25).

The typical kitchen cabinets and walls are of steel with a creamy white color. The counter top is of stainless steel. Most subjects rated the kitchen as plain or unpleasant in appearance.

None of the respondents put wall paper on the kitchen walls for aesthetic reasons (Table 26). As indicated in the previous section, protection was the main reason for having one's own material on the kitchen wall.

Floor materials. The rating of the aesthetic value of the six materials--shag carpet, looped carpet, vinyl floor tile, vinyl asbestos tile, wood, and ceramic tile-- varied among the respondents (Table 27). Fifty percent thought shag carpet was most beautiful, and 30% liked ceramic tile. None of the respondents preferred the existing vinyl floor tile when compared to other materials.

A majority of the respondents (80%) selected ceramic tile for the kitchen floor mainly because of ease of maintenance (Table 28). The existing vinyl floor tile was considered suitable as a kitchen floor material by 20% of the respondents.

Preferences for a dining floor material varied among the respondents (Table 29). Again, none of them preferred the existing vinyl floor tile or vinyl asbestos tile for the dining area. Between the two types of carpet, 50% considered the shag carpet most attractive, but only 10% selected it for the floor material in the dining area. On the other hand, only 10% thought the looped carpet attractive, but 40% preferred it as a floor material for the dining area.

Color scheme. A majority of respondents preferred a monochromatic color scheme for both kitchen and dining areas (Tables 31 and 32). A large percentage thought that the monochromatic scheme was more harmonious than the analogous or complementary color schemes.

#### Anthropometric Aspect

Counter top height. Eighty percent of the subjects indicated a preference for lower counters for kneading and 40% called for them for mixing. Most respondents considered the counter top height was adequate for cutting and cooking (Tables 33.i, 33.ii).

Height of the dining table and chair. The height of the dining chair was considered adequate for most activities by all the respondents (Table 34). The height of the existing dining table is 29 3/4", and it was considered adequate for ironing, sewing, playing cards and games, and drawing, a little too low for cutting fabrics, mixing, kneading, studying, reading, and writing, and a little too high for typing (Tables 35.i, 35.ii).

Kitchen storage space. A majority of respondents could reach the middle shelf of the kitchen cabinet (Table 36). Thirty percent of the respondents claimed that they could not store things they needed daily within their reach (Table 37). Half of the respondents had their own additional storage space such as shelves and a peg board (Table 38).

#### Safety Aspect

Most respondents and their families had had some accidents in the kitchen-dining area (Table 39). All had bumped into open cabinet doors. Half of them claimed it was because of their carelessness, while the other half thought it was due to the inadequate height. The small space of the kitchen was blamed for accidents such as "dropped knife", "bumped into open oven door", and "Kicked the lower cabinet door corner". The sharp edges of the table corners were thought to be a poor design by 40% of the respondents who had bumped into the corner of the table. Fifty percent of the respondents had gotten burned on the gas stove. They were not used to the pilot light that was always on and hot.

## Chapter 5

### RESULTS AND CONCLUSION

The characteristics of existing and redesigned apartments are compared in this chapter. The drawings of the existing and proposed apartment concepts and a picture of the sample board are presented in Appendix D.

#### Space Layout

Rearrangement of interior walls, kitchen built-ins and furniture are shown on the floor plans (Fig. 1). The existing floor plan was considered poor by the researcher for the following reasons:

1. Collision of the entrance and the closet doors
2. Limited dining space
3. Access to the bathroom through the bedroom-- it may be extremely inconvenient when having an overnight guest. It may also disturb a person sleeping in the bedroom.
4. Small kitchen space and poor layout
5. Awning type windows-- inconvenient to open while the blind is down.

The proposed plan outlined improvements believed to be beneficial to all users of the apartments:

1. A folding door for the entrance closet-- avoid collision with the entrance door.
2. Enough dining space for four to six persons without moving the table.
3. Bathroom location-- easy access from all areas in the apartment.
4. L-shaped kitchen layout-- desired by most subjects. The kitchen has slightly larger counter top space.
5. Vertical blind-- allows more light penetration in the house than the existing horizontal one.
6. Double-hung type windows-- can be opened while the blind is in use.

## Furniture

Some undesirable characteristics of the existing furniture are as follows:

1. Dining table-- not enough leg clearance while the 15" leaves are down.
2. Dining table and chairs-- considered to be plain in appearance by most respondents.
3. Sofa bed-- seat is too deep.
4. Vinyl upholstery of sofa, lounge chairs and dining chairs-- poor thermal characteristics.

The proposed furniture has the following positive characteristics (Fig. 2):

1. Dining table-- enough leg clearance even when the 9" leaves are down unless the table height is adjusted very low.
2. Dining chairs-- two extra chairs in each apartment.
3. Sofa bed-- adequate seat depth and more comfort.
4. Upholstery materials-- considered by the designer to be more comfortable and aesthetically pleasing than the existing ones.

## Lighting

The major undesirable feature in the existing building was the inappropriate location of the light fixture in the living-dining area. The lighting is improved in the proposed plan in the following manner (Figures 3 and 4):

1. Ceiling surface mounted track for a pendant light in the dining area -- a flexible light fixture that can be moved as the table moves. It also can be a supplemental lighting for the kitchen area.
2. Recessed fluorescent light fixture under the wall cabinet to light the counter top-- it offers easier maintenance because the fixture is covered with a removable diffuser.

3. A range hood with light and switch to illuminate the range area.
4. Additional surface mounted light fixtures on the living room and the bedroom ceilings.

### Kitchen Design

Details of the kitchen designs are shown in Figures 5, 6, 7 and 8. The undesirable characteristics of the existing kitchen are depicted as follows:

1. Steel cabinet doors and stainless steel counter top— considered by most respondents to be plain or unpleasant in appearance, but easy to maintain.
2. Uneven toe space— maybe the reason for some accidents.
3. Single sink
4. Limited storage space
5. Sharp corners of the backsplash area
6. Washer type faucet
7. 37" counter top height
8. 56" from the floor to the cabinet bottom

The characteristics of the proposed redesigned kitchen are:

1. Wood-like laminated plastic cabinet doors-- aesthetically pleasing and easy to clean.
2. 4" toe space-- enough foot clearance
3. Double sink-- style preferred by most respondents.
4. More storage space, including an over-the-refrigerator cabinet and lazy suzans in the corner base and wall cabinets.
5. Rounded corners of countertop and backsplash juncture.
6. Washerless type faucet— easier to clean.
7. Stainless steel countertop— durable, easy to clean and heat resistant.
8. Ceramic tile kitchen wall— easy to clean and heat resistant.



9. Exhaust fan— better ventilation and less oily stain accumulation on the counter top, wall, and cabinet doors.
10. Garbage disposal
11. Two sliding butcher blocks for mixing, kneading and cutting
12. 36" counter top height
13. 54" from the floor to the cabinet bottom

#### Product Design

A dining table was designed by the researcher. The construction drawings are shown in Figures 9 and 10. The table has the following characteristics:

1. Adjustable table height— it can be adjusted from 24 3/4" to 34 3/4" at 2" intervals to accomodate different needs. Spring loaded base and bullet spring offer easy operation.
2. Wood-like laminated plastic table top surface— identical with kitchen cabinet surface. It is easy to clean.
3. Table shape— square when the leaves are down and round when they are up. The operation is done easily by sliding a wood support under each leaf.

#### Materials and Furniture Selection

A picture of the sample board presenting selected color scheme and surface finishes is shown in Figure 11. A monochromatic color scheme was selected, because most respondents preferred it for the kitchen-dining area. Ceramic tile, which was desired by 80% of the respondents for the kitchen floor, was not selected for three reasons. First, it is slippery when wet. Second, plates are apt to break when dropped. Third, it offers poor noise control. Resilient vinyl sheet floor was chosen for the kitchen-dining area instead. For the rest of the apartment, looped carpet was chosen to provide noise control. It is important to note that noise was the main problem

reported in Sanders' study (1979).

The manufacturers of the furniture and the fiber contents of the upholstery materials are indicated in Figure 2.

### Conclusion

Results of the interviews with Chinese wives indicated many aspects of cultural use of space. Although an effort has been made to improve undesirable features expressed by the respondents, the main shortcoming of this study is the absence of feedback. The resulting design proposed in this study, may not satisfy all Chinese wives due to the fact that the apartment is in the United States and must serve a wide range of people.

Sanders' study (1979) indicated that the enlarged kitchen, use of soundproof materials and more storage space were desired by both U.S. citizen and non-U.S. citizen. If a rehabilitation of Jardine Terrace would occur in the future, these facilities should be included in the apartment.

Because this study is a hypothetical one, the cost factor has not been considered. It is predicted that the rehabilitation of the apartment would be a rather expensive one. Sanders stated that the residents in Jardine Terrace were willing to pay for extra facilities such as shower, new kitchen appliances and cabinet/counter space (p.55, 1979). At the same time, she indicated that the low rent was the feature liked best in Jardine Terrace. The planners of the housing should assure improved housing at a cost that present neighborhood residents can afford if the rehabilitation would occur in actuality.

In spite of the fact that various cultural groups reside in Jardine Terrace, only the Chinese culture was examined in this study. Further research is necessary to understand the needs of people from other cultural groups.

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## APPENDIX A

## INTERVIEW QUESTIONS

No. \_\_\_\_\_

Date: \_\_\_\_\_

### Demographic Data:

What is your age? \_\_\_\_\_ years old.

What is your height? \_\_\_\_\_ ' \_\_\_\_\_ " or \_\_\_\_\_ cm.

How long have you been living in Jardine Terrace?

\_\_\_\_\_ yrs. \_\_\_\_\_ mths.

Address \_\_\_\_\_

### Functional Aspect:

\*1. Of the following three types of kitchens, which one would you think is most functional?

- a. L-shaped
- b. one wall type
- c. U-shaped

2.i. Is the position of lighting fixture in the dining area functional?

- a. yes
- b. no

ii. If not, do you have any supplementary lighting fixture?

- a. yes
- b. no

iii. If the answer is yes in 2.ii, is it furnished by the housing department or by yourself?

- a. housing department
- b. myself

\*iv. What type of lighting do you wish to have in the dining area?

- a. ceiling surface mounted
- b. ceiling mounted pendant light
- c. table lamp
- d. floor lamp
- e. wall mounted sconce
- f. none of the above

3.i. Is the position of lighting fixture in the kitchen functional?

- a. yes
- b. no

ii. If not, do you have any supplementary lighting fixture?

- a. yes
- b. no

iii. If the answer is yes in 3.ii, is it furnished by the housing department or by yourself?

- a. housing department
- b. myself

iv. What type of lighting do you wish to have in your kitchen?

- a. ceiling surface mounted
- b. ceiling mounted pendant light
- c. floor lamp
- d. wall mounted fluorescent lamp
- e. recessed lighting fixture under wall cabinet
- f. none of the above

4.i. Besides eating, which of the following activities take place on your dining table?

ii. Do you think the table is convenient for these activities?

	i.		ii.	
a. ironing	yes	no	yes	no
b. cutting fabrics	yes	no	yes	no
c. sewing	yes	no	yes	no
d. playing cards, games	yes	no	yes	no
e. mixing	yes	no	yes	no
f. kneading	yes	no	yes	no
g. studying	yes	no	yes	no
h. reading	yes	no	yes	no
i. writing	yes	no	yes	no
j. typing	yes	no	yes	no
k. other (                      )			yes	no

5. When compared to kitchen-dining area back in Taiwan, what is the most undesirable feature of the area in Jardine Terrace?

6. When compared to kitchen-dining area back in Taiwan, what do you like most about the area in Jardine Terrace?

7. What kitchen facilities would you like to have that you do not have now?

- |                                   |     |    |
|-----------------------------------|-----|----|
| a. exhaust fan                    | yes | no |
| b. electric stove                 | yes | no |
| c. dishwasher                     | yes | no |
| d. garbage disposal               | yes | no |
| e. other (                      ) |     |    |

\*8. If you can have any size of kitchen, which type of kitchen sink would you like to have?

- a. single sink (14" x 18")
- b. double sink (two 14" x 18")
- c. larger single sink (18" x 22")

\*9. Which type of kitchen sink would you like to have if the kitchen space remains as is?

- a. single sink (14" x 18")
- b. double sink (two 14" x 18")
- c. larger single sink (18" x 22")

10.i. Would you prefer separate kitchen and dining area in general?

- a. yes
- b. no

\*11. If yes, what type of partition would you like to have?

- a. solid wall with opening
- b. solid wall with solid door
- c. solid wall with folding door
- d. curtain
- e. screen
- f. other (                      )

#### Social Aspect:

11. How often do you invite your friends for dinner on the average?

- a. more than once a week to once a week
- b. once every two weeks
- c. once every three weeks
- d. once every month or less

\*12. Which dining table would you like to have to accomodate guests?

- a. round
- b. square
- c. rectangular
- d. oval
- e. don't care

\*13. Which dining table would you like to have when you do not have guests?

- a. round
- b. square
- c. rectangular
- d. oval
- e. don't care



14. Have you ever used the kitchen with your friends on any occasion?

- a. yes
- b. no

\*15. Which type of kitchen do you think is most convenient when you cook with friends?

- a. L-shaped
- b. one wall type
- c. U-shaped

16.i. Have you had meals in living area when you have had many guests?

- a. yes
- b. no

ii. If yes, is it because you like it or you have no other choice?

- a. like it that way
- b. no other choice

\*17. Of the following 9 diagrams, which is the normal position of your dining table?

- a. corner, two leaves down
- b. corner, one leaf up
- c. corner, two leaves up
- d. against one wall, two leaves down
- e. against one wall, one leaf up
- f. against one wall, two leaves up
- g. center, two leaves down
- h. center, one leaf up
- i. center, two leaves up

18. When you have guests:

i. Do you move your dining table from where it usually is?

- a. yes
- b. no

ii. If yes, does it bother you?

- a. yes
- b. no

iii. Do you put the table leaves up?

- a. yes
- b. no

iv. If yes, does it bother you?

- a. yes
- b. no

19. Is the flexibility of the dining table adequate for accomodating guests for dinner?

- a. yes
- b. no

20. Do you usually have enough dining chairs for your guests?

- a. yes
- b. no

Ease of Maintenance:

21.i. Do you put any protective material on your kitchen wall for maintenance reasons?

- a. yes
- b. no

ii. If yes, what is it?

22.i. Do you have any protective material on the kitchen floor for maintenance reasons?

- a. yes
- b. no

ii. If yes, what is it?

23. How often do you clean the following parts of the kitchen?  
(1-never, 2-seldom, 3-often, 4-daily)

a. counter top	1	2	3	4
b. counter top corners	1	2	3	4
c. range	1	2	3	4
d. oven	1	2	3	4
e. broiler	1	2	3	4
f. kitchen wall	1	2	3	4
g. kitchen floor	1	2	3	4
h. faucet	1	2	3	4
i. sink	1	2	3	4
j. kitchen cabinet interiors	1	2	3	4
k. cabinet doors	1	2	3	4
l. fluorescent light fixtures	1	2	3	4

24. How would you rate the ease of maintenance on the following parts of the kitchen?

(1-very hard, 2-hard, 3-moderate, 4-easy, 5-very easy)

a. counter top	1	2	3	4	5
b. counter top corners	1	2	3	4	5
c. range	1	2	3	4	5
d. oven	1	2	3	4	5
e. broiler	1	2	3	4	5
f. kitchen wall	1	2	3	4	5
g. kitchen floor	1	2	3	4	5
h. faucet	1	2	3	4	5
i. sink	1	2	3	4	5
j. kitchen cabinet interiors	1	2	3	4	5
k. cabinet doors	1	2	3	4	5
l. fluorescent light fixtures	1	2	3	4	5



\*32. Which color scheme do you like for your dining area?

- a. monochromatic
- b. analogous
- c. complementary
- d. don't care

Anthropometric Aspect:

33.i. Is the height of the counter top adequate for the following activities?

\*ii. If not, what is the adequate height for you?

	i.		ii.
a. mixing	yes	no	_____ "
b. kneading	yes	no	_____ "
c. cutting	yes	no	_____ "
d. cooking	yes	no	_____ "

34. Is the height of the dining chair adequate for most activities?

- a. yes
- b. no

35.i. Is the height of the dining table adequate for the activities you responded to in Question 4?

\*ii. If not, what is the adequate height for you?

	i.		ii.
a. ironing	yes	no	_____ "
b. cutting fabrics	yes	no	_____ "
c. sewing	yes	no	_____ "
d. playing cards, games	yes	no	_____ "
e. mixing	yes	no	_____ "
f. kneading	yes	no	_____ "
g. studying	yes	no	_____ "
h. reading	yes	no	_____ "
i. writing	yes	no	_____ "
j. typing	yes	no	_____ "
k. other (                      )	yes	no	_____ "

36. How far can you reach into the kitchen cabinet comfortably when standing on the floor?

- a. bottom shelf front
- b. bottom shelf rear
- c. middle shelf front
- d. middle shelf rear
- e. top shelf front
- f. top shelf rear

37. Can you store things you need daily in the kitchen cabinet within your reach?

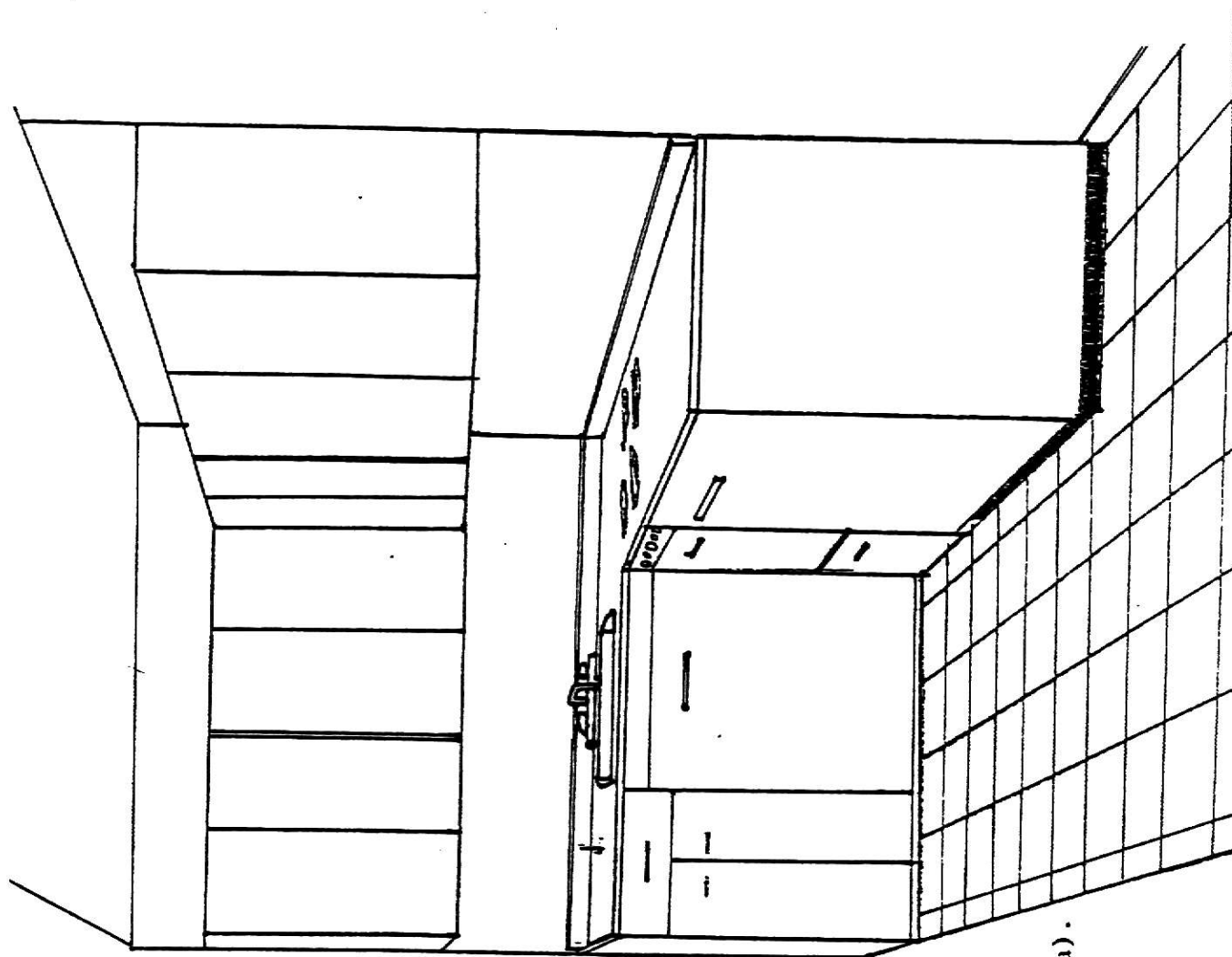
- a. yes
- b. no

38. Do you have any additional storage space of your own in the kitchen-dining area?
- a. yes
  - b. no

Safety Aspect:

39. Have you or your family had any of the following accidents in the kitchen-dining area before?
- a. got burned on gas stove
  - b. slipped on wet floor
  - c. bumped into corner of the table
  - d. bumped into open cabinet doors due to its height
  - e. got caught with metal edge molding of cabinet doors
  - f. other ( )
40. Was accident(s) cited result of poor design or carelessness?
- |       |             |              |
|-------|-------------|--------------|
| 39.a. | poor design | carelessness |
| 39.b. | poor design | carelessness |
| 39.c. | poor design | carelessness |
| 39.d. | poor design | carelessness |
| 39.e. | poor design | carelessness |
| 39.f. | poor design | carelessness |

## APPENDIX B



L-SHAPED

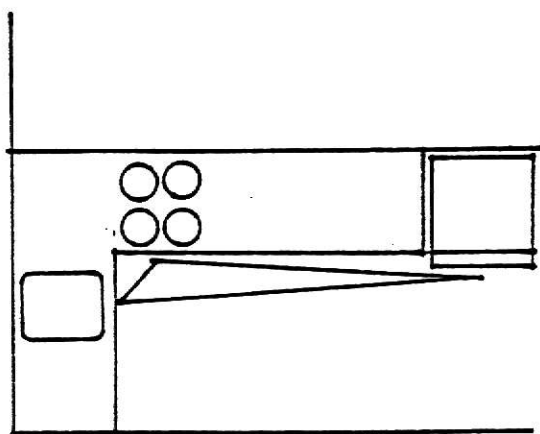


PLATE I. Kitchen Type (Questions 1 and 15, a).

ONE WALL TYPE

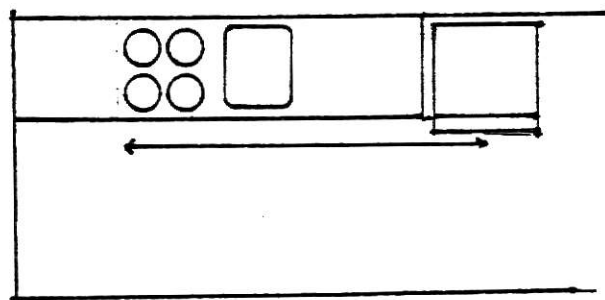
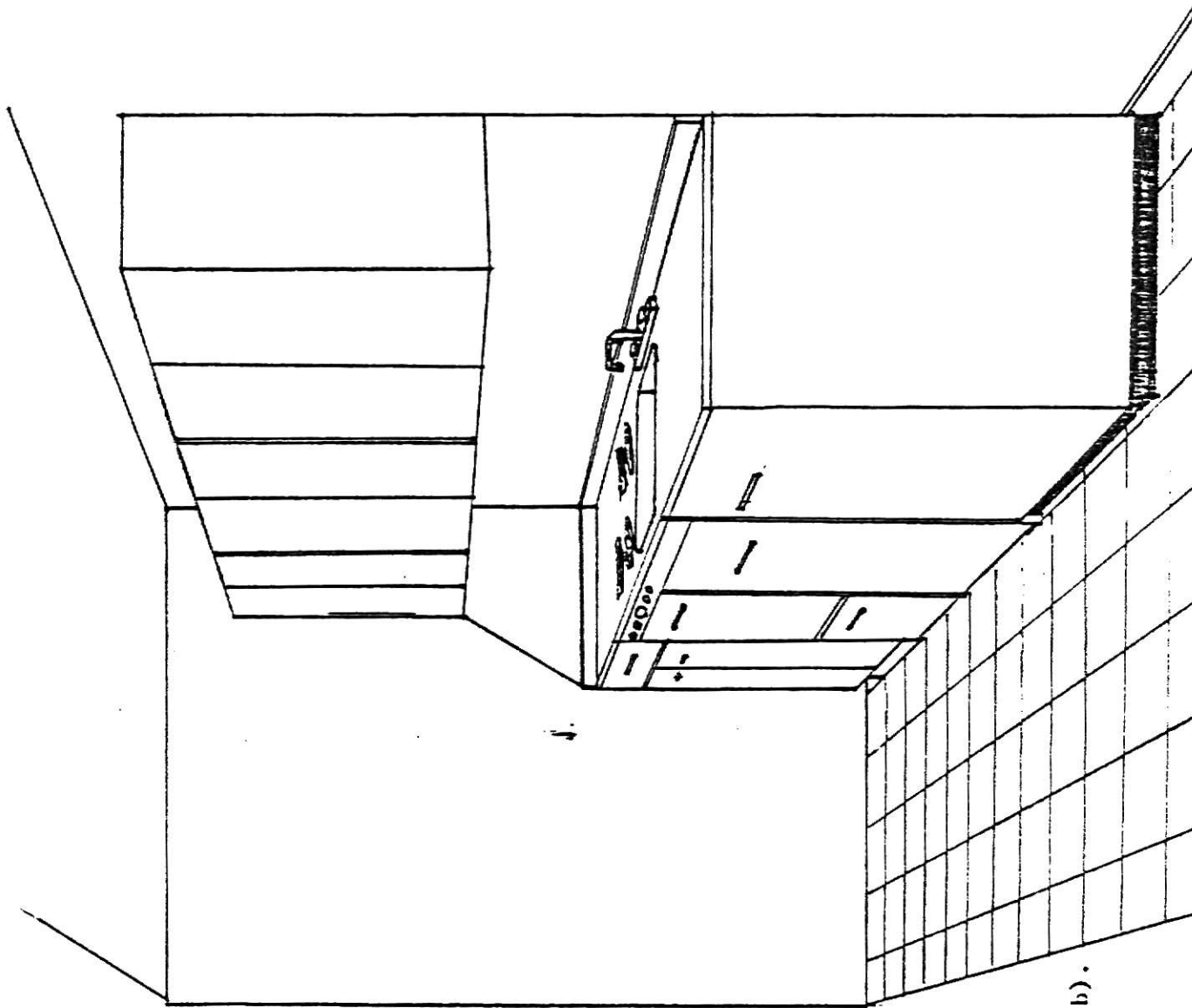


PLATE II. Kitchen Type  
(Questions 1 and 15, b).





U-SHAPED

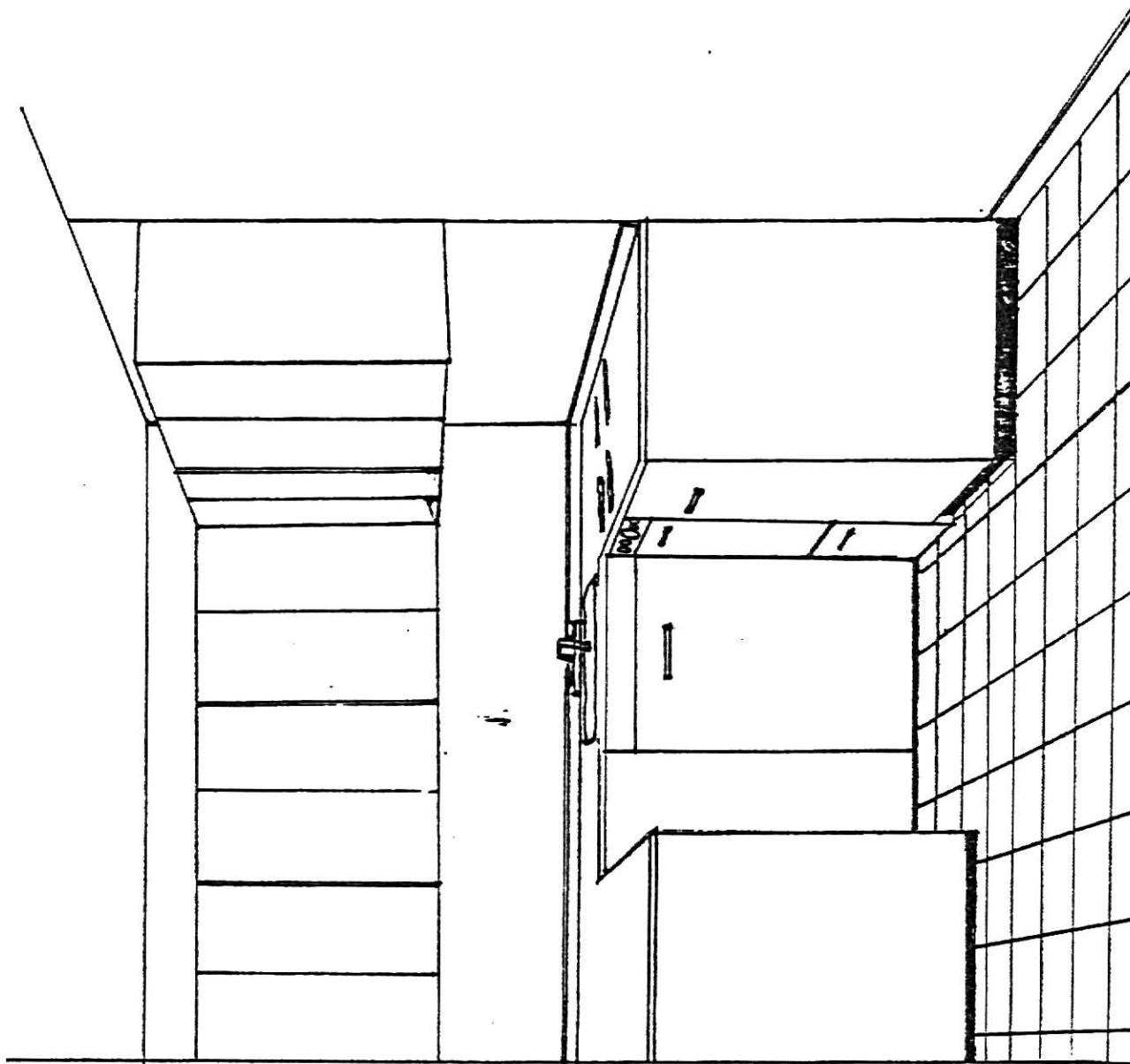
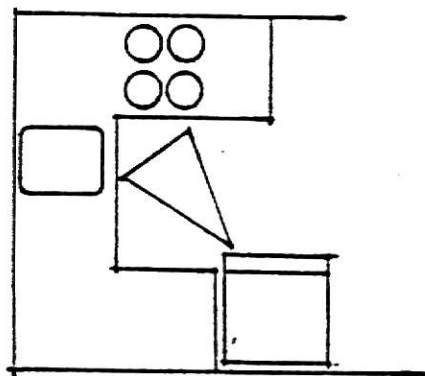
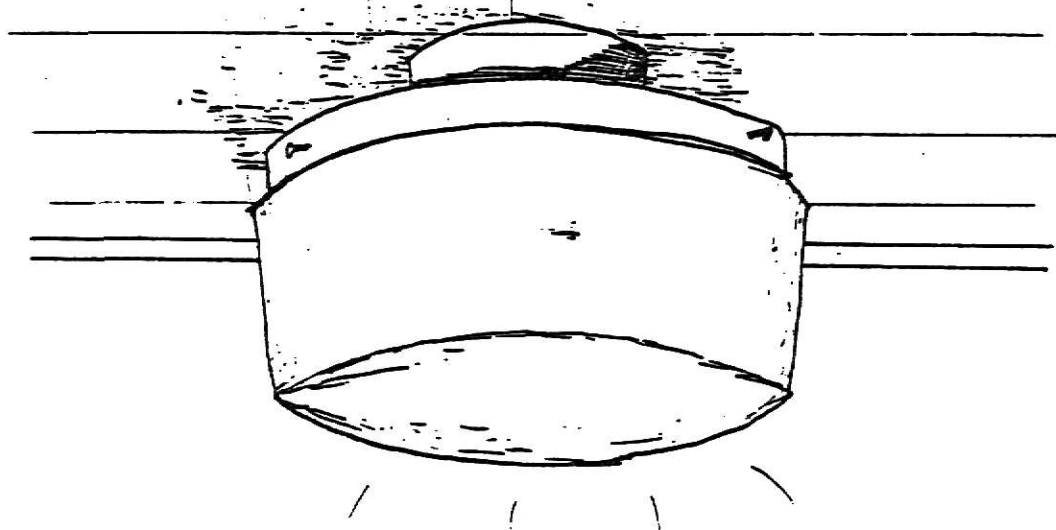
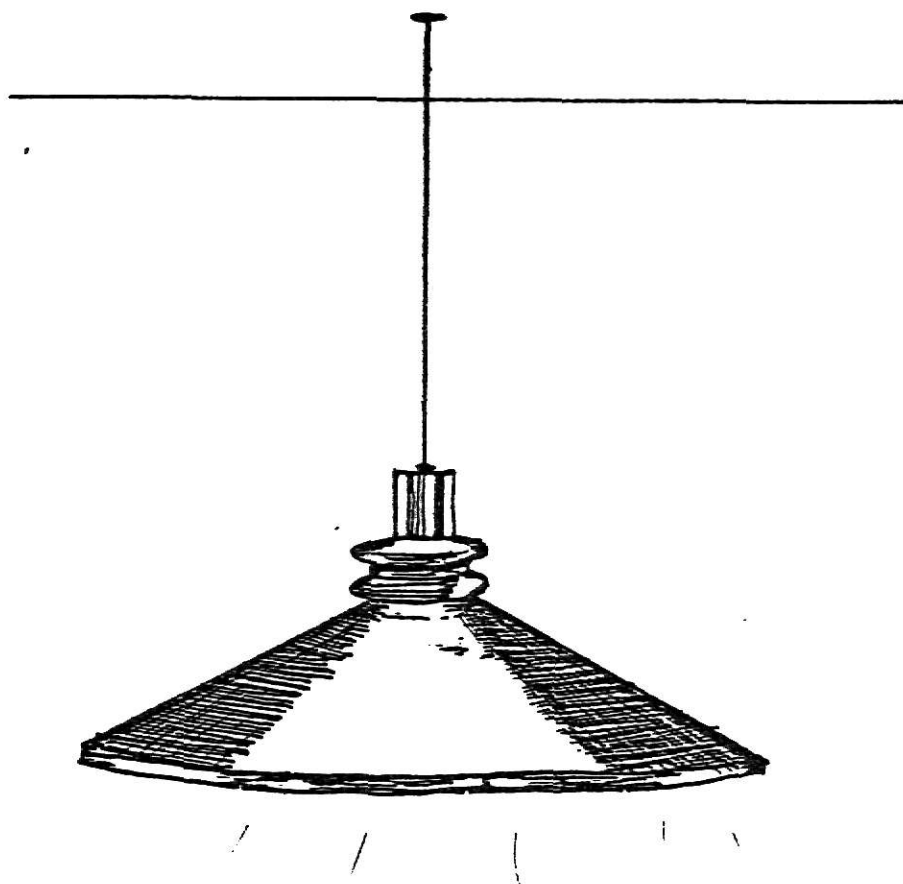


PLATE III. Kitchen Type  
(Questions 1 and  
15, c).



CEILING SURFACE MOUNTED

PLATE IV. Lighting Fixture for the Dining Area (Question 2.iv, a)..



## CEILING MOUNTED PENDANT LIGHT

PLATE V. Lighting Fixture for the Dining Area (Question 2.iv, b).

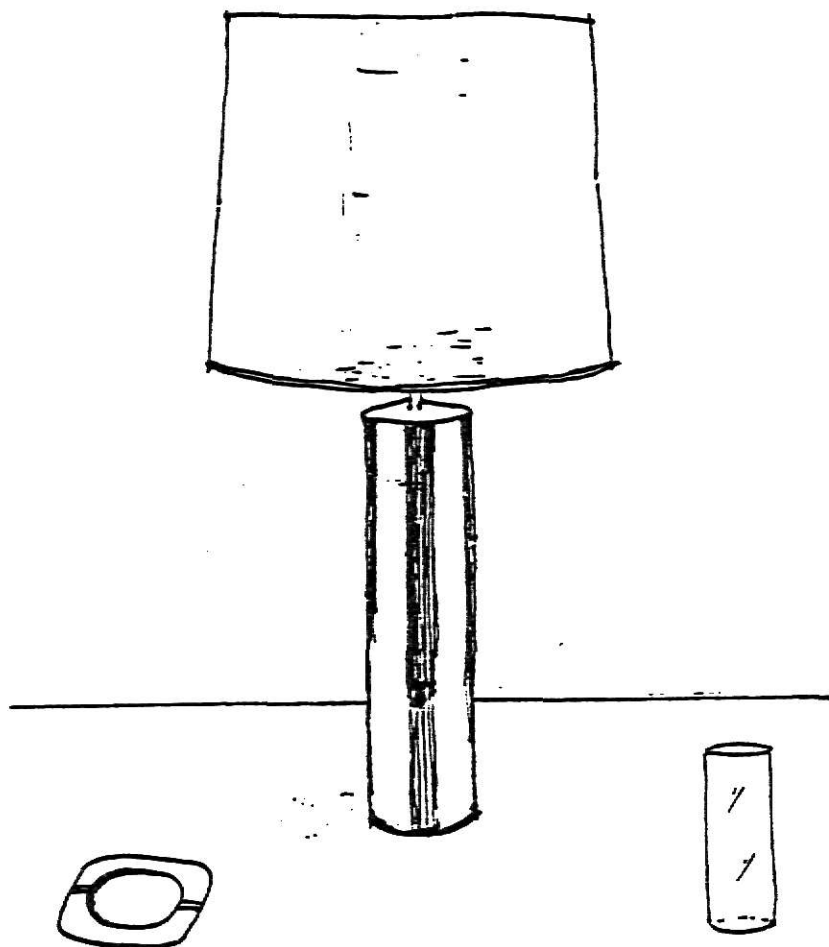
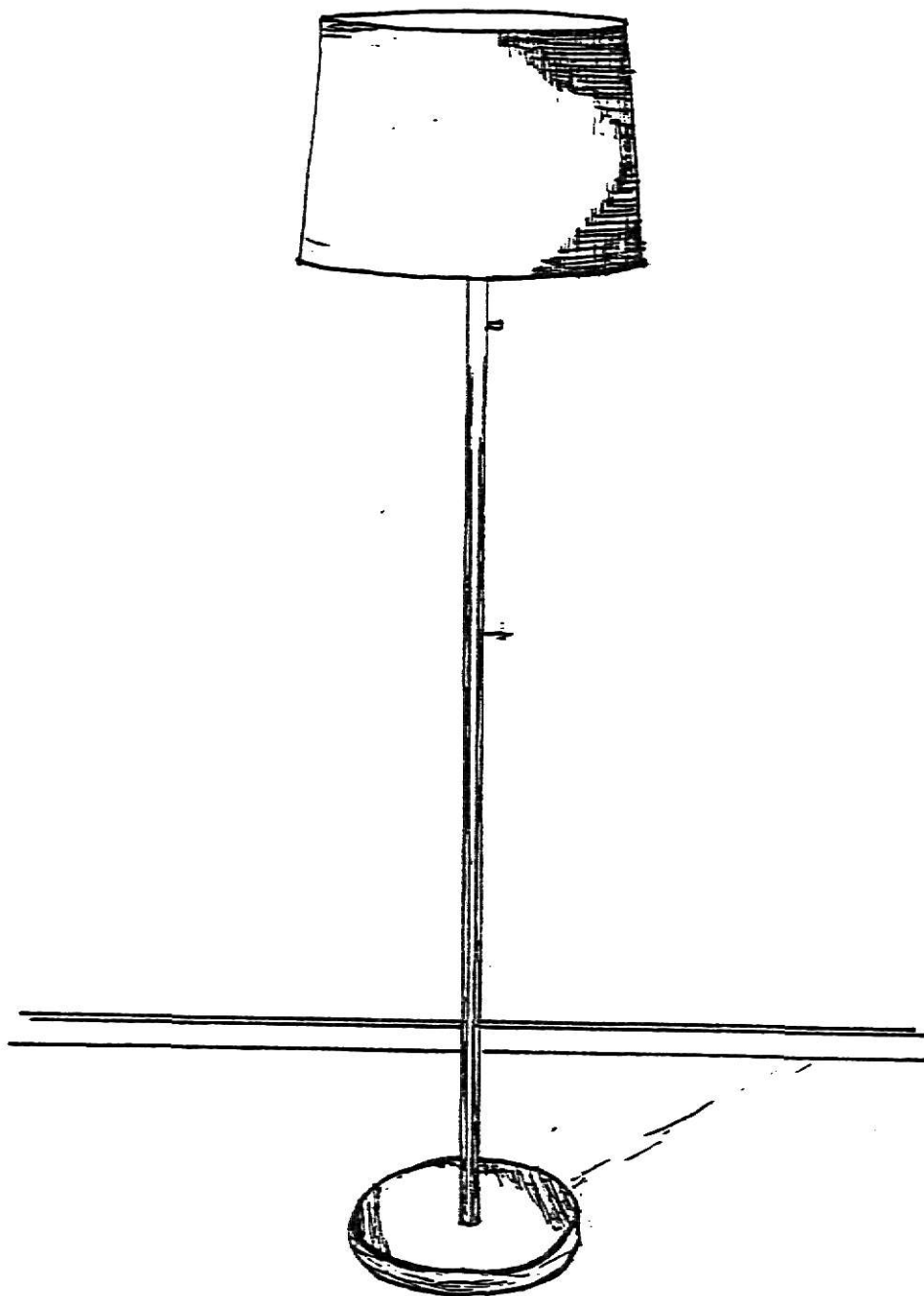


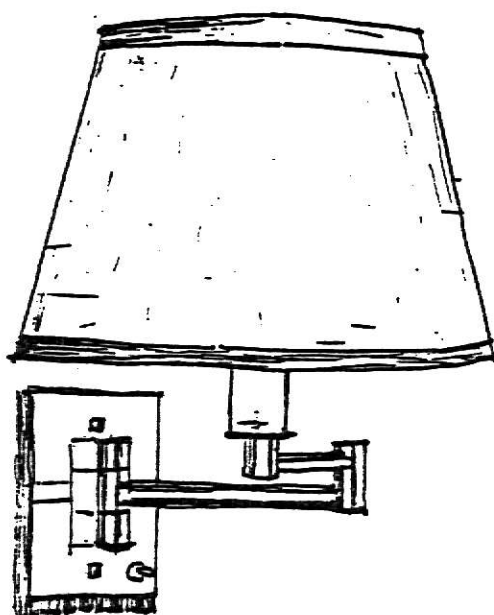
TABLE LAMP

PLATE VI. Lighting Fixture for the Dining Area (Question 2.iv, c).



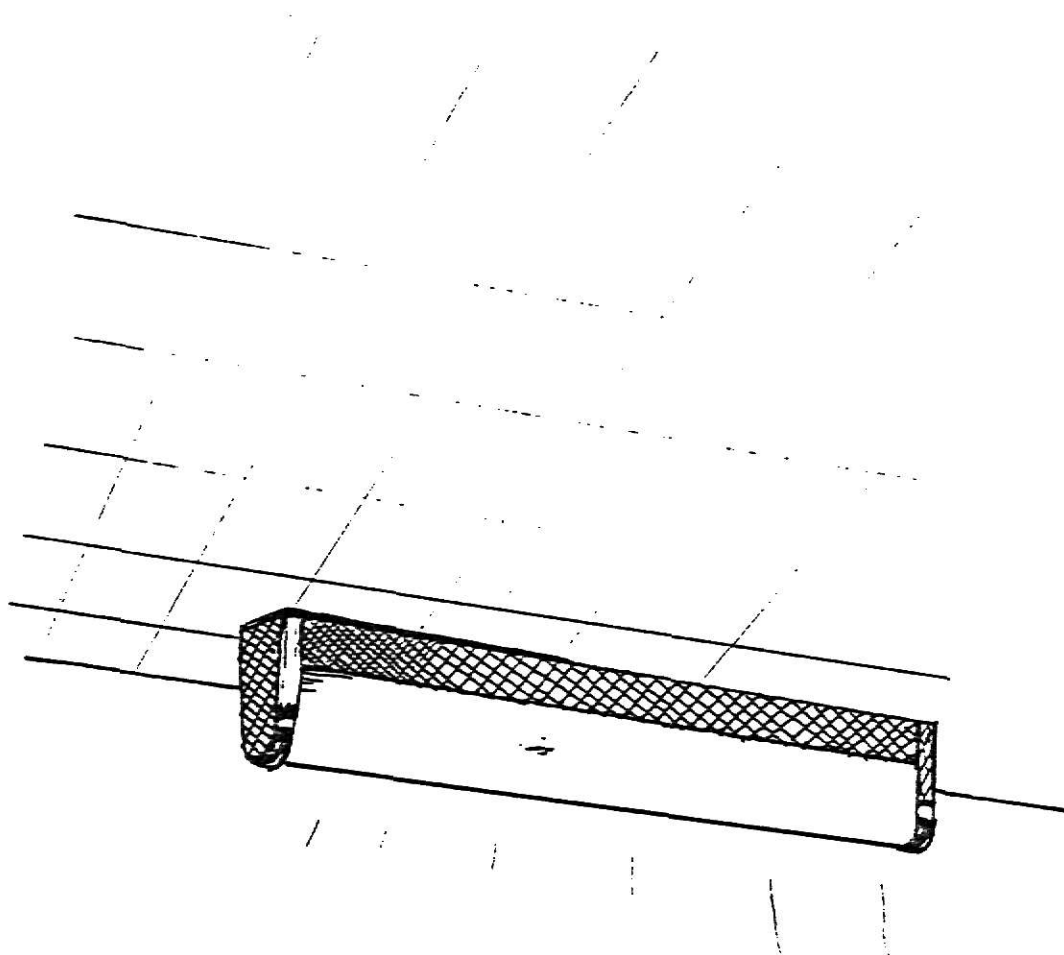
FLOOR LAMP

PLATE VII. Lighting Fixture for the Dining Area (Question 2.iv, d).



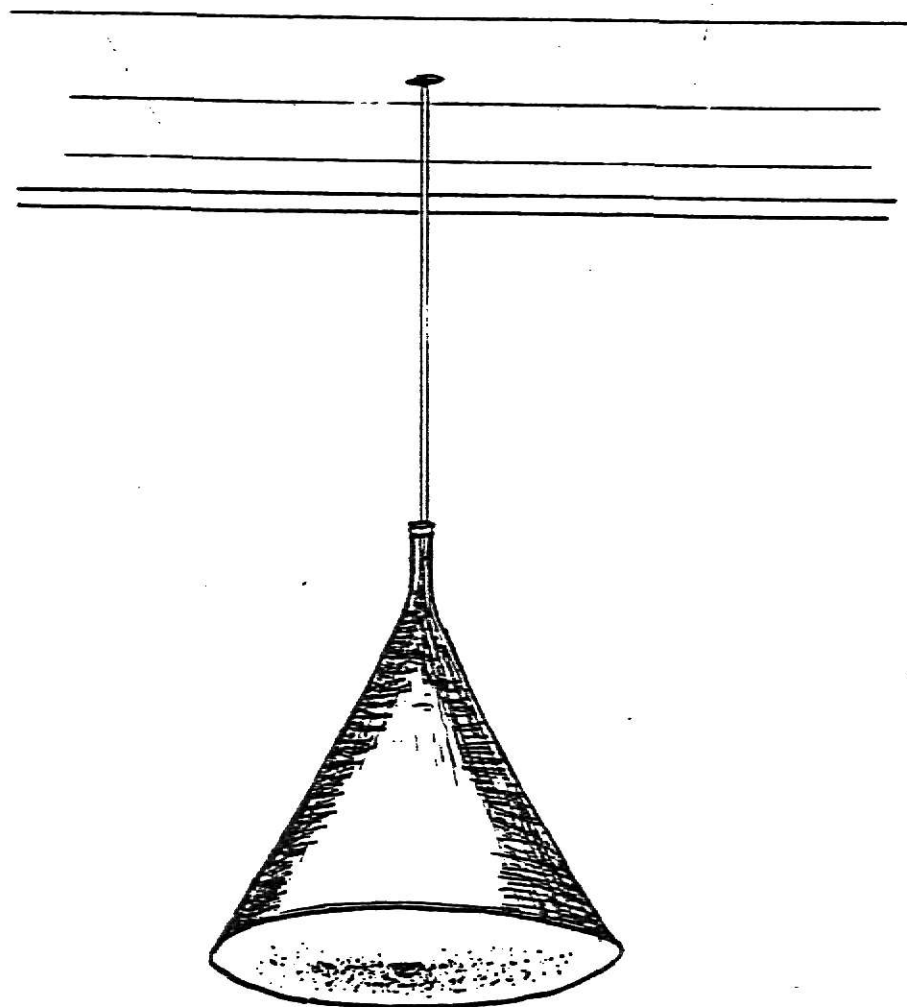
WALL MOUNTED SCONCE

PLATE VIII. Lighting Fixture for the Dining Area (Question 2.iv, e).



CEILING SURFACE MOUNTED.

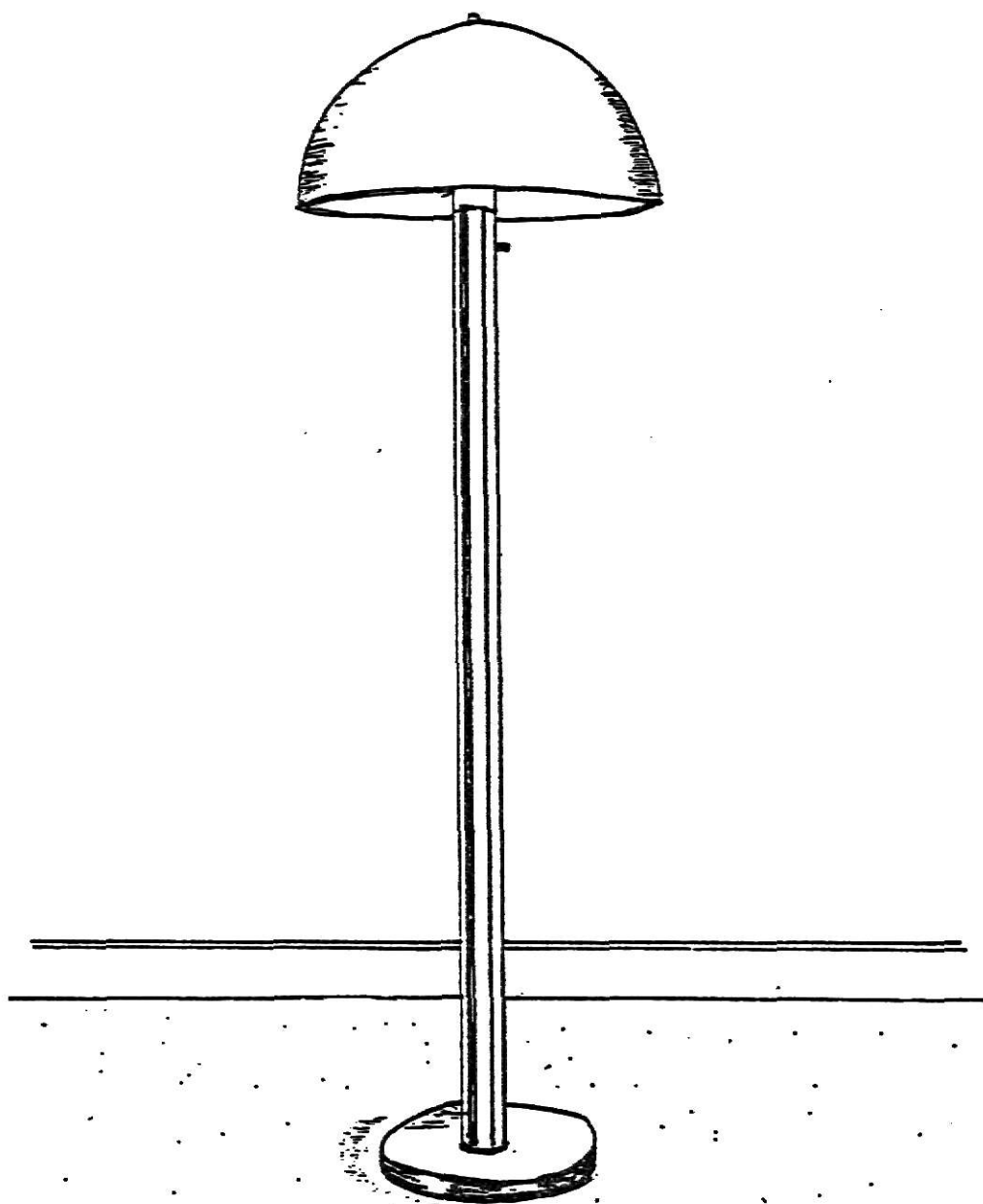
PLATE IX. Lighting Fixture for the Kitchen (Question 3.iv, a).



CEILING MOUNTED PENDANT LIGHT

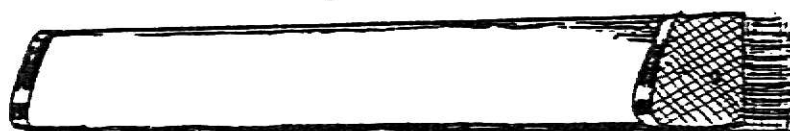
PLATE X. Lighting Fixture for the Kitchen (Question 3.iv, b).





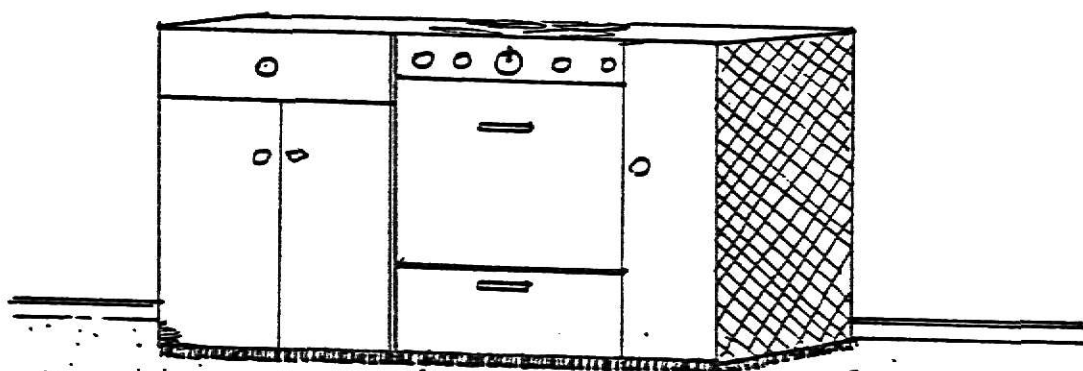
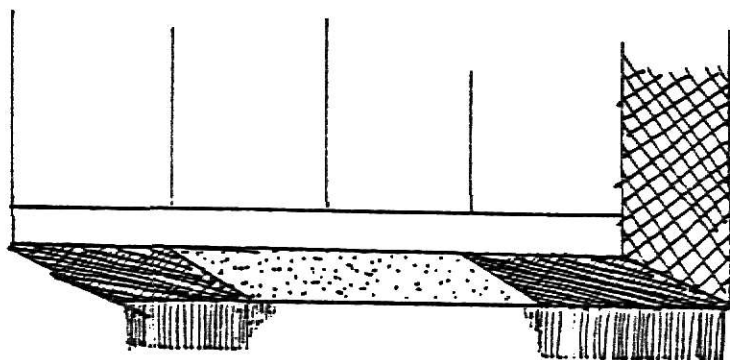
FLOOR LAMP

PLATE XI. Lighting Fixture for the Kitchen (Question 3.iv, c).



WALL MOUNTED FLUORESCENT LAMP

PLATE XII. Lighting Fixture for the Kitchen (Question 3.iv, d).



RECESSED LIGHTING UNDER THE WALL CABINET

PLATE XIII. Lighting Fixture for the Kitchen (Question 3.iv, e).

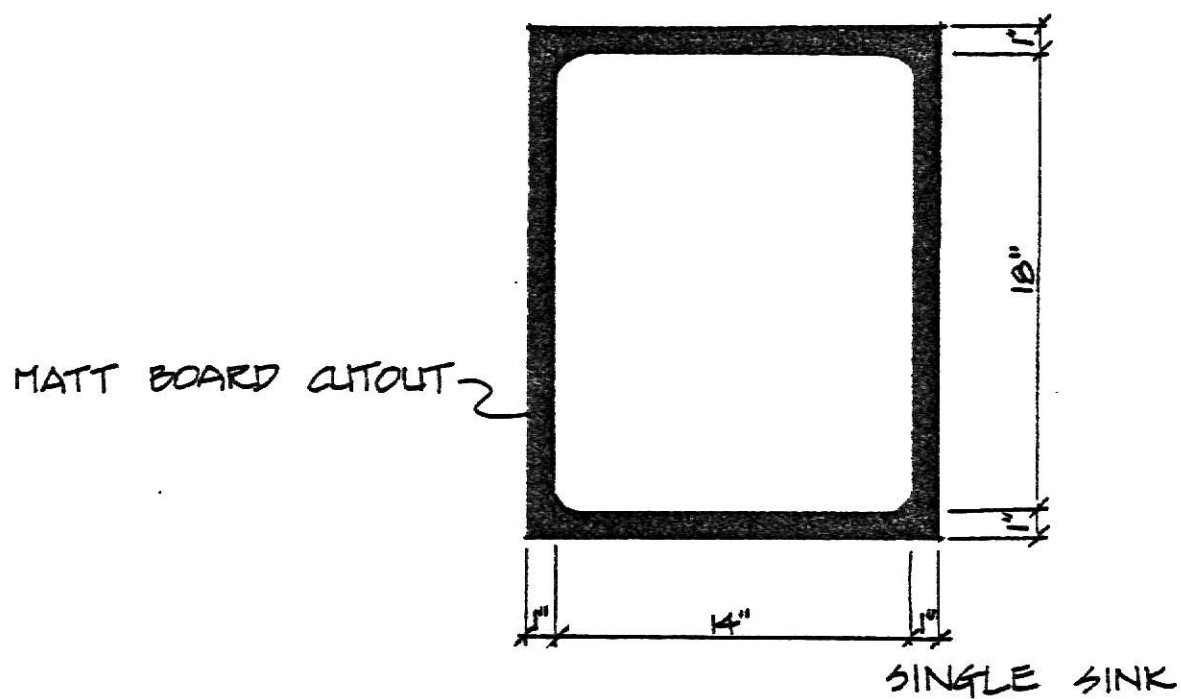


PLATE XIV. Sink Type (Questions 8 and 9, a).

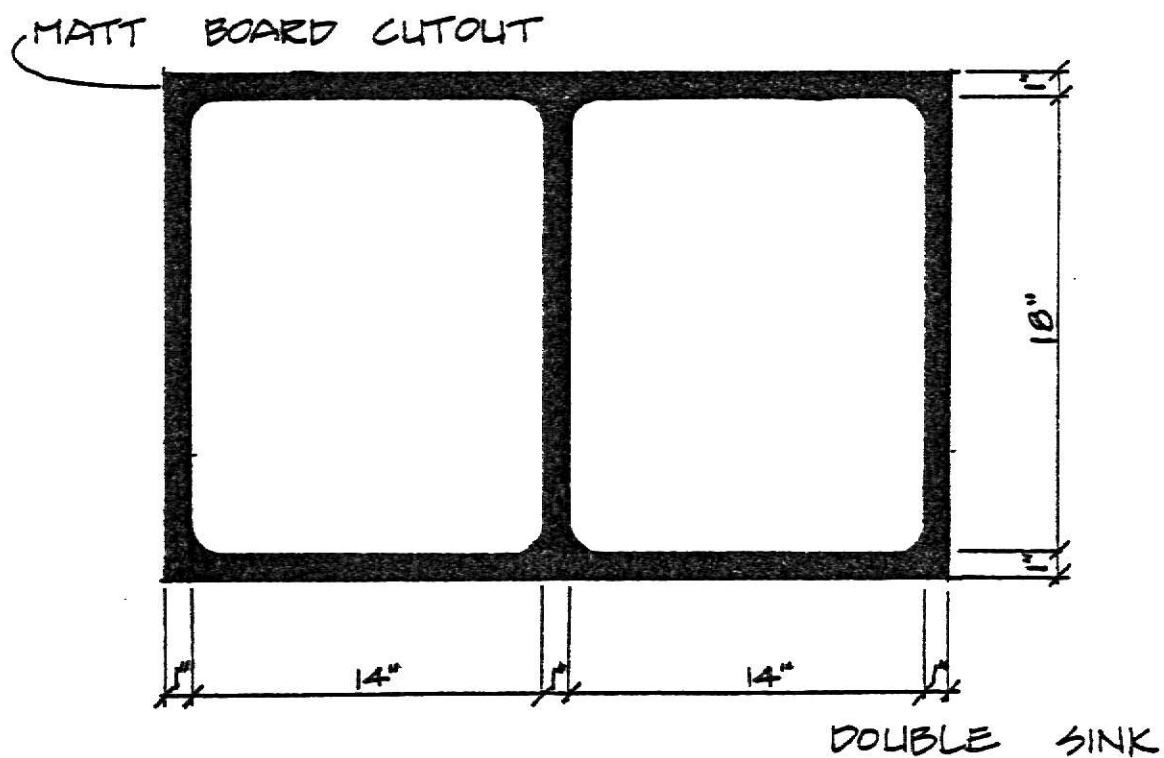
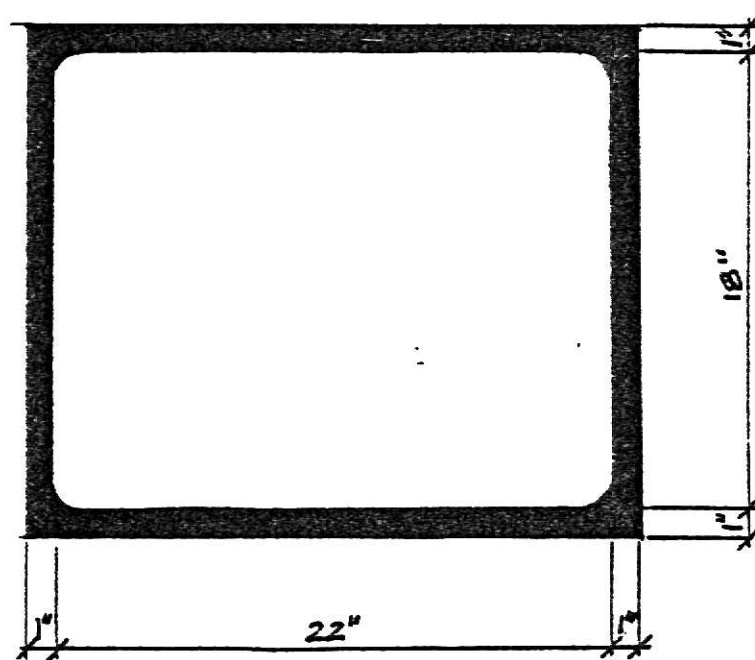
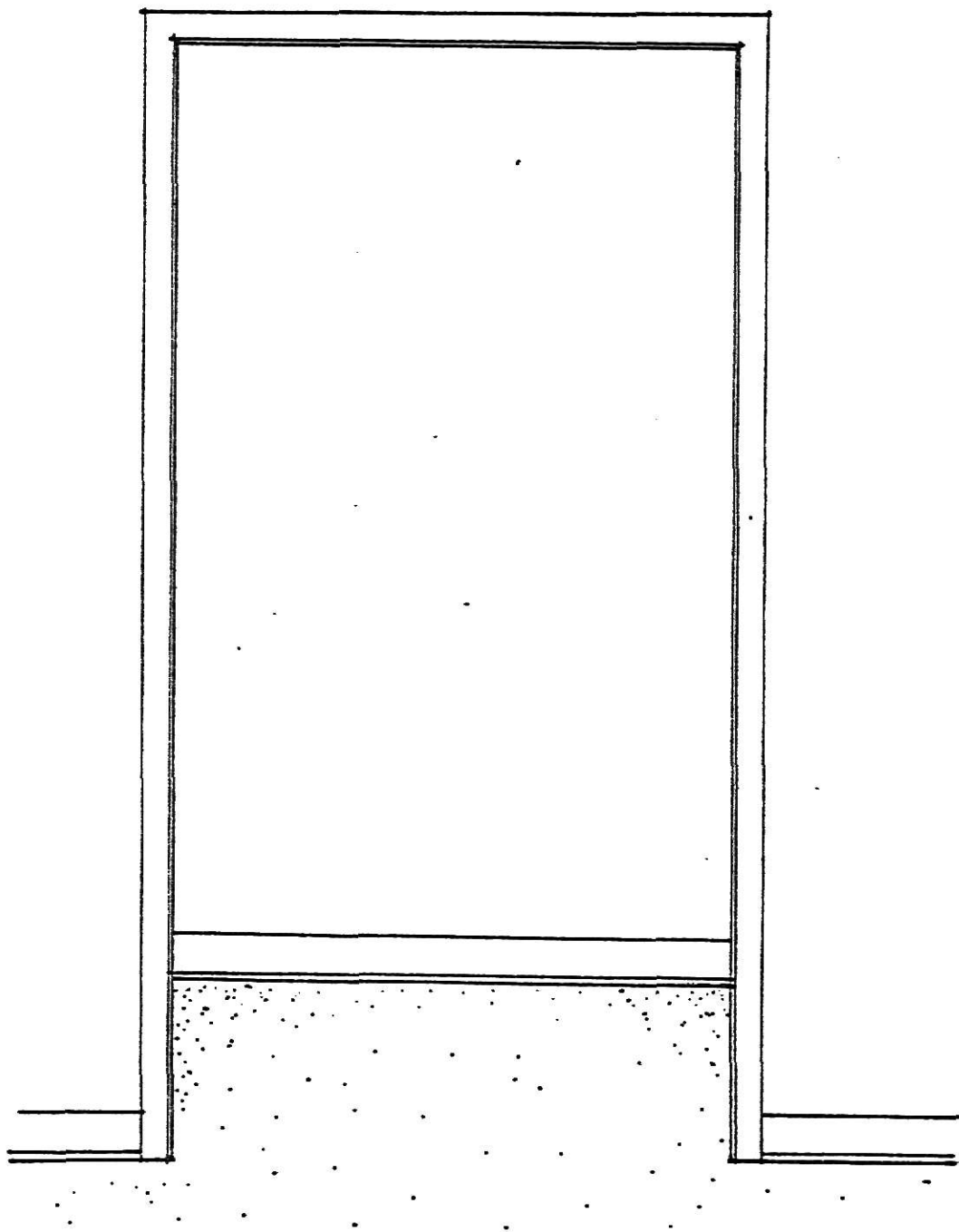


PLATE XV. Sink Type (Questions 8 and 9, b).

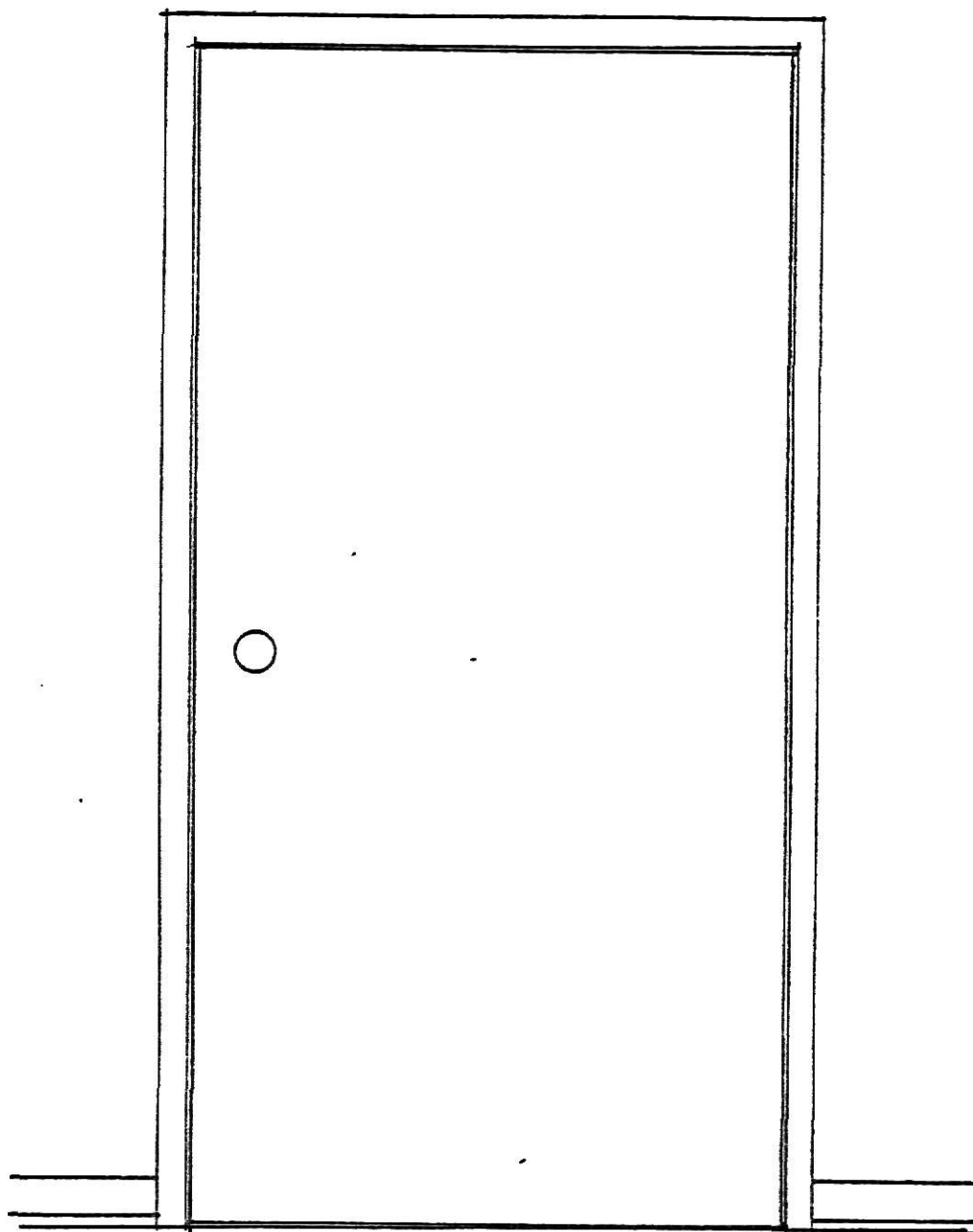


LARGE SINGLE SINK

PLATE XVI. Sink Type (Questions 8 and 9, c).

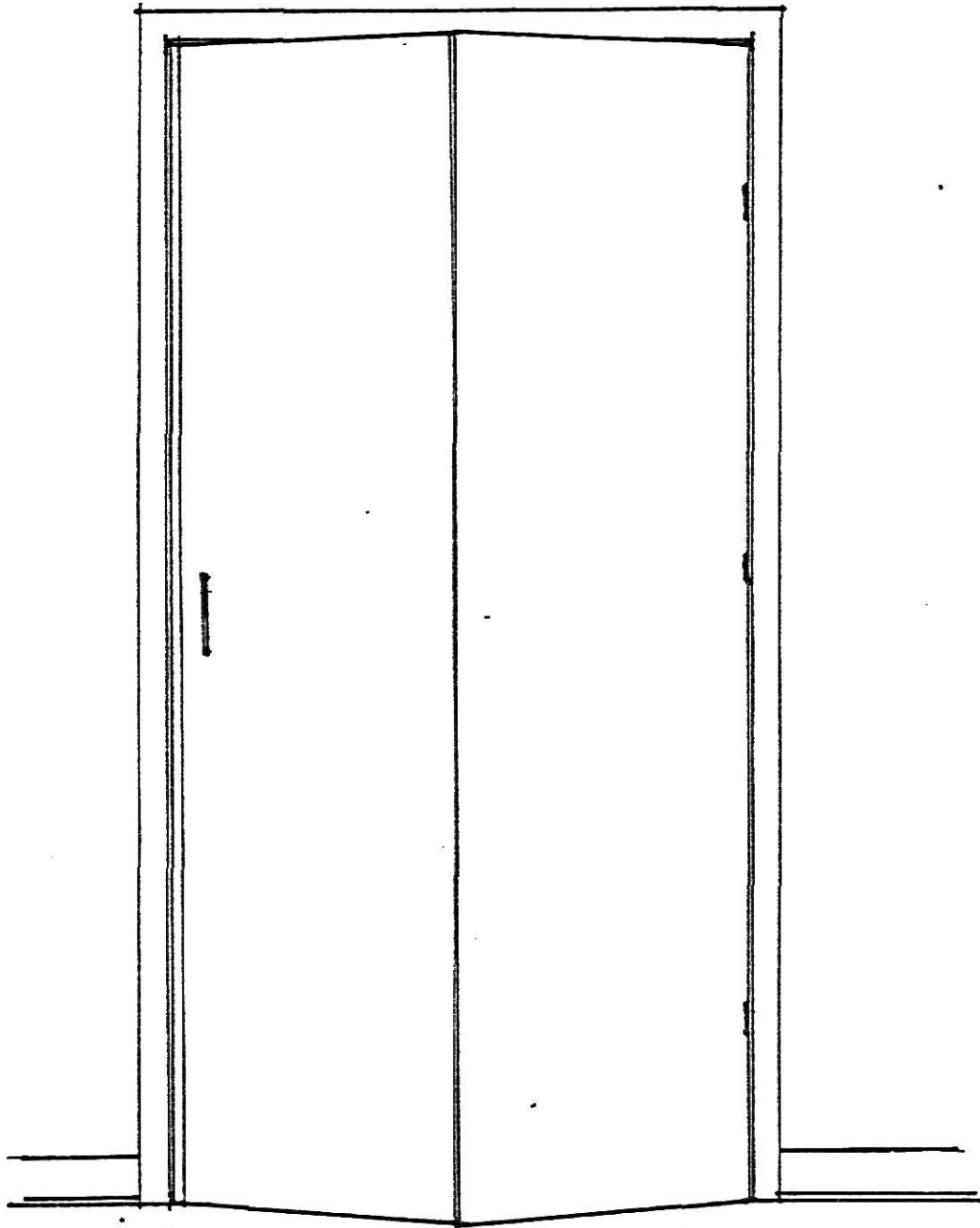


SOLID WALL WITH OPENING



SOLID WALL WITH SOLID DOOR

PLATE XVIII. Room Partition (Question 10.ii, b).



SOLID WALL WITH FOLDING DOOR

PLATE XIX. Room Partition (Question 10.11, c).



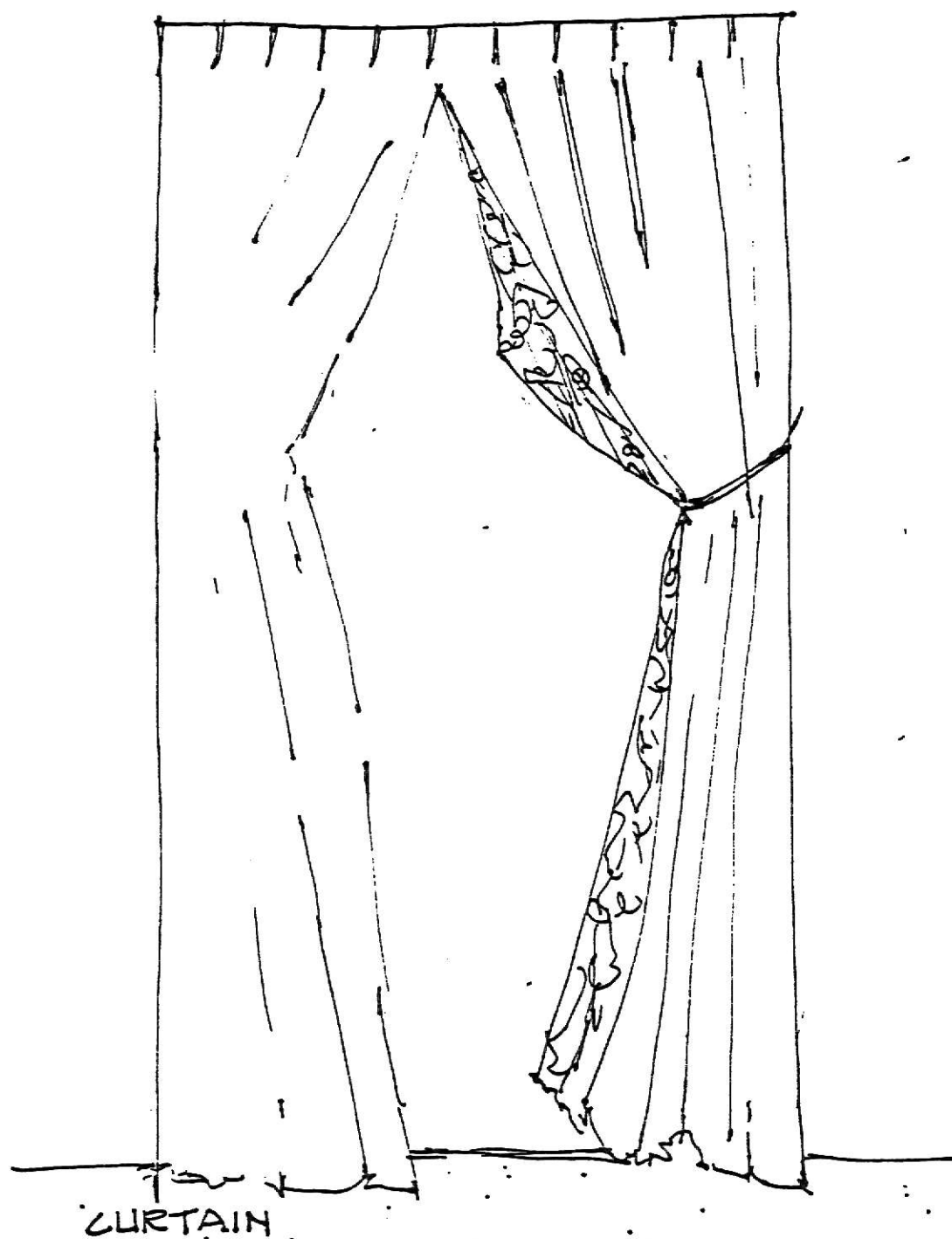
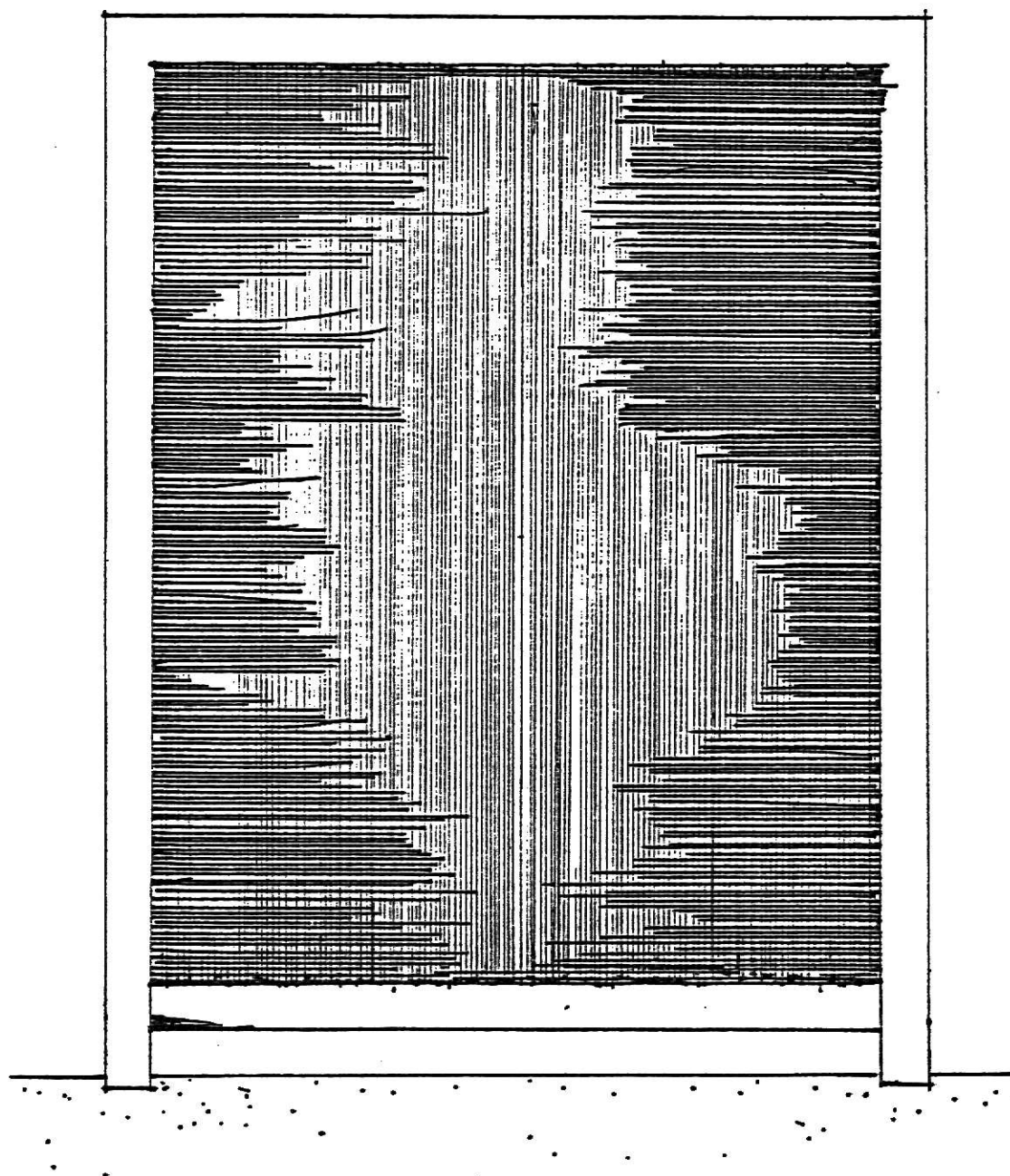
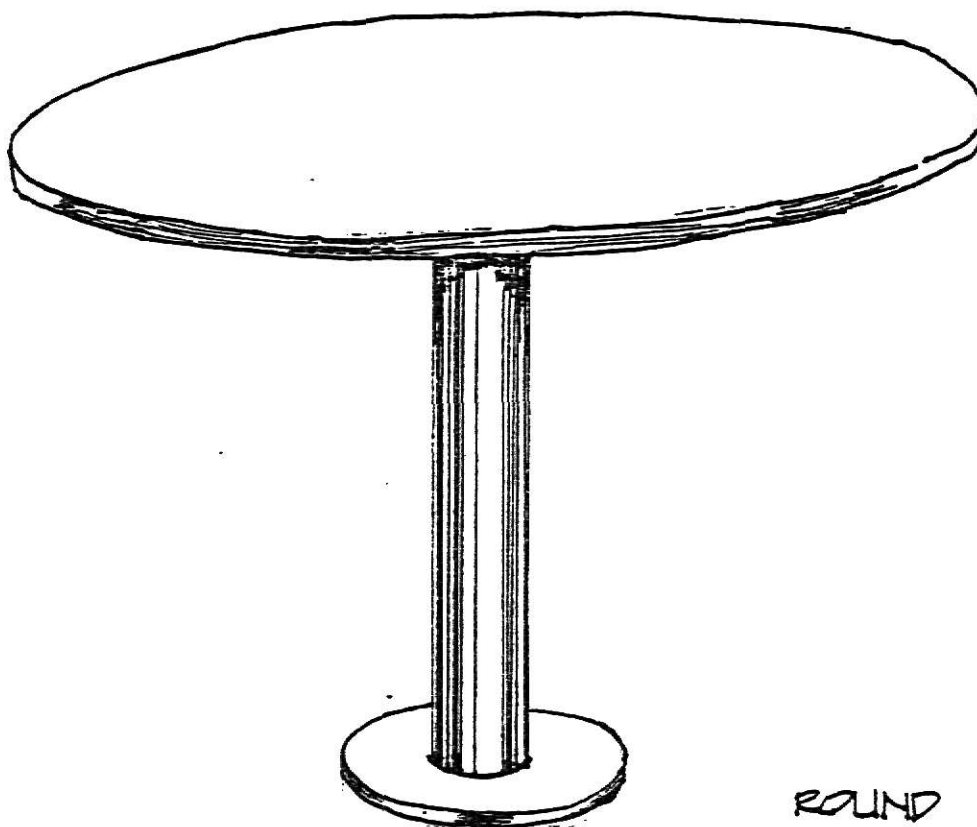


PLATE XX. Room Partition (Question 10.ii, d).



SCREEN.

PLATE XXI. Room Partition (Question 10.ii, e).



ROUND TABLE

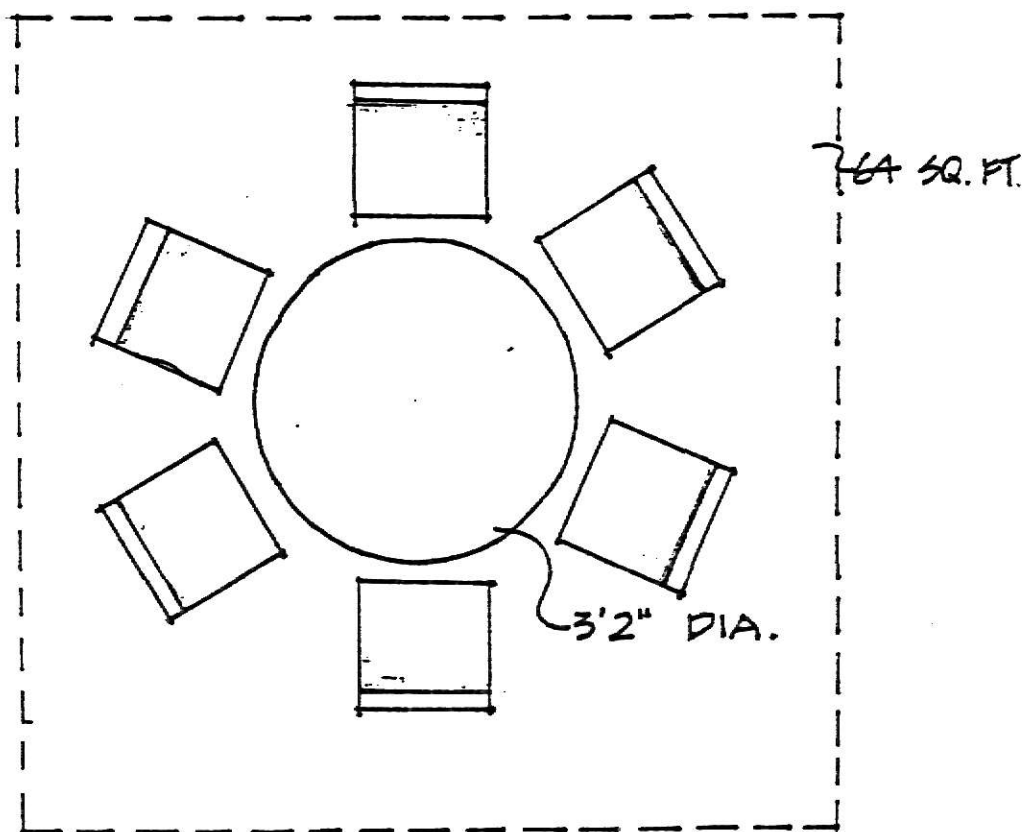
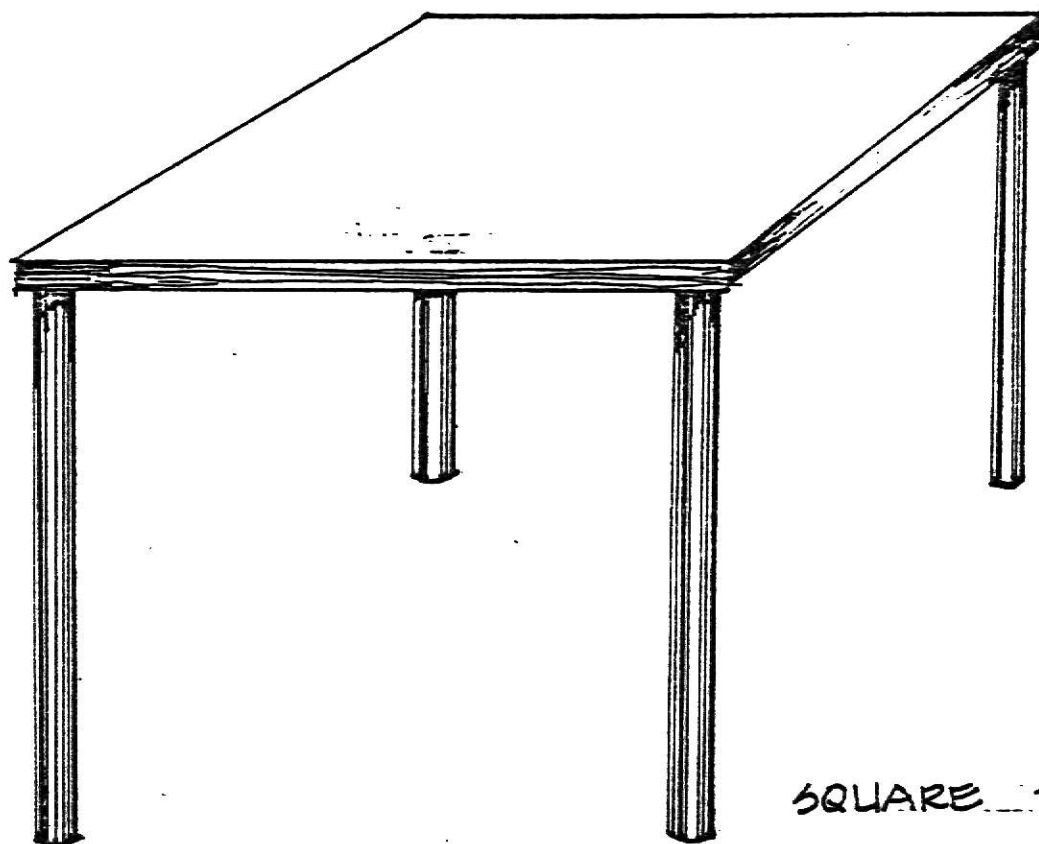
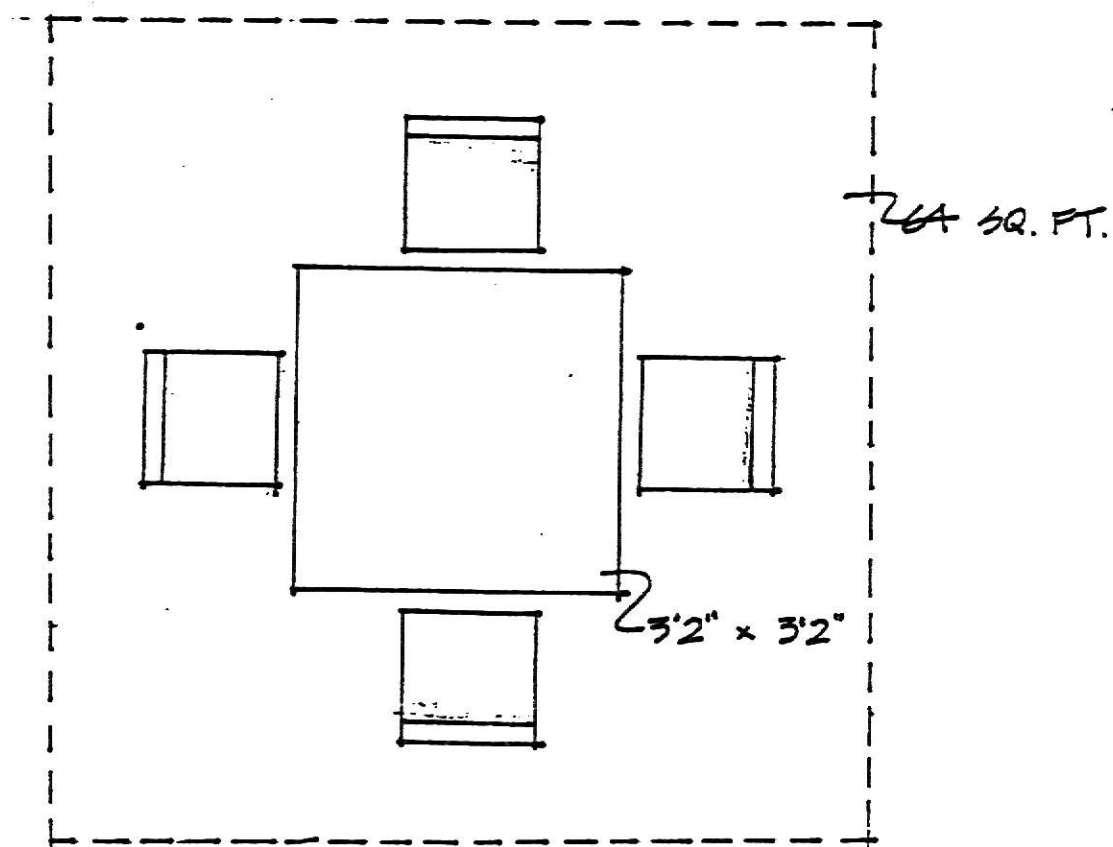


PLATE XXII. Dining Table Shape (Questions 12 and 13, a).



SQUARE TABLE



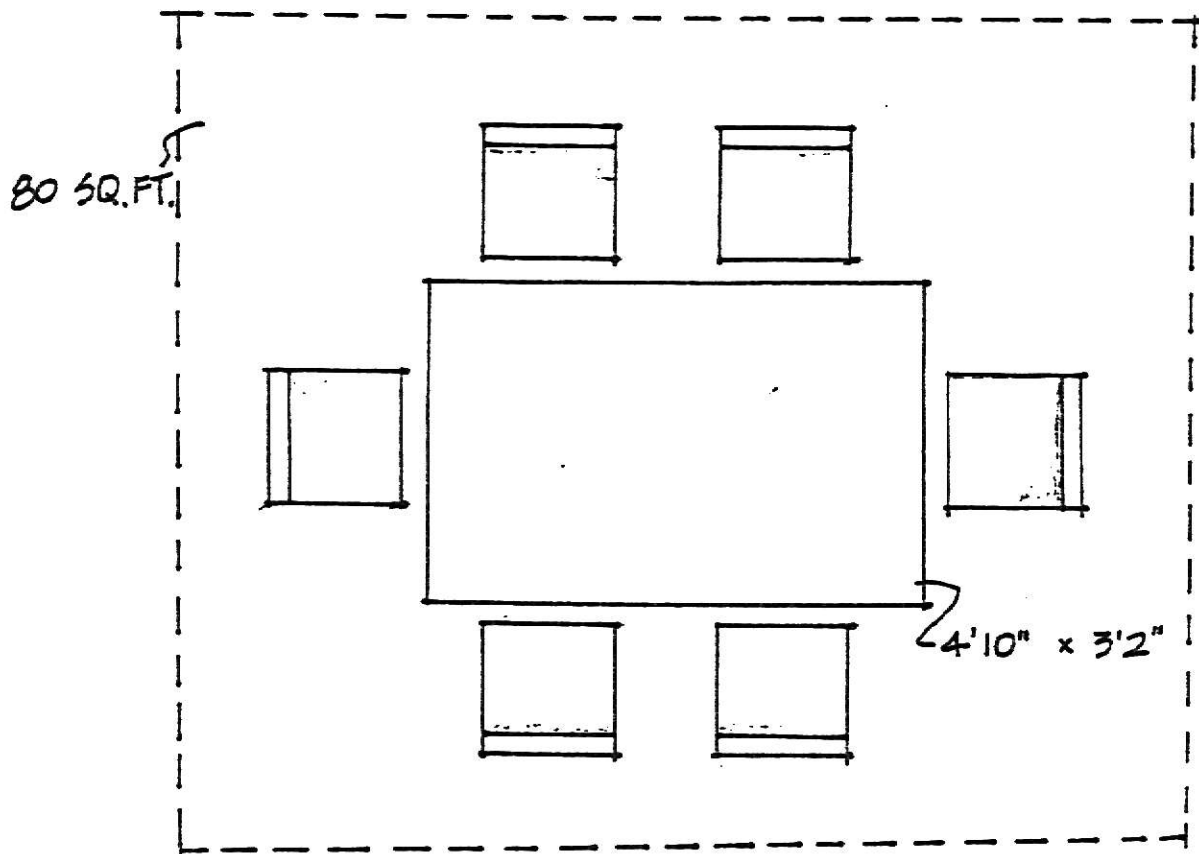
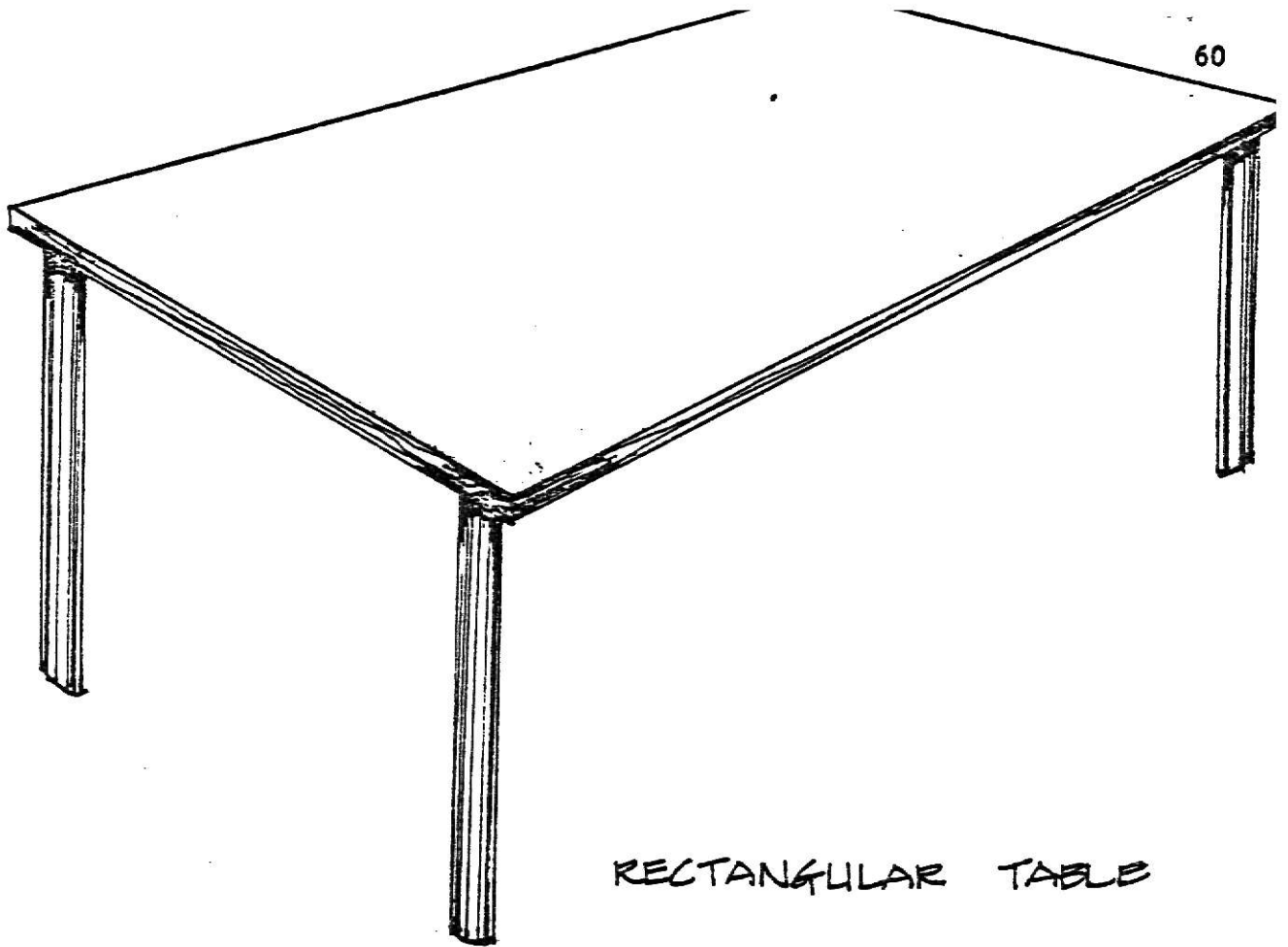
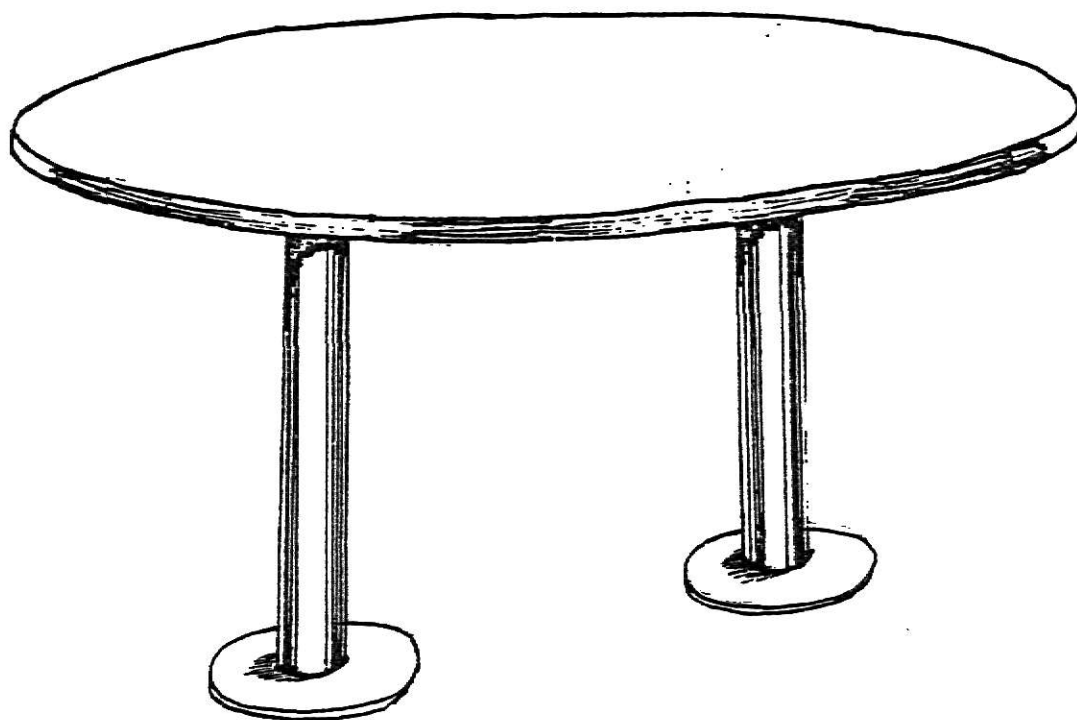


PLATE XXIV. Dining Table Shape (Questions 12 and 13, c).



OVAL TABLE

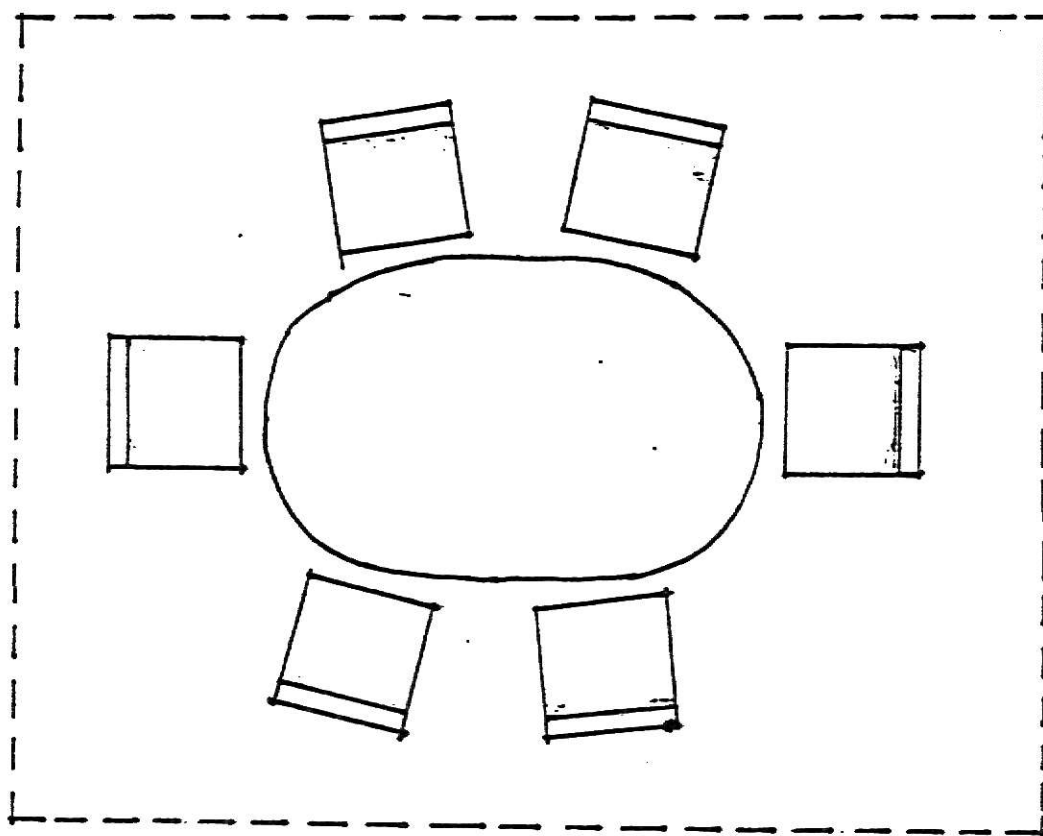
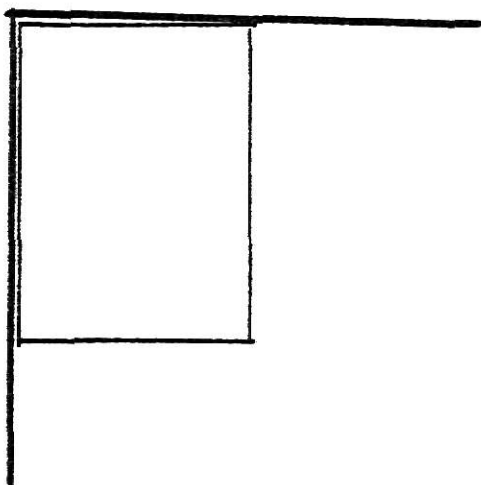
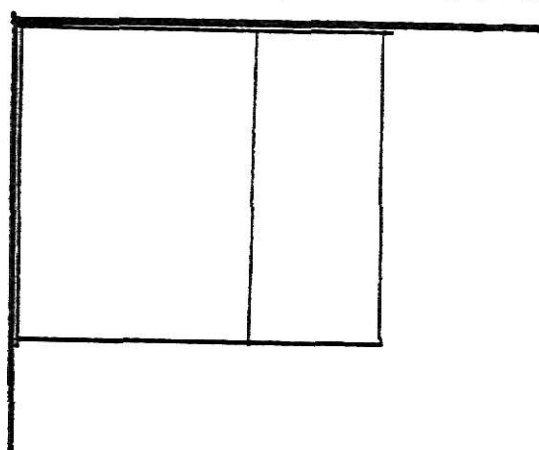


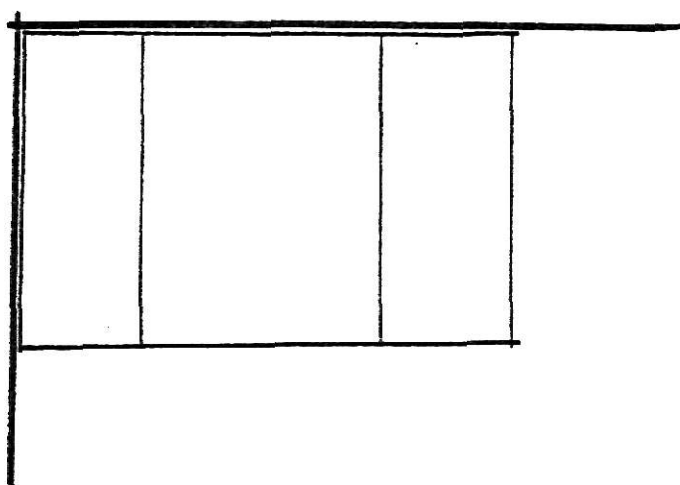
PLATE XXV. Dining Table Shape (Questions 12 and 13, d).



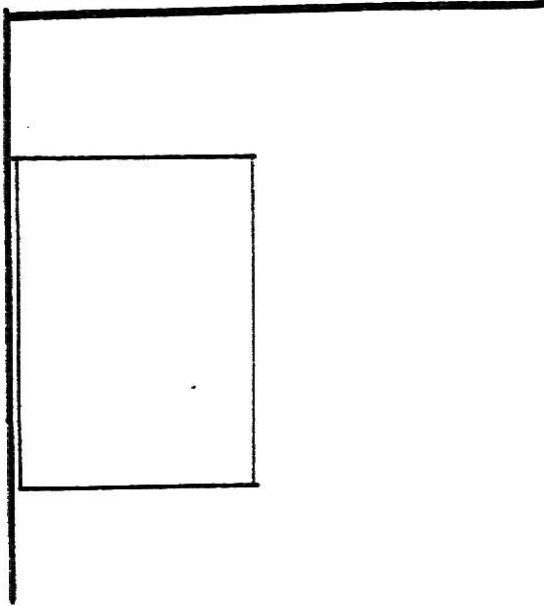
b. CORNER, ONE LEAF UP



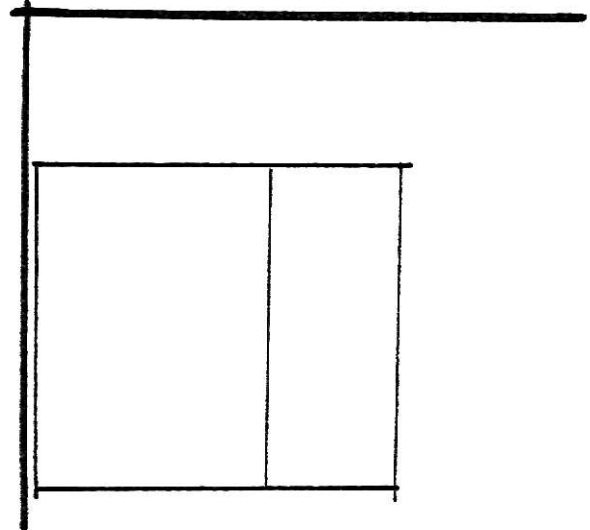
c. CORNER, TWO LEAVES UP



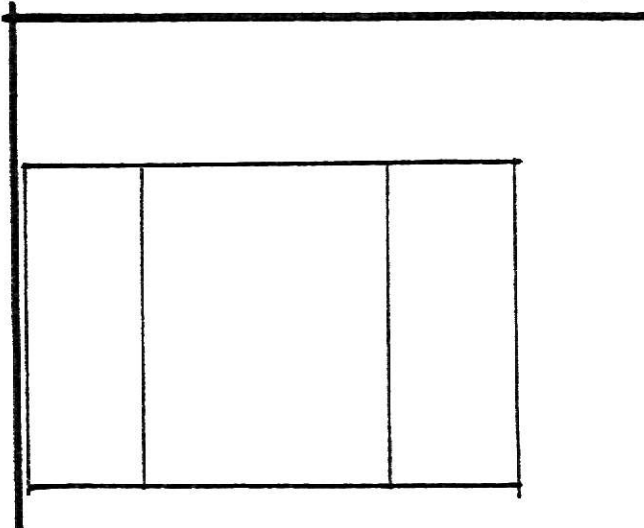
d. AGAINST ONE WALL, TWO LEAVES DOWN 63



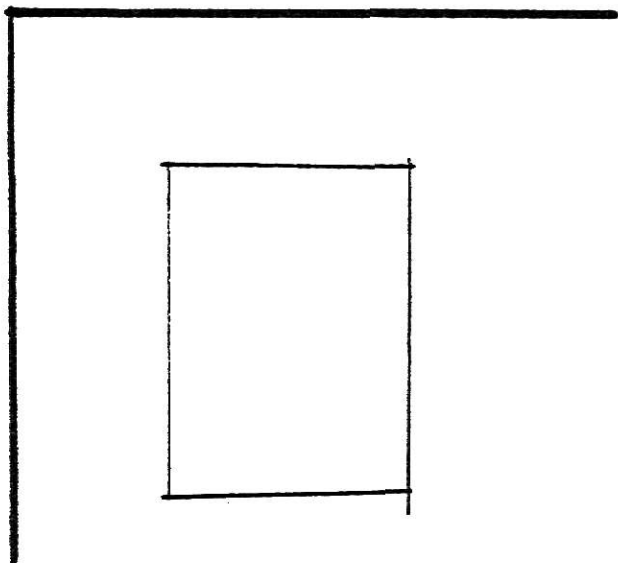
e. AGAINST ONE WALL, ONE LEAF UP



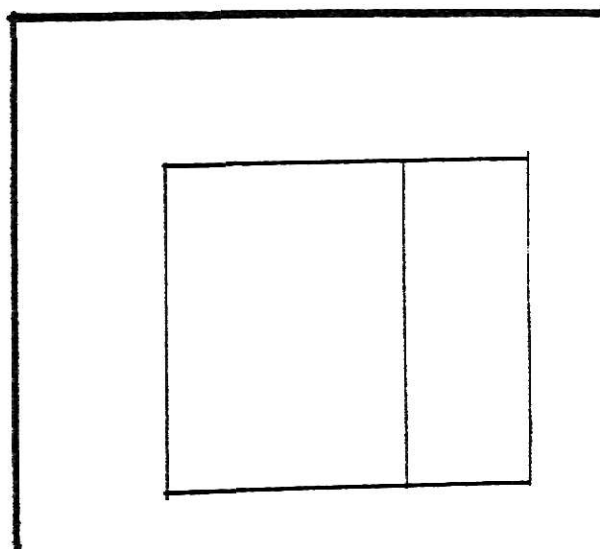
f. AGAINST ONE WALL, TWO LEAVES UP



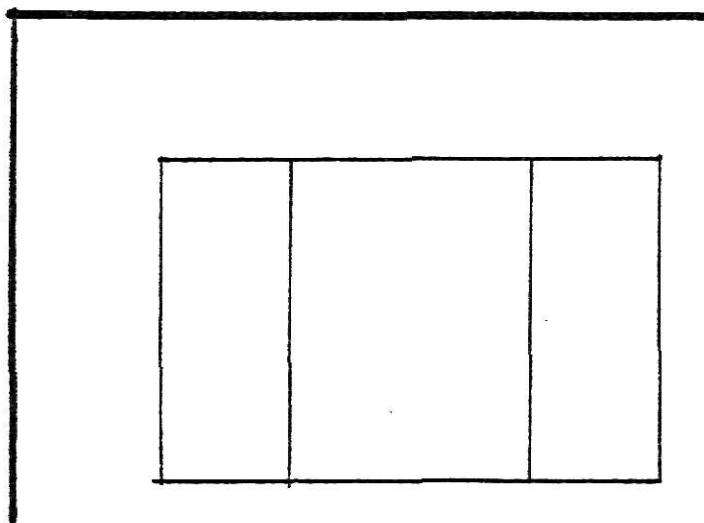




h. CENTER, ONE LEAF UP



i. CENTER, TWO LEAVES UP.



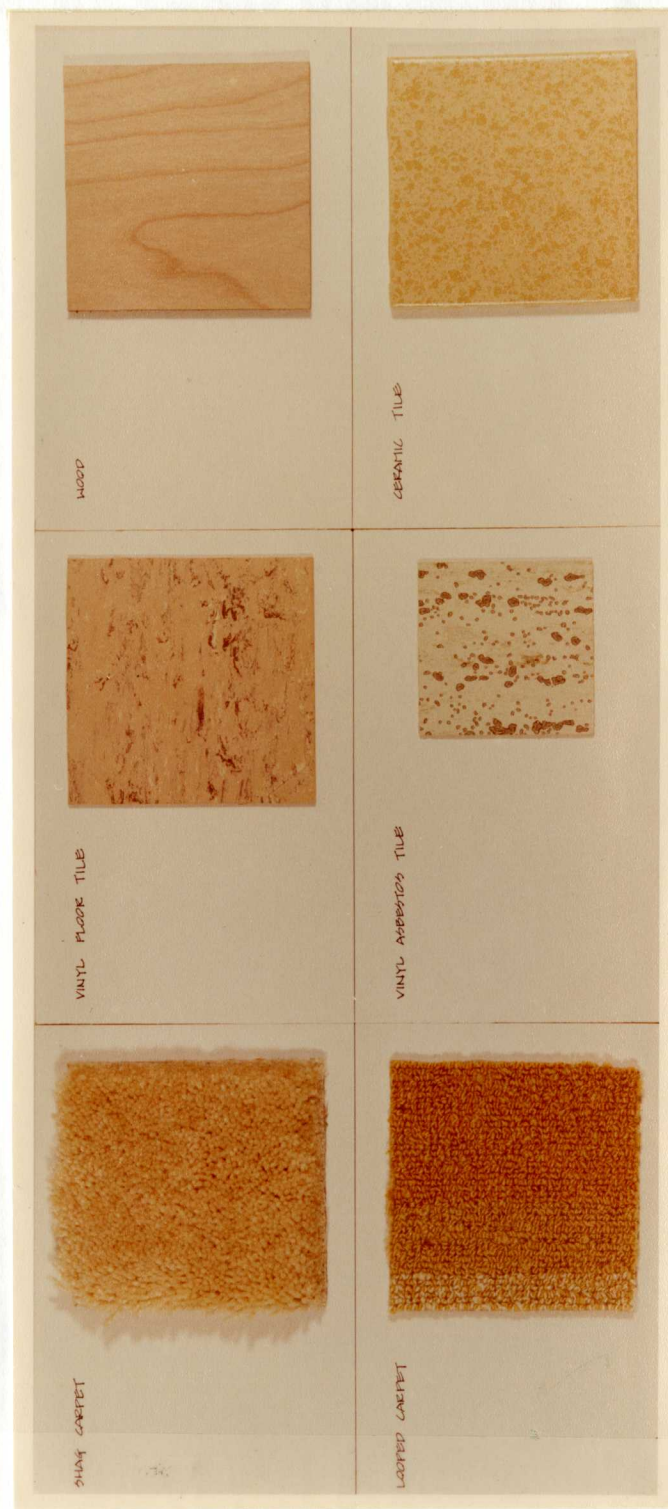


PLATE XXIX. Floor Material Samples

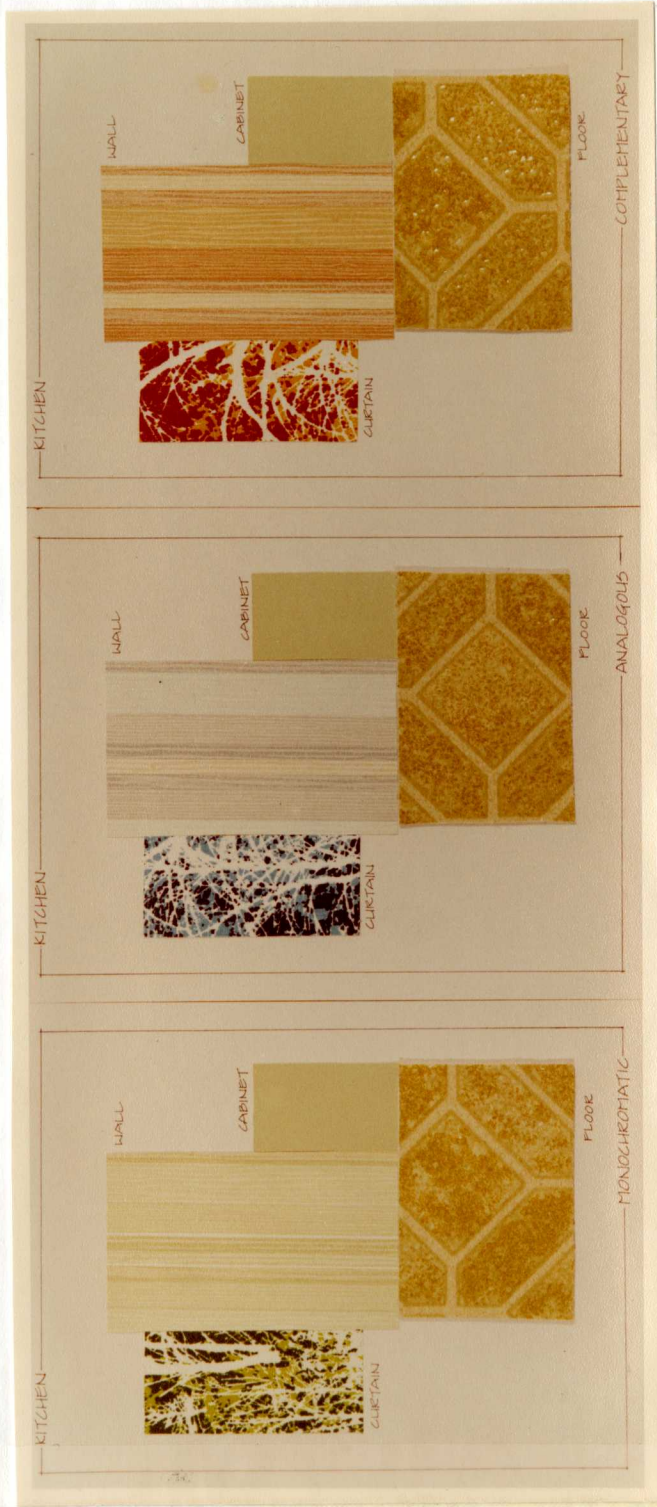


PLATE XXX. Color Schemes for the Kitchen



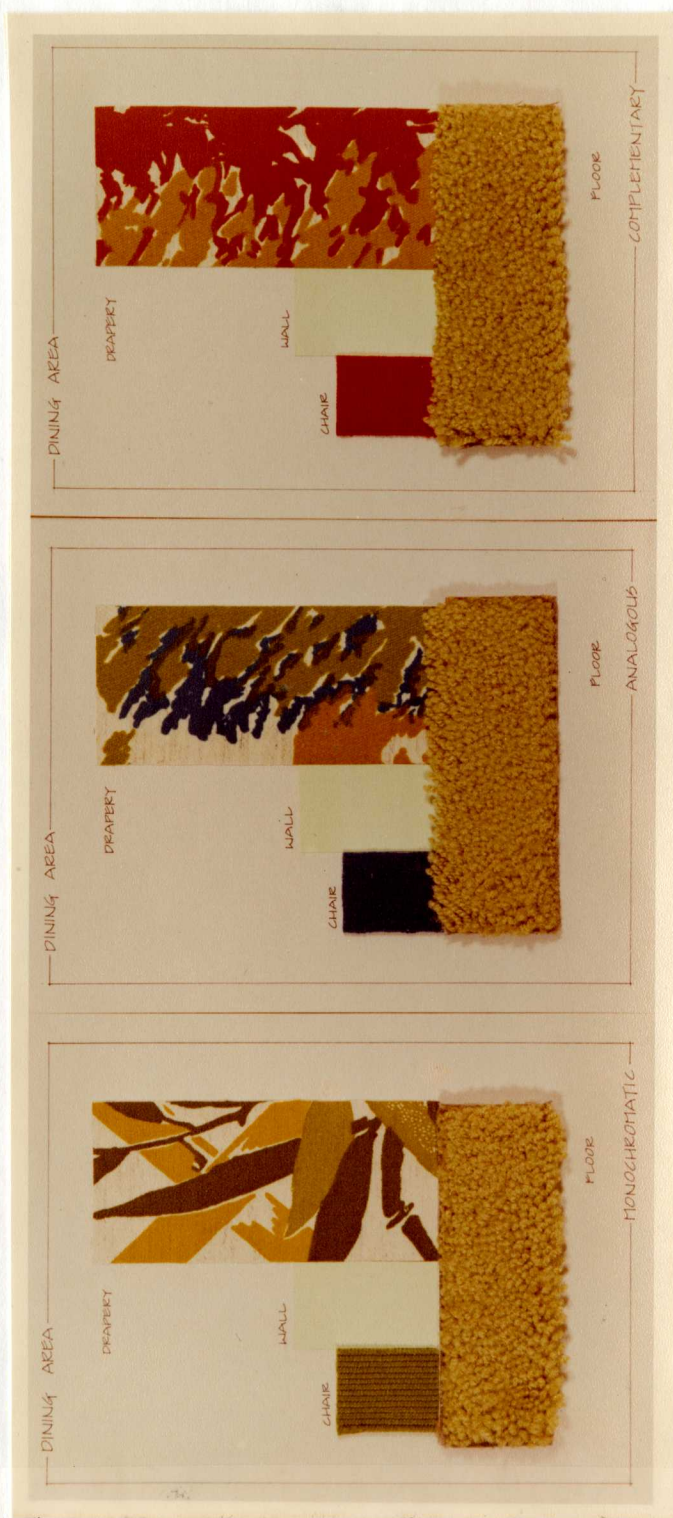
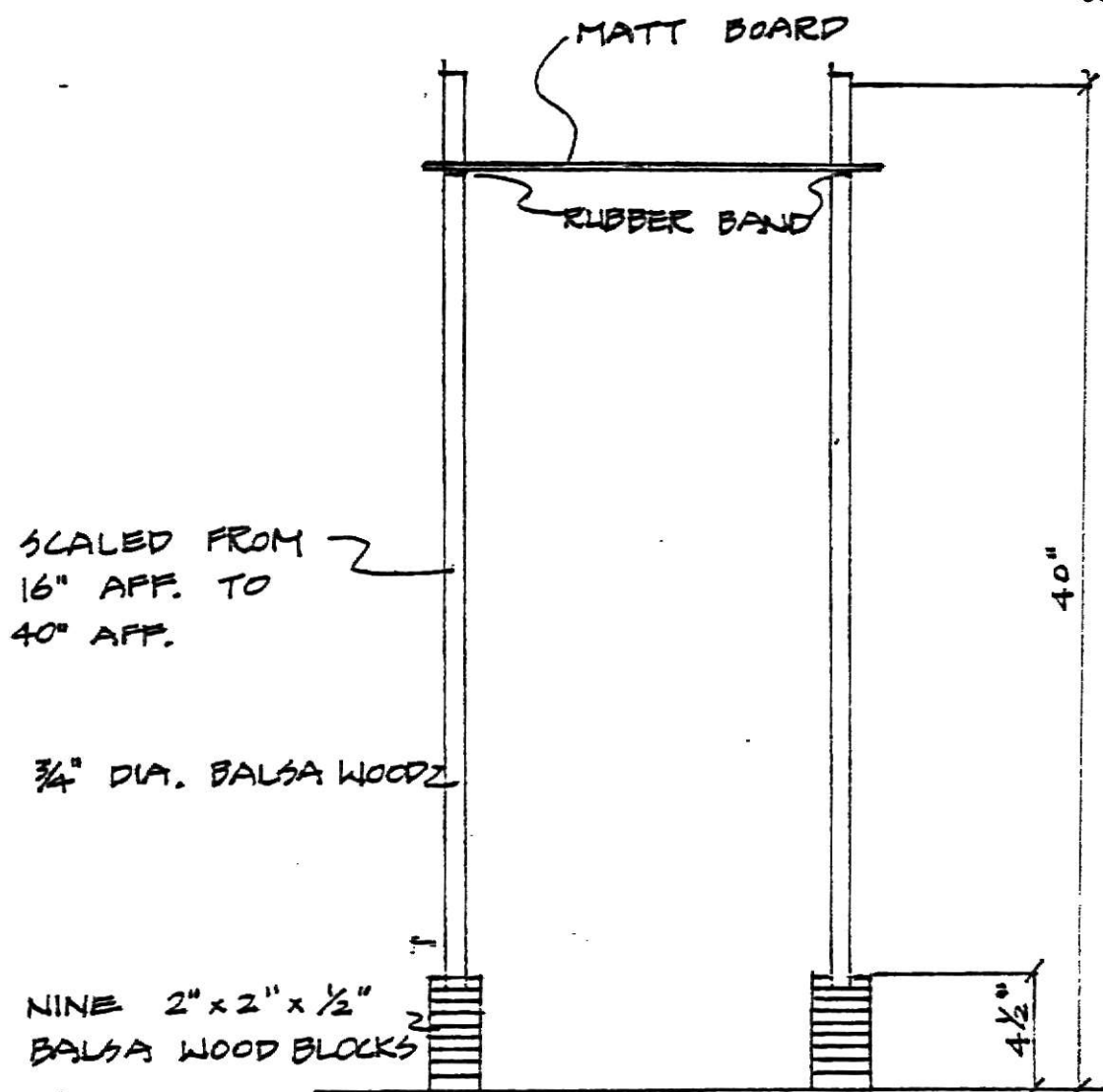
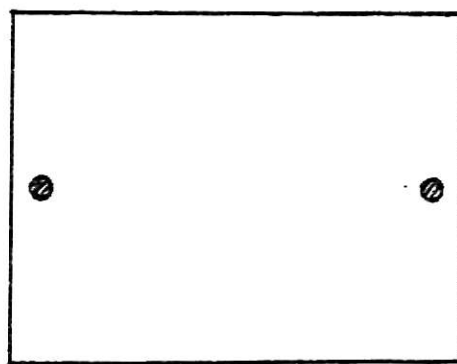


PLATE XXXI. Color Schemes for the Dining Area



SIDE VIEW  
SCALE:  $1\frac{1}{2}$ " = 1' 0"



TOP VIEW  
SCALE:  $1\frac{1}{2}$ " = 1' 0"

## APPENDIX C

## DEMOGRAPHIC DATA:

Age: mean-28.8, range-10 (35-25)

Height: mean-158.3 cm or 5'3 1/4", range-11 cm or 4 1/4"

Length of stay in Jarding Terrace: mean-21.4 months  
range-55 months (58 mths.-5 mths.)

## INTERVIEW RESULTS:

Table 1. Result of Question 1

	number	percentage
L-shaped	9	90%
one wall type	1	10%
U-shaped	0	0%

Table 2.i. Result of Question 2.i

	number	percentage
yes	0	0%
no	10	100%

Table 2.ii. Result of Question 2.ii

	number	percentage
yes	7	70%
no	3	30%

Table 2.iii. Result of Question 2.iii

	number	percentage
housing department	3	42.9%
myself	4	57.1%

Table 2.iv. Result of Question 2.iv

	number	percentage
ceiling surface mounted	1	10%
clg. sur. mtd. pendant	7	70%
table lamp	0	0%
floor lamp	0	0%
wall mtd. sconce	2	20%
none of the above	0	0%

Table 3.i. Result of Question 3.i

	number	percentage
yes	10	100%
no	0	0%

Table 3.iv. Result of Question 3.iv

	number	percentage
ceiling surface mounted	4	40%
clg. sur. mtd. pendant	0	0%
floor lamp	0	0%
wall mtd. fluorescent	0	0%
recessed under the wall cabinet	10	100%
none of the above	0	0%

Note: Four people considered they need a ceiling surface mounted light in addition to a recessed lighting under the wall cabinet.

Table 4.i. Result of Question 4.i

		number	percentage
ironing	yes	2	20%
	no	8	80%
cutting fabrics	yes	3	30%
	no	7	70%
sewing	yes	3	30%
	no	7	70%
playing cards, games	yes	5	50%
	no	5	50%
mixing	yes	9	90%
	no	1	10%
kneading	yes	8	80%
	no	2	20%
studying	yes	9	90%
	no	1	10%
reading	yes	7	70%
	no	3	30%
writing	yes	8	80%
	no	2	20%
typing	yes	8	80%
	no	2	20%
other (drawing)		1	10%

Table 4.ii. Result of Question 4.ii

		number	percentage
ironing	yes	2	100%
	no	0	0%
cutting fabrics	yes	2	66.6%
	no	1	33.3%
sewing	yes	3	100%
	no	0	0%
playing cards, games	yes	4	80%
	no	1	20%
mixing	yes	5	55.5%
	no	4	44.5%
kneading	yes	5	62.5%
	no	3	37.5%



Table 4.ii. continued

		number	percentage
studying	yes	7	77.3%
	no	2	22.2%
reading	yes	6	95.7%
	no	1	14.3%
writing	yes	7	87.5%
	no	1	12.5%
typing	yes	4	50%
	no	4	50%
other (drawing)		1	100%

Table 5. Result of Question 5

	number
no exhaust fan	8
counter top space insufficient	4
sink and stove are too close	3
insufficient storage space	2
range top unsuitable for wok	1
small refrigerator	1
small dining space	1
small space overall	1
no floor drain	1
kitchen and dining area are too close	1
no window	1
no hanging space for pans	1
pilot light is always on	1

Table 6. Result of Question 6

	number
having oven	6
hot water is available all day	3
many burners	2
pilot light is always on	1
sufficient light	1
stainless counter top is easy to clean	1
many storage spaces	1
many electric outlets	1
hot and cold water run simultaneously	1
right height of the counter top	1
have refrigerator in the kitchen	1

Table 7. Result of Question 7

		number	percentage
exhaust fan	yes	10	100%
	no	0	0%
electric stove	yes	2	20%
	no	8	80%
dish washer	yes	4	40%
	no	6	60%
garbage disposal	yes	10	100%
	no	0	0%
other (more storage space, double sink, microwave oven)			

Table 8. Result of Question 8

	number	percentage
single sink	0	0%
double sink	10	100%
larger single sink	0	0%

Table 9. Result of Question 9

	number	percentage
single sink	6	60%
double sink	2	20%
larger single sink	2	20%

Table 10.i. Result of Question 10.i

	number	percentage
yes	5	50%
no	5	50%

Table 10.ii. Result of Question 10.ii

	number	percentage
solid wall w/opening	3	60%
solid wall w/solid door	0	0%
solid wall w/folding door	1	20%
curtain	0	0%
screen	1	20%

Table 11. Result of Question 11

	number	percentage
once a week or more	0	0%
once every two weeks	0	0%
once every three weeks	4	40%
once every month or less	6	60%

Table 12. Result of Question 12

	number	percentage
round	5	50%
square	1	10%
rectangular	2	20%
oval	2	20%
don't care	0	0%

Table 13. Result of Question 13

	number	percentage
round	0	0%
square	7	70%
rectangular	2	20%
oval	0	0%
don't care	1	10%

Table 14. Result of Question 14

	number	percentage
yes	6	60%
no	4	40%

Table 15. Result of Question 15

	number	percentage
L-shaped	7	70%
one wall type	2	20%
U-shaped	1	10%

Table 16.i. Result of Question 16.i

	number	percentage
yes	9	90%
no	1	10%

Table 16.ii. Result of Question 16.ii

	number	percentage
like it that way	0	0%
no choice	9	100%

Table 17. Result of Question 17

	number	percentage
corner		
two leaves down	1	10%
one leaf up	5	50%
two leaves up	2	20%
against one wall		
two leaves down	1	10%
one leaf up	1	10%
two leaves up	0	0%
center		
two leaves down	0	0%
one leaf up	0	0%
two leaves up	0	0%

Table 18.i. Result of Question 18.i

	number	percentage
yes	10	100%
no	0	0%

Table 18.ii. Result of Question 18.ii

	number	percentage
yes	5	50%
no	5	50%

Table 18.iii. Result of Question 18.iii

	number	percentage
yes	9	90%
no	1	10%

Table 18.iv. Result of Question 18.iv

	number	percentage
yes	4	44.4%
no	5	55.6%

Table 19. Result of Question 19

	number	percentage
yes	8	80%
no	2	20%

Table 20. Result of Question 20

	number	percentage
yes	0	0%
no	10	100%

Table 21.i. Result of Question 21.i

	number	percentage
yes	6	60%
no	4	40%

Table 21.ii. Result of Question 21.ii

	number	percentage
self adhesive plastic	5	83.3%
wall paper, foil	1	16.7%

Table 22.i. Result of Question 22.i

	number	percentage
yes	3	30%
no	7	70%

Table 22.ii. Result of Question 22.ii

	number	percentage
shag carpet	1	33.3%
looped carpet	1	33.3%
towel	1	33.3%

Table 23. Result of Question 23

	never		seldom		often		daily	
	no.	percent.	no.	percent.	no.	percent.	no.	percent.
counter top	0	0%	0	0%	5	50%	5	50%
counter top corners	0	0%	4	40%	5	50%	1	10%
range	0	0%	7	70%	2	20%	1	10%
oven	4	40%	6	60%	0	0%	0	0%
broiler	7	70%	3	30%	0	0%	0	0%
kitchen wall	3	30%	5	50%	2	20%	0	0%
kitchen floor	1	10%	1	10%	7	70%	1	10%
faucet	0	0%	1	10%	9	90%	0	0%
sink	0	0%	0	0%	3	30%	7	70%
kitchen cabinet interiors	0	0%	10	100%	0	0%	0	0%
cabinet doors	1	10%	4	40%	5	50%	0	0%
fluorescent light fixture	5	50%	5	50%	0	0%	0	0%

Table 24. Result of Question 24

	very hard		hard		moderate		easy		very easy	
	no.	percent.	no.	percent.	no.	percent.	no.	percent.	no.	percent.
counter top	0	0%	0	0%	1	10%	5	50%	4	40%
counter top corners	0	0%	0	0%	2	20%	7	70%	1	10%
range	1	10%	5	50%	3	30%	1	10%	0	0%
oven	1	10%	6	60%	1	10%	0	0%	0	0%
broiler	0	0%	3	30%	1	10%	0	0%	0	0%
kitchen wall	0	0%	4	40%	3	30%	3	30%	0	0%
kitchen floor	1	10%	1	10%	2	20%	6	60%	0	0%
faucet	0	0%	1	10%	1	10%	7	70%	1	10%
sink	0	0%	0	0%	0	0%	7	70%	3	30%
kitchen cabinet interiors	0	0%	3	30%	4	40%	2	20%	1	10%
cabinet doors	0	0%	2	20%	2	20%	5	50%	1	10%
fluorescent light fixture	0	0%	3	30%	1	10%	2	20%	0	0%

Note: Response on oven, broiler, and fluorescent light fixture does not add up to 100%.  
Non-respondents have never cleaned the facilities so that the evaluation is impossible.

Table 25. Result of Question 25

	number	percentage
very pleasant	0	0%
pleasant	1	10%
plain	7	70%
unpleasant	2	20%
very unpleasant	0	0%

Table 26. Result of Question 26

	number	percentage
yes	0	0%
no	10	100%

Table 27. Result of Question 27

	number	percentage
shag carpet	5	50%
looped carpet	1	10%
vinyl floor tile	0	0%
vinyl asbestos tile	0	0%
wood	1	10%
ceramic tile	3	30%

Table 28. Result of Question 28

	number	percentage
shag carpet	0	0%
looped carpet	0	0%
vinyl floor tile	2	20%
vinyl asbestos tile	0	0%
wood	0	0%
ceramic tile	8	80%

Table 29. Result of Question 29

	number	percentage
shag carpet	1	10%
looped carpet	4	40%
vinyl floor tile	0	0%
vinyl asbestos tile	0	0%
wood	3	30%
ceramic tile	2	20%

Table 30. Result of Question 30

	number	percentage
very pleasant	0	0%
pleasant	1	10%
plain	6	60%
unpleasant	2	20%
very unpleasant	1	10%

Table 31. Result of Question 31

	number	percentage
monochromatic	9	90%
analogous	1	10%
complementary	0	0%
don't care	0	0%

Table 32. Result of Question 32

	number	percentage
monochromatic	8	80%
analogous	1	10%
complementary	1	10%
don't care	0	0%

Table 33.i. Result of Question 33.i

		number	percentage
mixing	yes	6	60%
	no	4	40%
kneading*	yes	1	10%
	no	8	80%
cutting	yes	9	90%
	no	1	10%
cooking	yes	8	80%
	no	2	20%

\* One respondent do not knead.

Table 33.ii. Result of Question 33.ii

	average height desired
mixing	35 3/4"
kneading	33 1/2"
cutting	36 5/8"
cooking	36 3/8"

Table 34. Result of Question 34

	number	percentage
yes	10	100%
no	0	0%



Table 35.i. Result of Question 35.i

		number	percentage
ironing	yes	2	100%
	no	0	0%
cutting fabrics	yes	2	66.6%
	no	1	33.3%
sewing	yes	3	100%
	no	0	0%
playing cards, games	yes	5	100%
	no	0	0%
mixing	yes	5	55.5%
	no	4	44.5%
kneading	yes	2	25%
	no	6	75%
studying	yes	8	88.8%
	no	1	11.2%
reading	yes	5	71.4%
	no	2	28.6%
writing	yes	7	87.5%
	no	1	12.5%
typing	yes	3	37.5%
	no	5	62.5%
drawing	yes	1	100%
	no	0	0%

Table 35.ii. Result of Question 35.ii

	average height desired
ironing	29 3/4"
cutting fabrics	31 1/8"
sewing	29 3/4"
playing cards, games	29 3/4"
mixing	32"
kneading	31 3/4"
studying	29 7/8"
reading	29 7/8"
writing	29 7/8"
typing	27 7/8"
drawing	29 3/4"

Table 36. Result of Question 36

	number	percentage
bottom shelf front	0	0%
bottom shelf rear	2	20%
middle shelf front	5	50%
middle shelf rear	2	20%
top shelf front	1	10%
top shelf rear	0	0%

Table 37. Result of Question 37

	number	percentage
yes	7	70%
no	3	30%

Table 38. Result of Question 38

	number	percentage
yes	5	50%
no	5	50%

Table 39. Result of Question 39

	number	percentage
got burned on gas stove	6	60%
slipped on wet floor	3	30%
bumped into the corner of the table	5	50%
bumped into open cabinet door due to its height	10	100%
got caught with metal edge moldings of lower cabinet doors	1	10%
dropped knife due to the lack of counter top space	1	10%
bumped into open oven door due to the small kitchen space	1	10%
kicked the lower cabinet door corner	1	10%

Table 40. Result of Question 40

	number	percentage
got burned on gas stove		
poor design	3	50%
carelessness	3	50%
slipped on wet floor		
poor design	0	0%
carelessness	3	100%
bumped into corner of the table		
poor design	2	40%
carelessness	3	60%
bumped into open cabinet door		
poor design	5	50%
carelessness	5	50%
got caught with metal edge moldings		
poor design	0	0%
carelessness	1	100%
dropped knife		
poor design	1	100%
carelessness	0	0%
bumped into open oven door		
poor design	1	100%
carelessness	0	0%
kicked the lower cabinet door		
poor design	1	100%
carelessness	0	0%

## APPENDIX D

Figures 1 through 10 were originally drawn on 17" x 22" vellum and then reduced to the size of 11" x 17". Samples of materials used in the proposed design were mounted on 22" x 29" matt board. The picture of the sample board is shown in Figure 11.

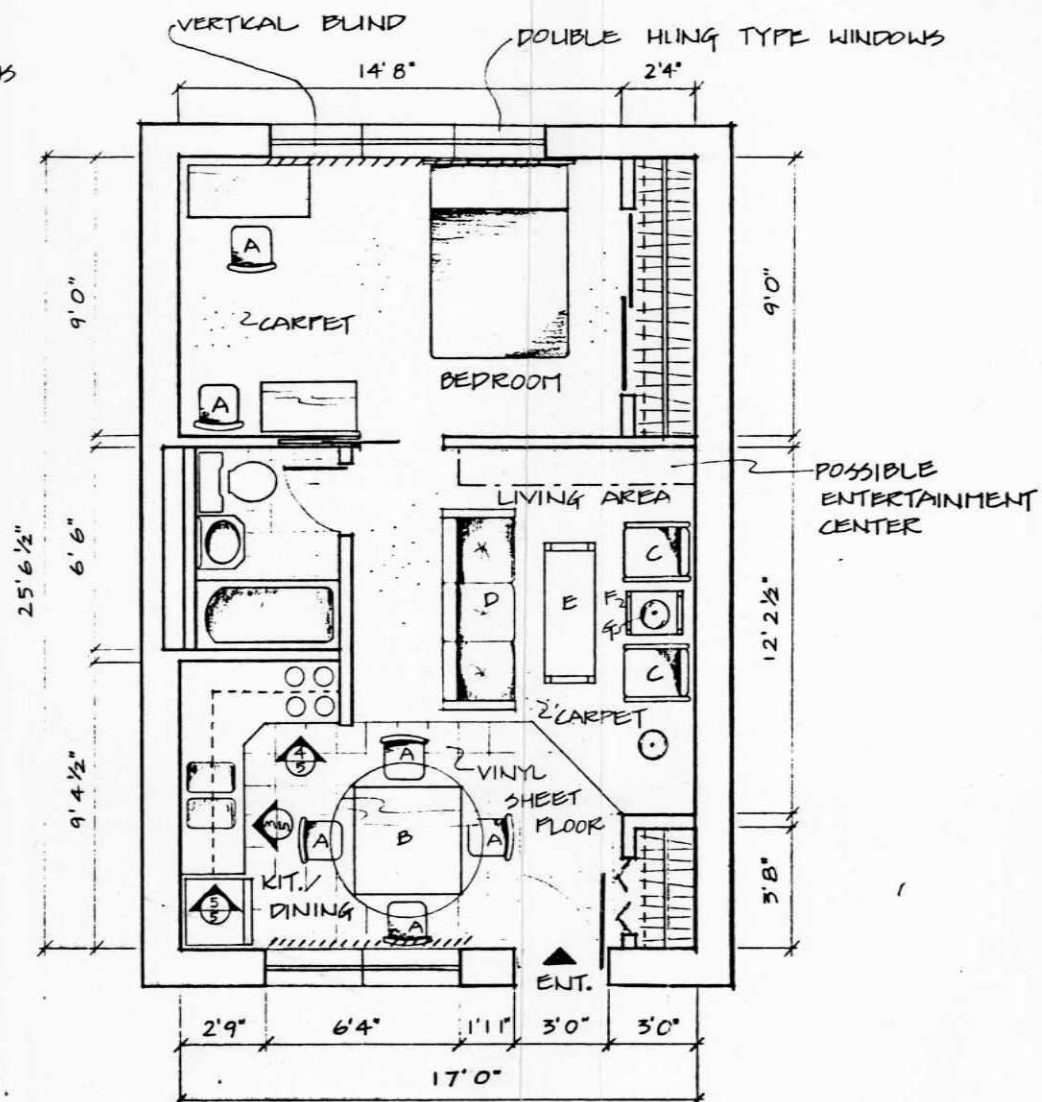
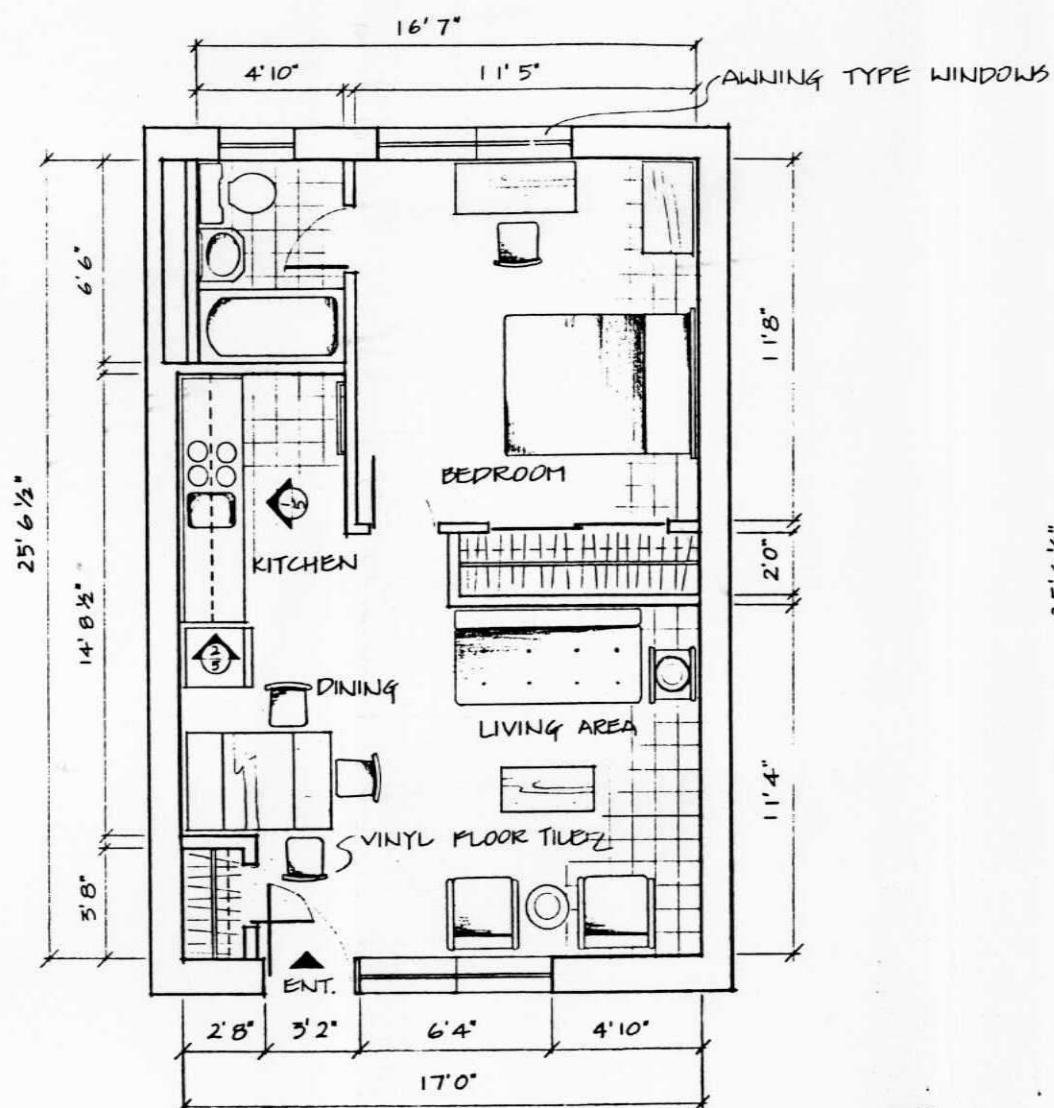


Figure 1.

# FLOOR PLANS

## JARDINE TERRACE

SHEET

OF 10 SHTS

FURNITURE SCHEDULE							
ITEM #	CODE	QTY.	IDENTIFICATION & MANUFACTURER	FINISH	UPHOLSTERY	HARDWARE	REMARKS
1	A	6	STACKING CHAIR CADO/ROYAL, BOOTH 1080	NATURAL MAPLE	100% NYLON		
2	B	1	DROP LEAF TABLE BY DESIGNER	PLASTIC LAMINATE POLISHED CHROME		METAL MULTI- PLE HINGE	SEE PAGE 9, 10
3	C	2	ARM CHAIR METROPOLITAN 536F.	NATURAL MAPLE	100% NYLON		
4	D	1	SOFA BED THE BERKLINE CORP 174-79-9	DO.	100% NYLON		MATTRESS SIZE 72" L x 60" W
5	E	1	COFFEE TABLE THONET 893-110	PLASTIC LAMINATE TABLE TOP			
6	F	1	SIDE TABLE THONET 891-090	DO.			
7	G	1	TABLE LAMP NESSEN NT 931	POLISHED CHROME			MOLDED PLASTIC DOME
8	H	1	FLOOR LAMP NESSEN NF 1000	DO.			CLEAR ACRYLIC TABLE

## NOTE:

BEDROOM FURNITURE REMAIN AS IS.

Figure 2.

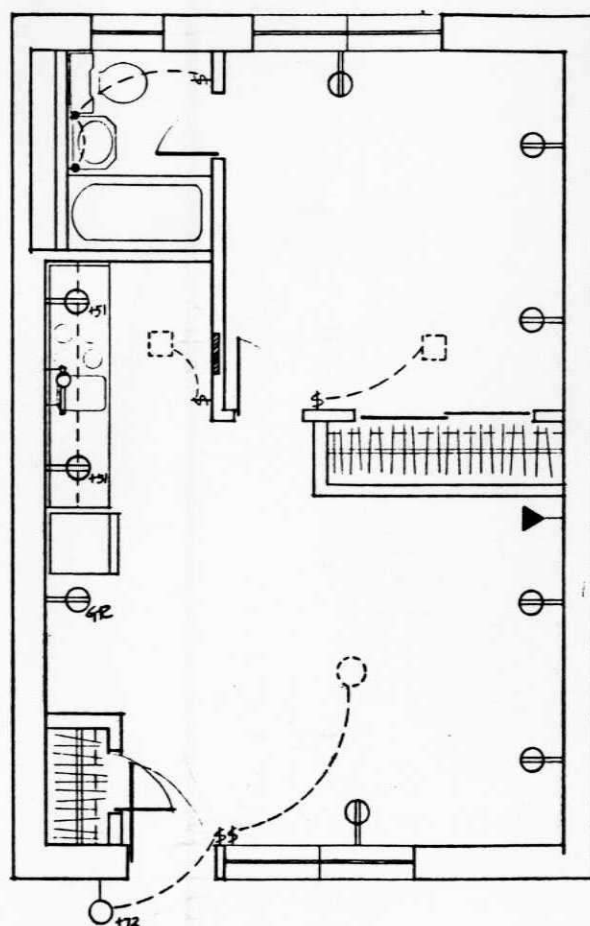
FURNITURE SCHEDULE  
JARDINE TERRACE

SHEET

2

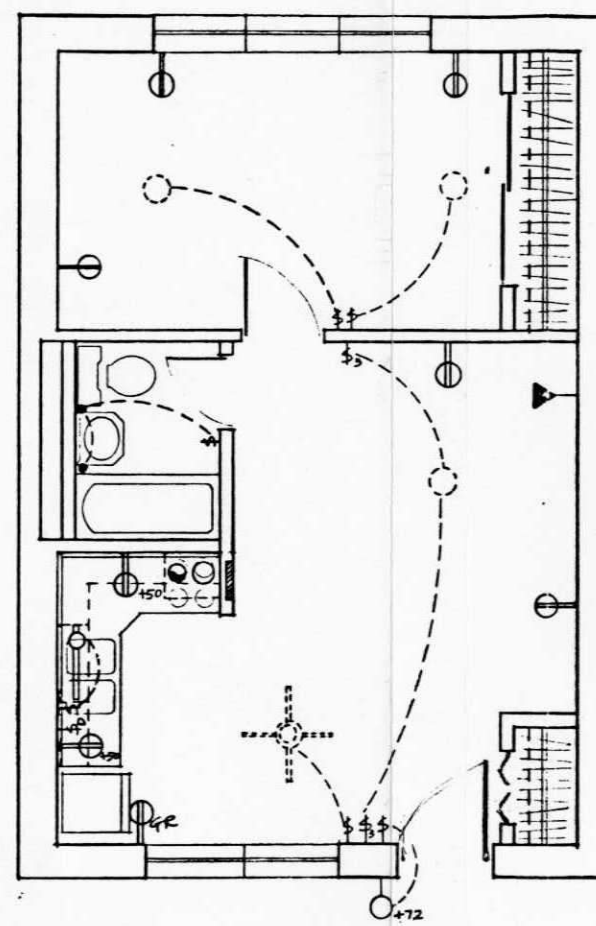
OF 10 SHEETS

SYMBOL KEYS		
SYMBOL	DESCRIPTION	REMARKS
	DUPLEX CONVENIENCE OUTLET	16" AFF. UNLESS OTHERWISE SPECIFIED
	DUP. CONV. OUTLET FOR GROUNDING TYPE PLUGS	DO
	WALL MTD. TELEPHONE OUTLET	DO
	SINGLE-POLE SWITCH	4'0" AFF.
	3-WAY SWITCH	DO
	SWITCH FOR GARBAGE DISPOSER	4'2" AFF.
	RANGE HOOD W/EXHAUST FAN, LIGHT & SWITCH	
	CEILING SURFACE MTD. INCAND. LIGHT FIX.	
	CEILING TRACK PENDANT LIGHT W/RETRACTABLE CORD	
	RECESSED CLG. MTD. INCAND. LIGHT FIX.	
	FLUO. LIGHT FIX. RECESSED UNDER WALL CABINET	
	WALL MTD. FLUO. LIGHT FIX. W/ SWITCH	
	WALL MTD. VERTICAL FLUO. LIGHT FIX. W/ CONV. OUTLET	
	WALL MTD. INCAND. LIGHT FIX.	
	BREAKER BOX	



EXISTING PLAN

SCALE: 1/4" = 1'0"



PROPOSED PLAN

SCALE: 1/4" = 1'0"





Figure 3.

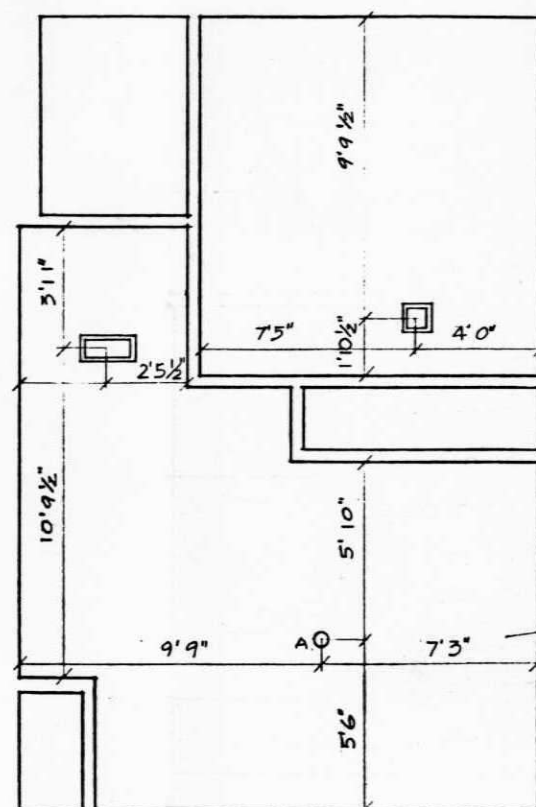
ELECTRICAL PLANS  
JARDINE TERRACE

SHEET

3

OF 10 SHTS.

SYMBOL KEYS	
SYMBOL	DISCRIPTION
	RECESSED INCAND. LIGHT
	SURFACE MTD. INCAND. DOWN LIGHT
	SURFACE MTD. INCAND. GENERAL LIGHT
	SURFACE MTD. TRAC



ALL CEILING HEIGHTS 8'2"

PLASTERED CEILING

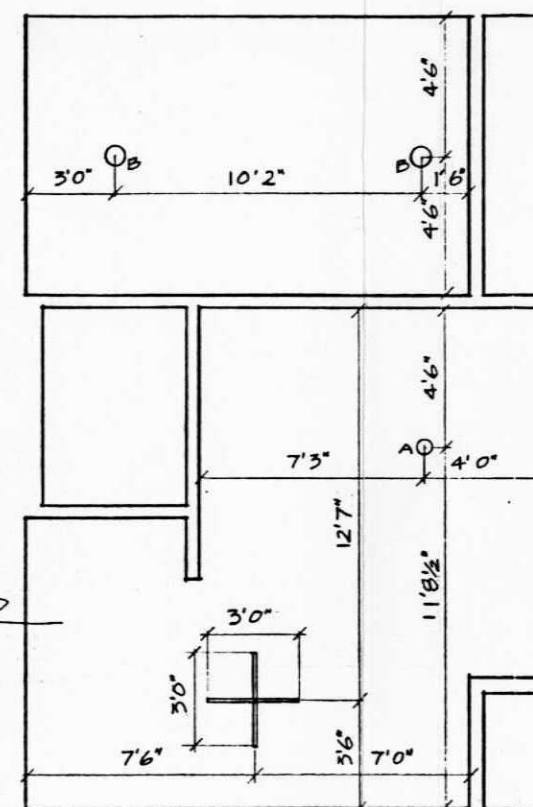


Figure 4.

REFLECTED CEILING PLANS  
JARDINE TERRACE

SHEET

4

OF 10 SHTS



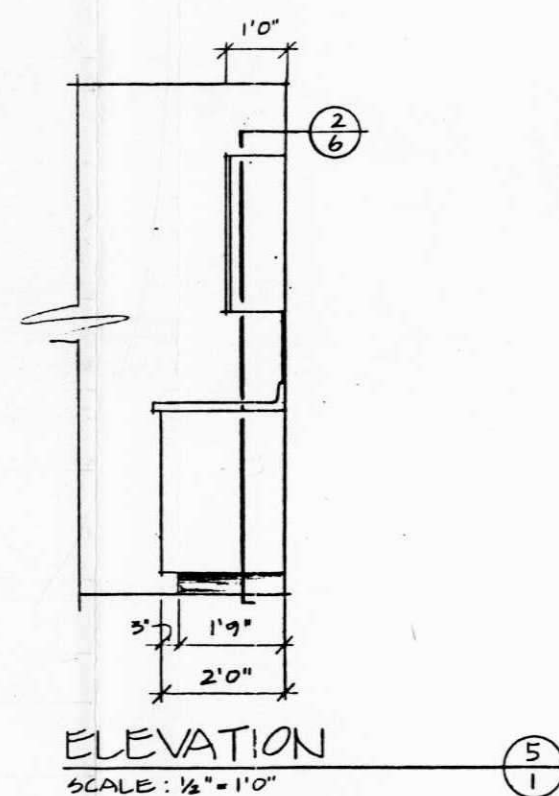
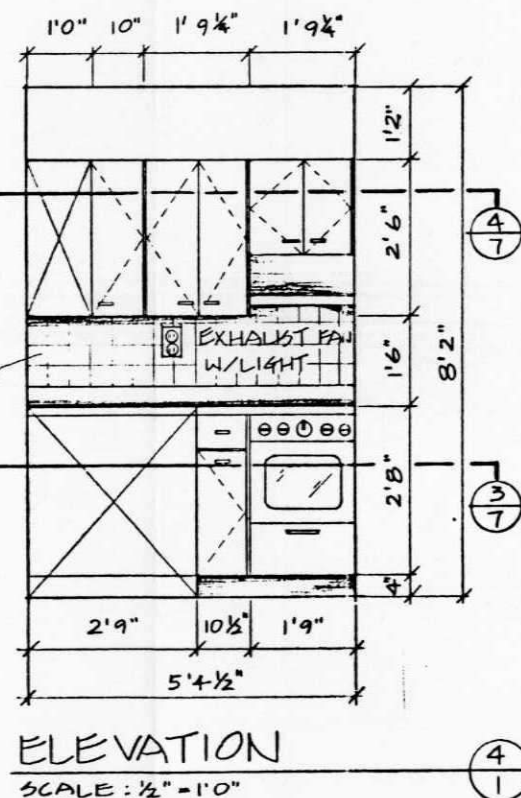
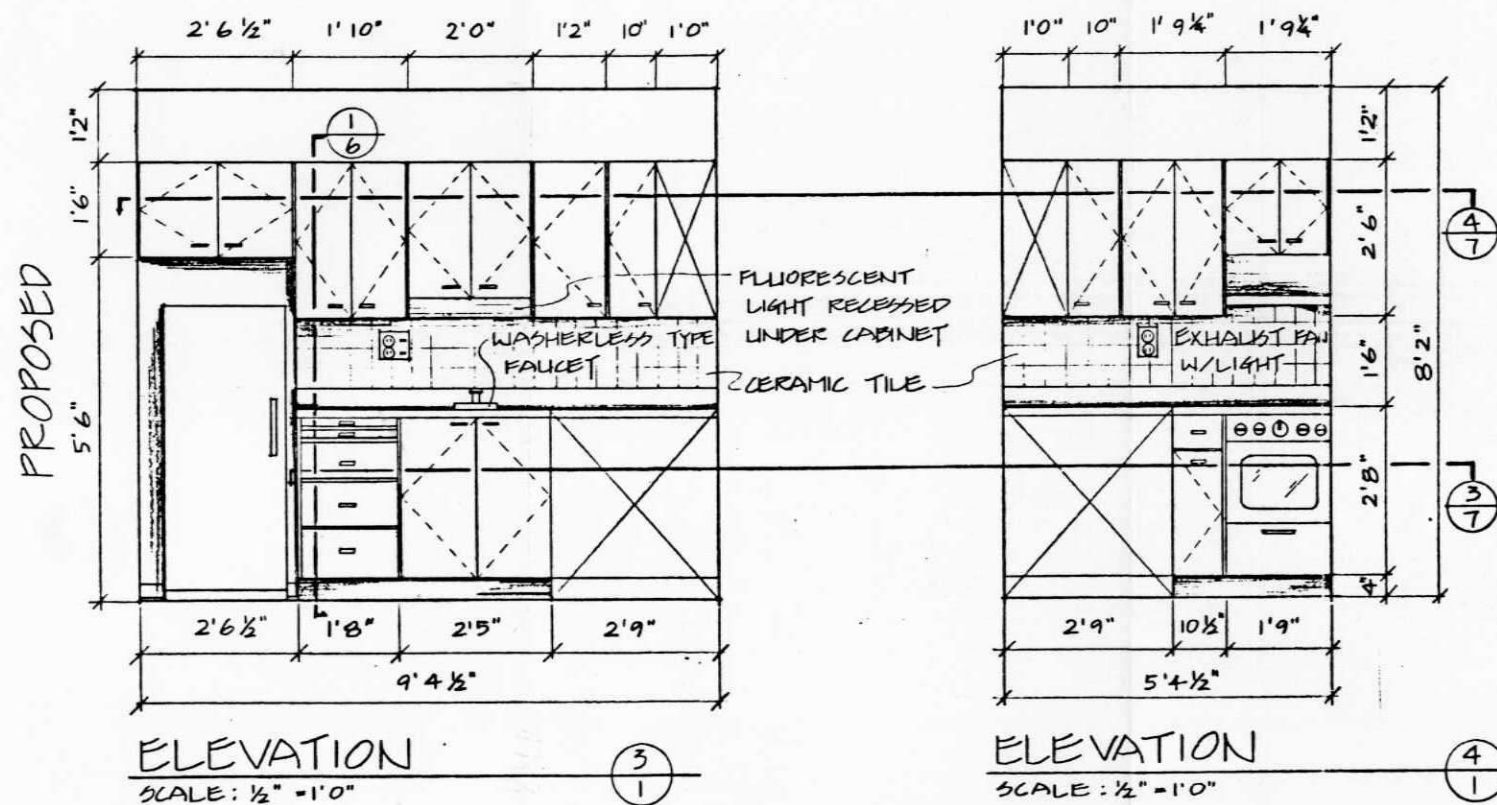
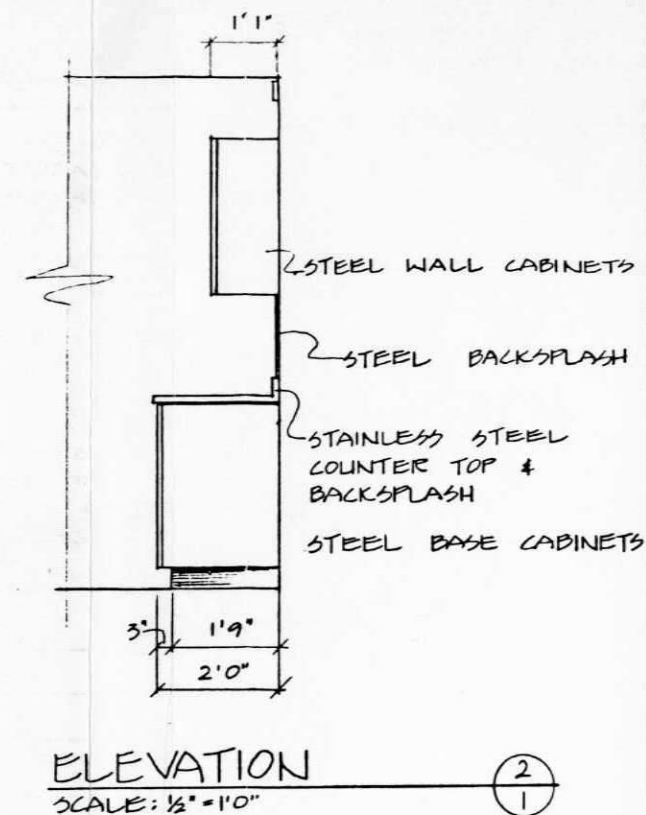
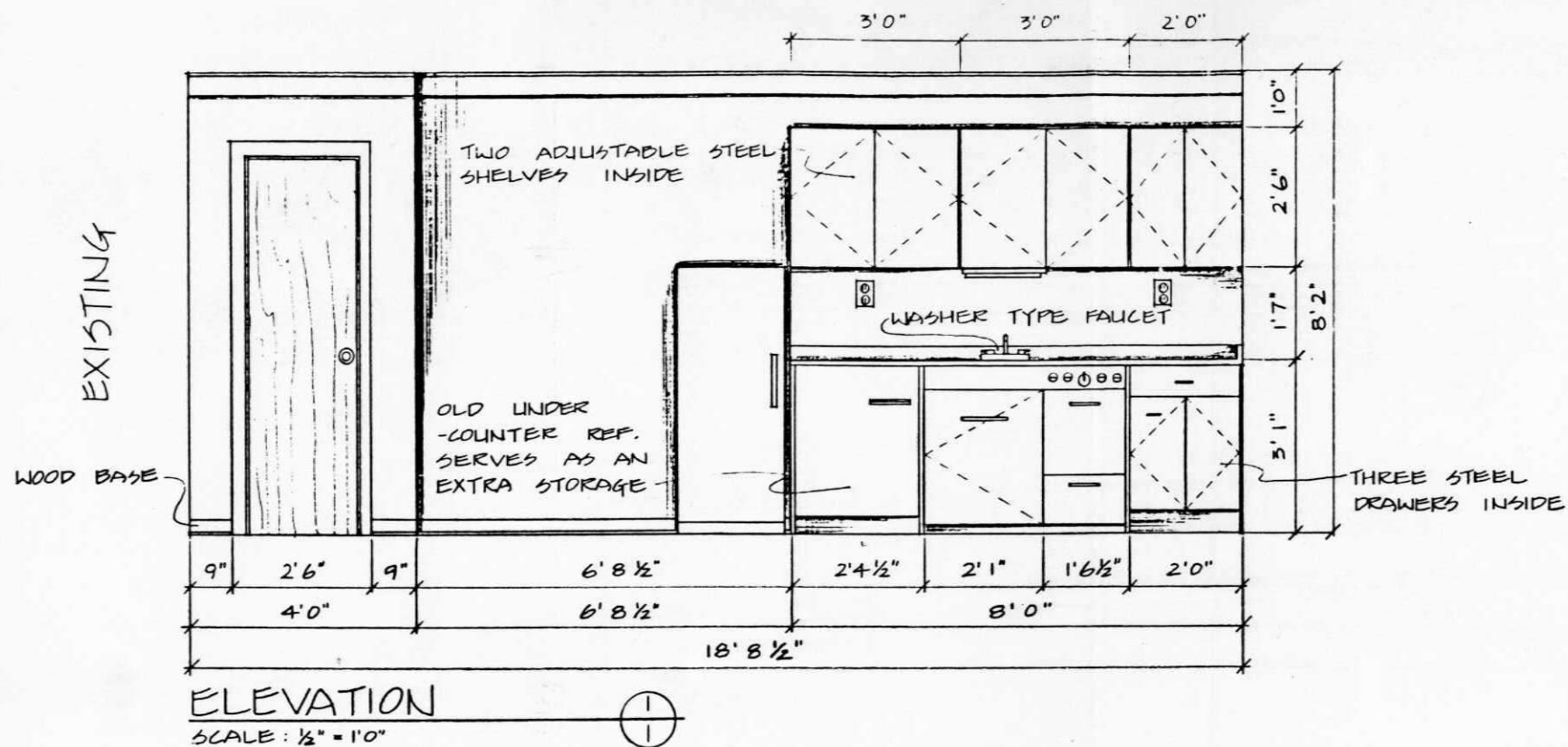


Figure 5.

ELEVATIONS  
JARDINE TERRACE

SHEET

5

OF 10 SHTS.

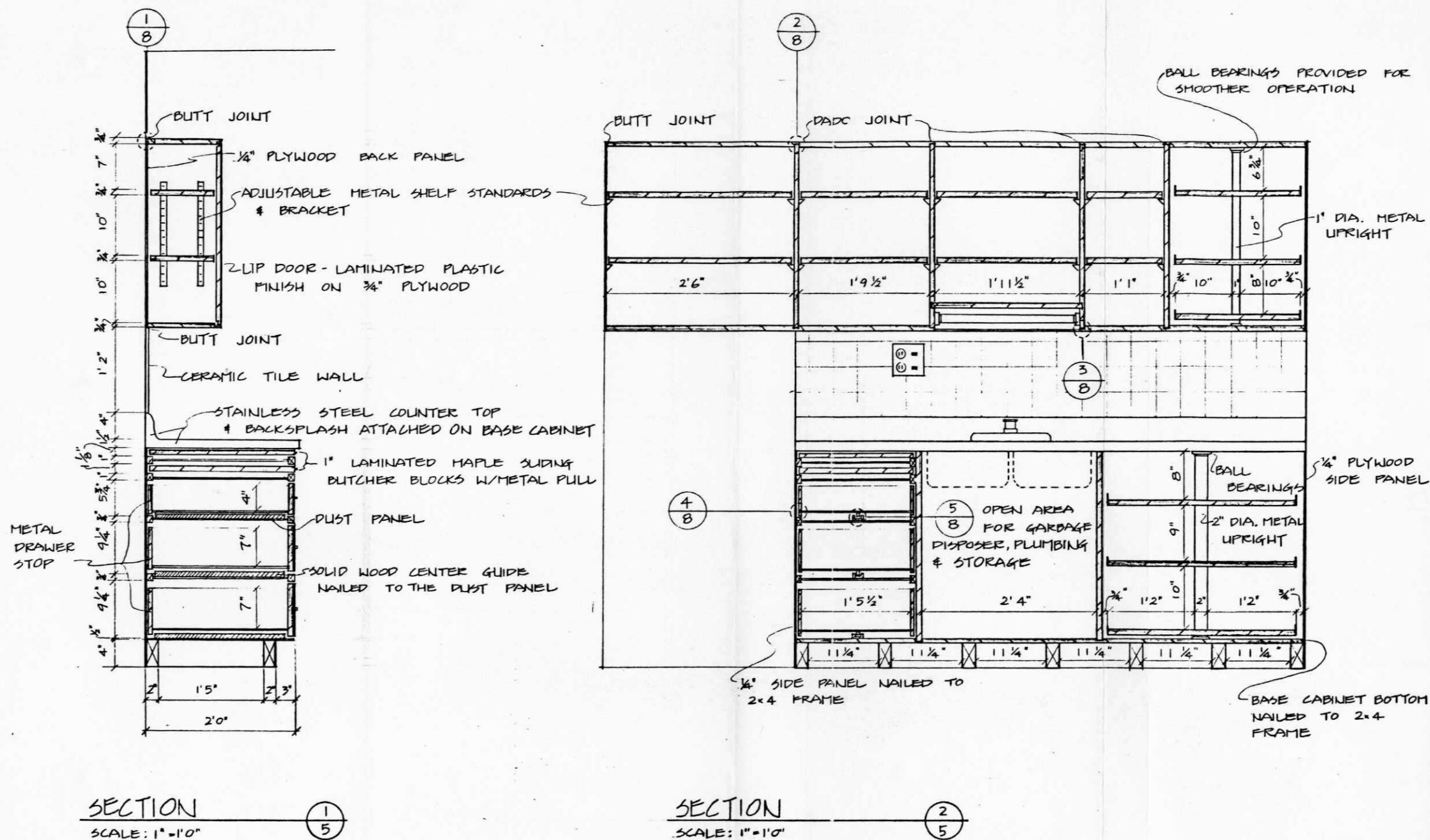


Figure 6.

SECTIONS
JARDINE TERRACE

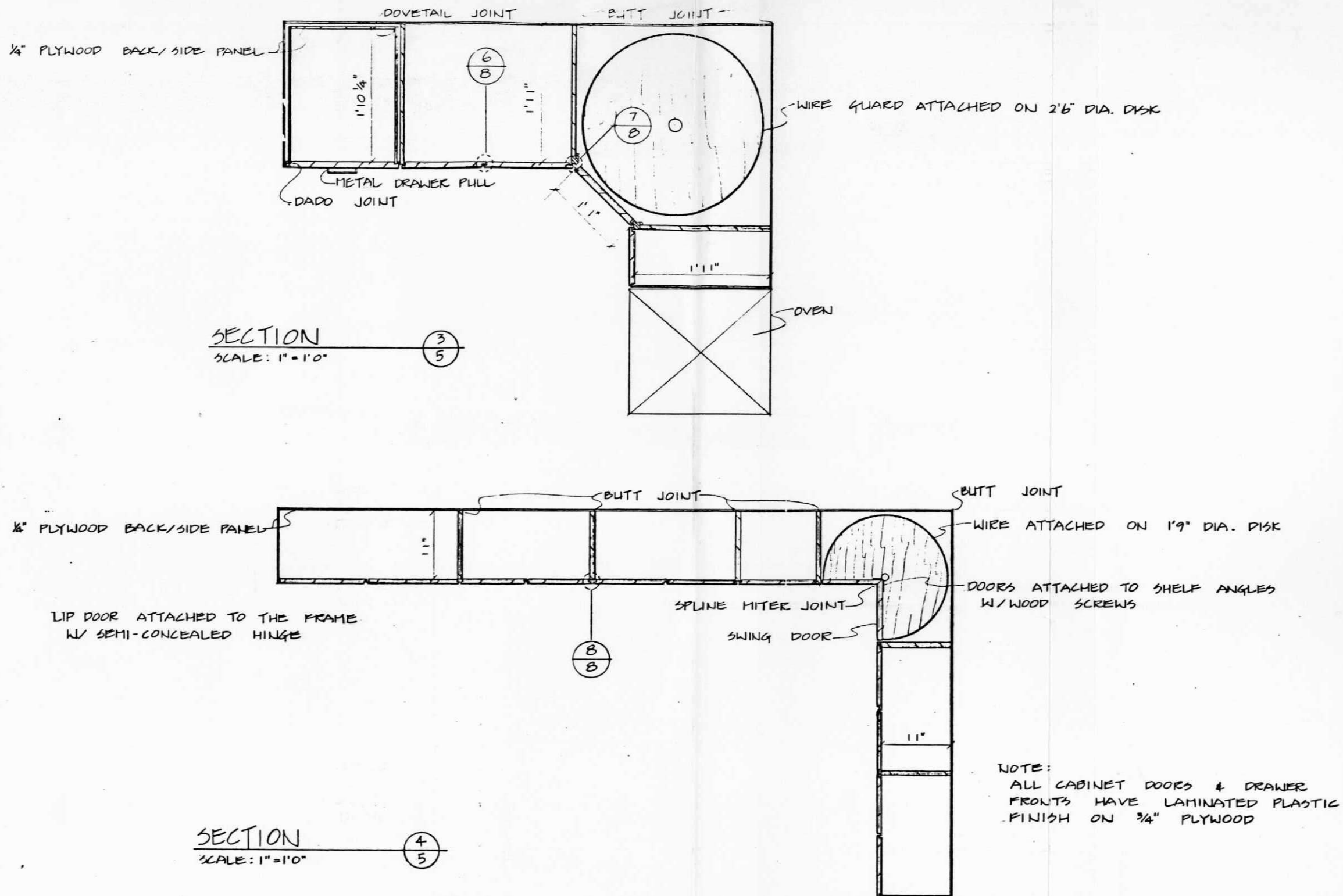
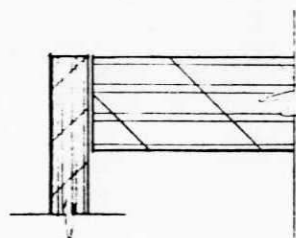
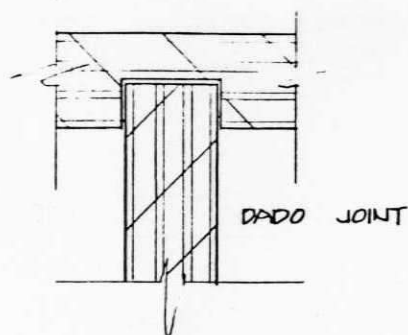


Figure 7.

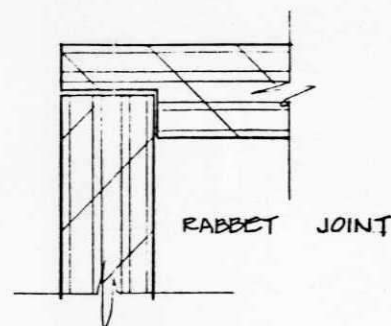
SECTIONS  
JARDINE TERRACE



BUTT JOINT

DETAIL  
F.S.①  
6

DADO JOINT

DETAIL  
F.S.②  
6

RABBET JOINT

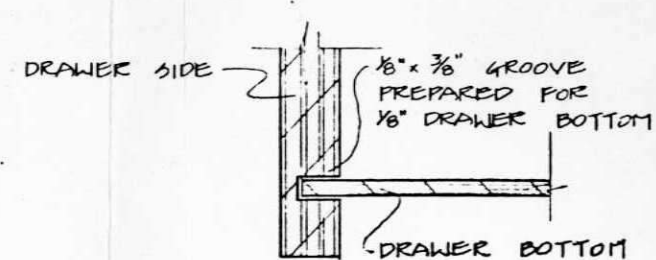
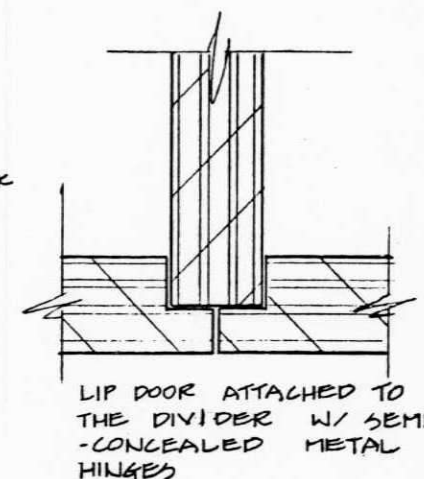
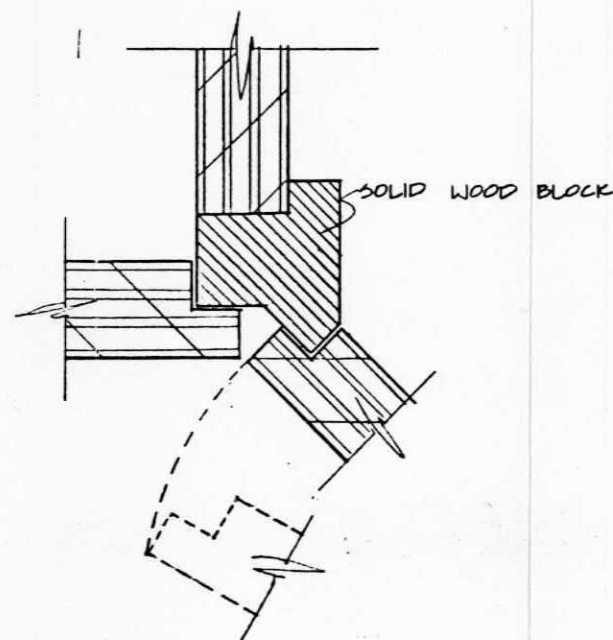
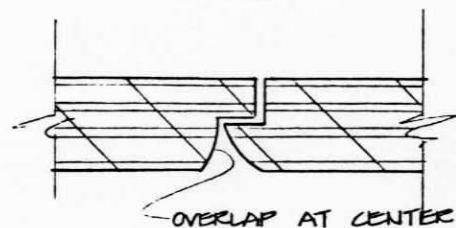
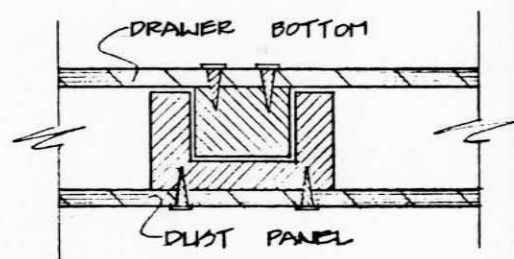
DETAIL  
F.S.③  
6DETAIL  
F.S.④  
6DETAIL  
F.S.⑤  
6DETAIL  
F.S.⑥  
7DETAIL  
F.S.⑦  
7DETAIL  
F.S.⑧  
7

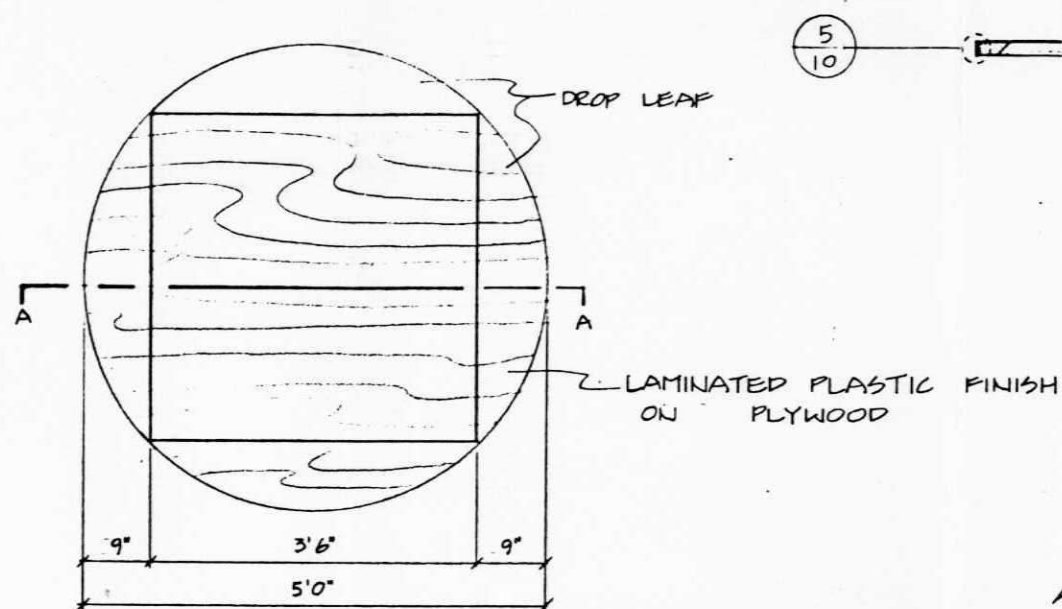
Figure 8.

DETAILS  
JARDINE TERRACE

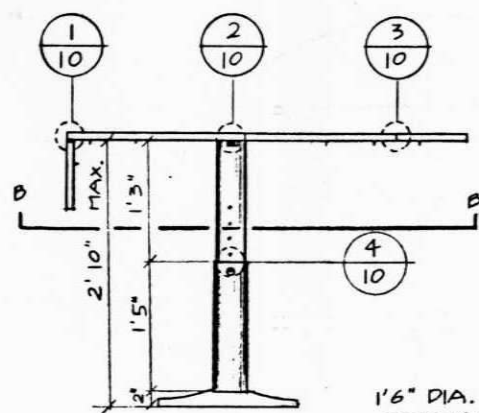
SHEET

8

OF 10 SHTS

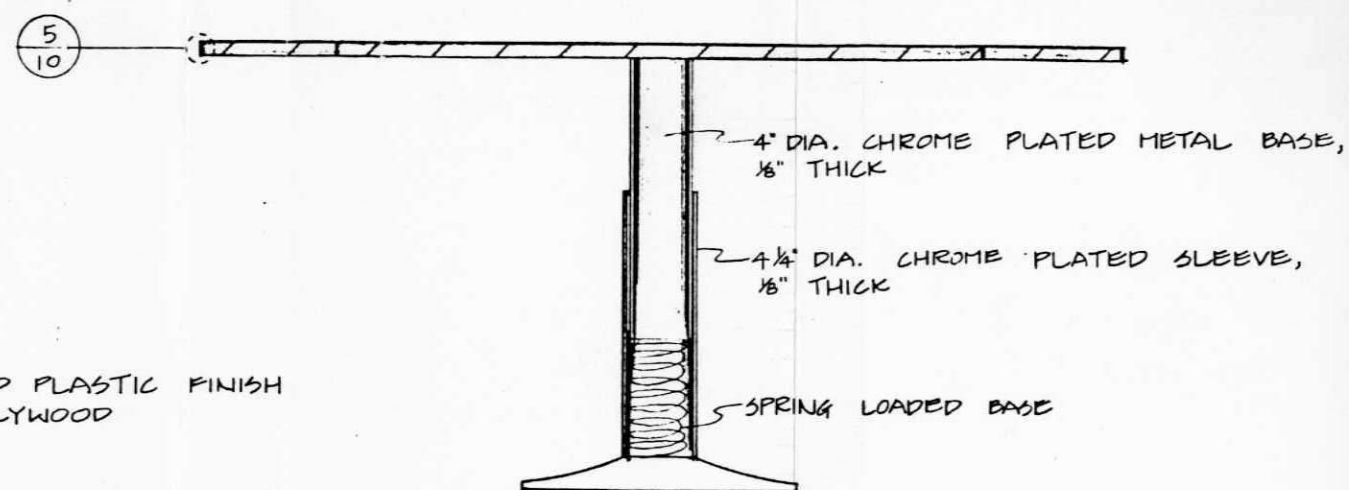


TOP VIEW  
SCALE:  $\frac{3}{4}$ " = 1'0"

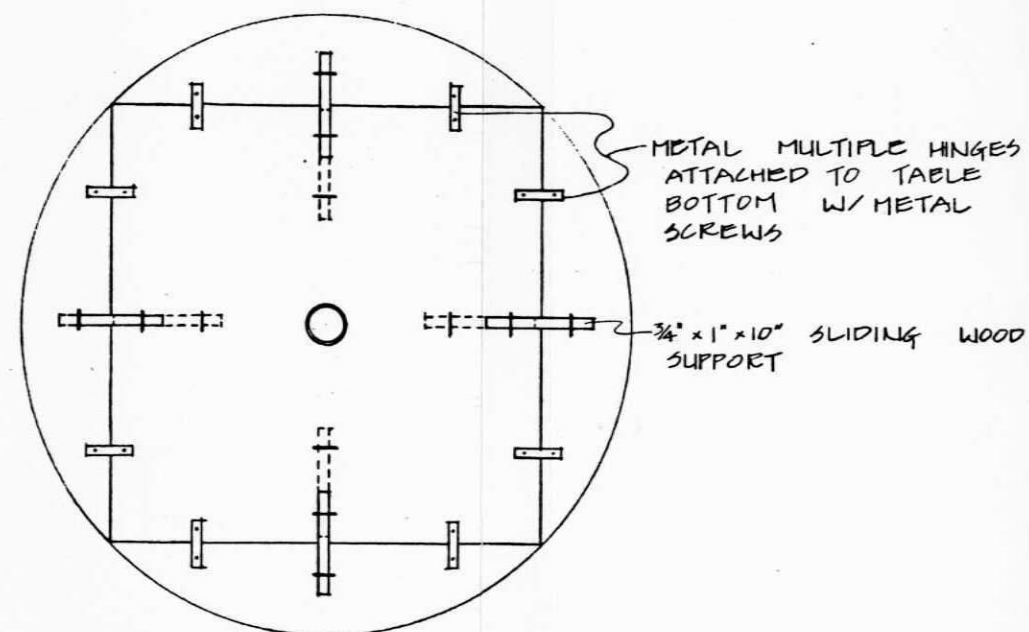


FRONT/SIDE VIEW  
SCALE:  $\frac{3}{4}$ " = 1'0"

NOTE:  
TABLE HEIGHT RANGES  
FROM 24  $\frac{3}{4}$ " TO 34  $\frac{3}{4}$ "  
AT 2" INTERVALS



SECTION AA  
SCALE: 1 1/2" = 1'0"



SECTION BB  
SCALE: 1" = 1'0"

Figure 9.

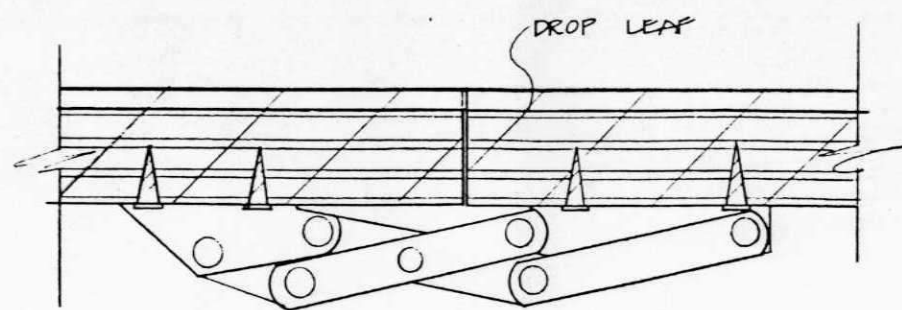
PRODUCT DESIGN  
JARDINE TERRACE

SHEET

9

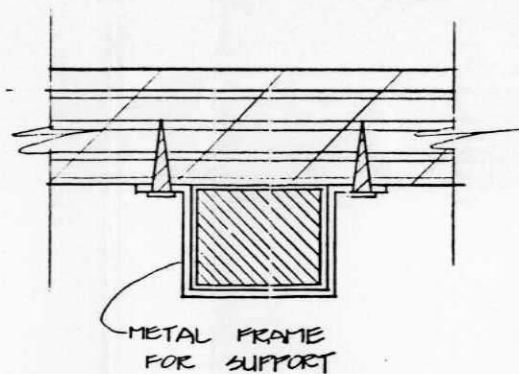
OF 10 SHEETS





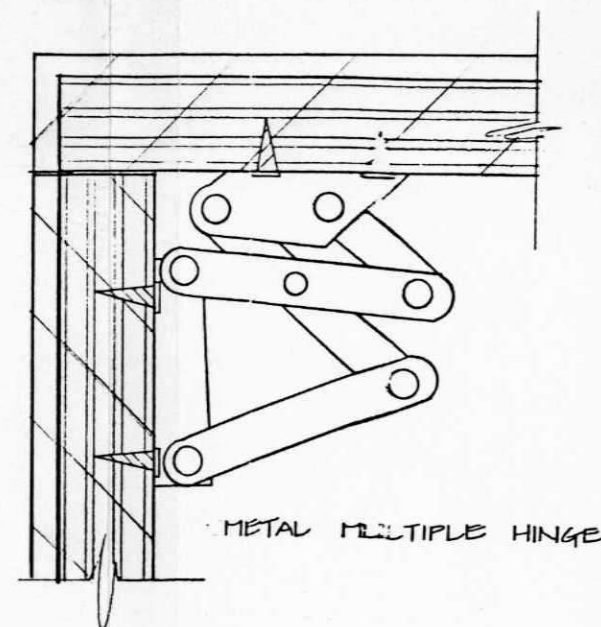
DETAIL  
P.S.

1  
9



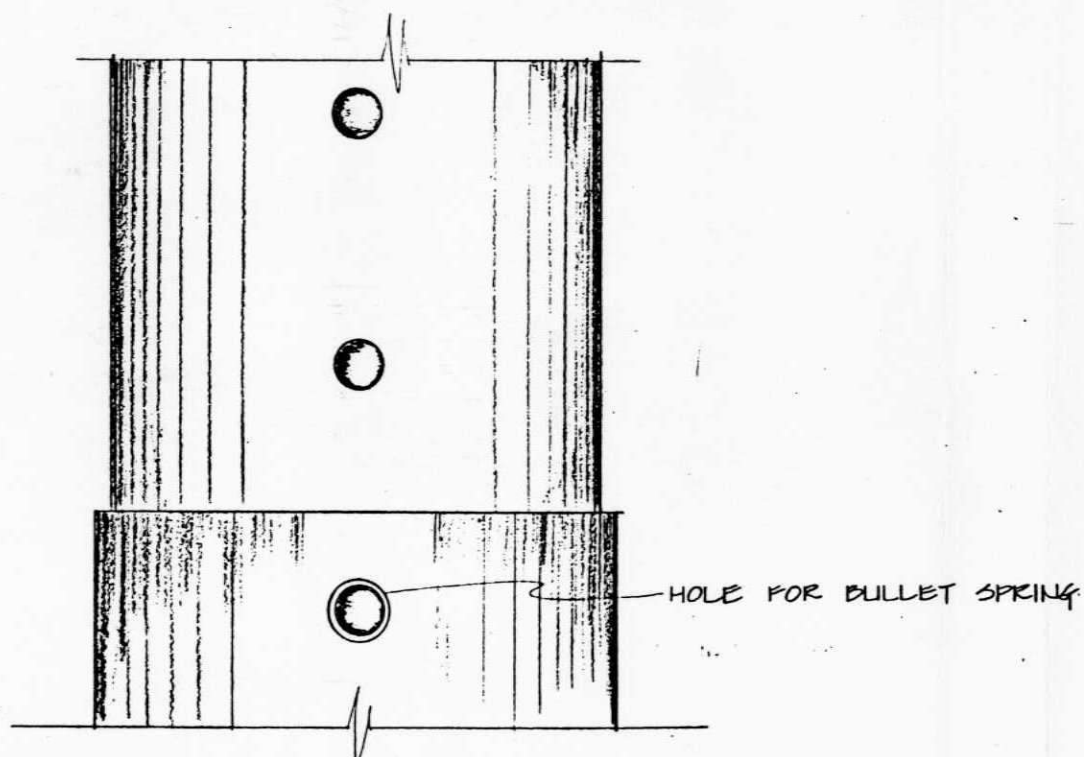
DETAIL  
P.S.

2  
9



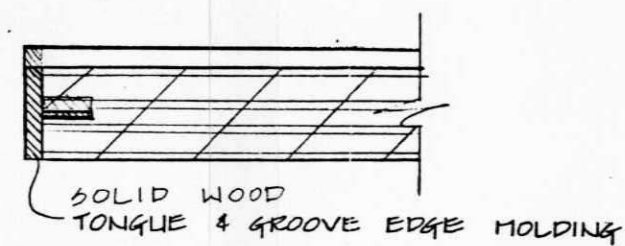
DETAIL  
P.S.

3  
9



DETAIL  
P.S.

4  
9



DETAIL  
P.S.

5  
9

Figure 10.

PRODUCT DESIGN DETAILS  
JARDINE TERRACE

SHEET  
10  
OF 10 SHEETS

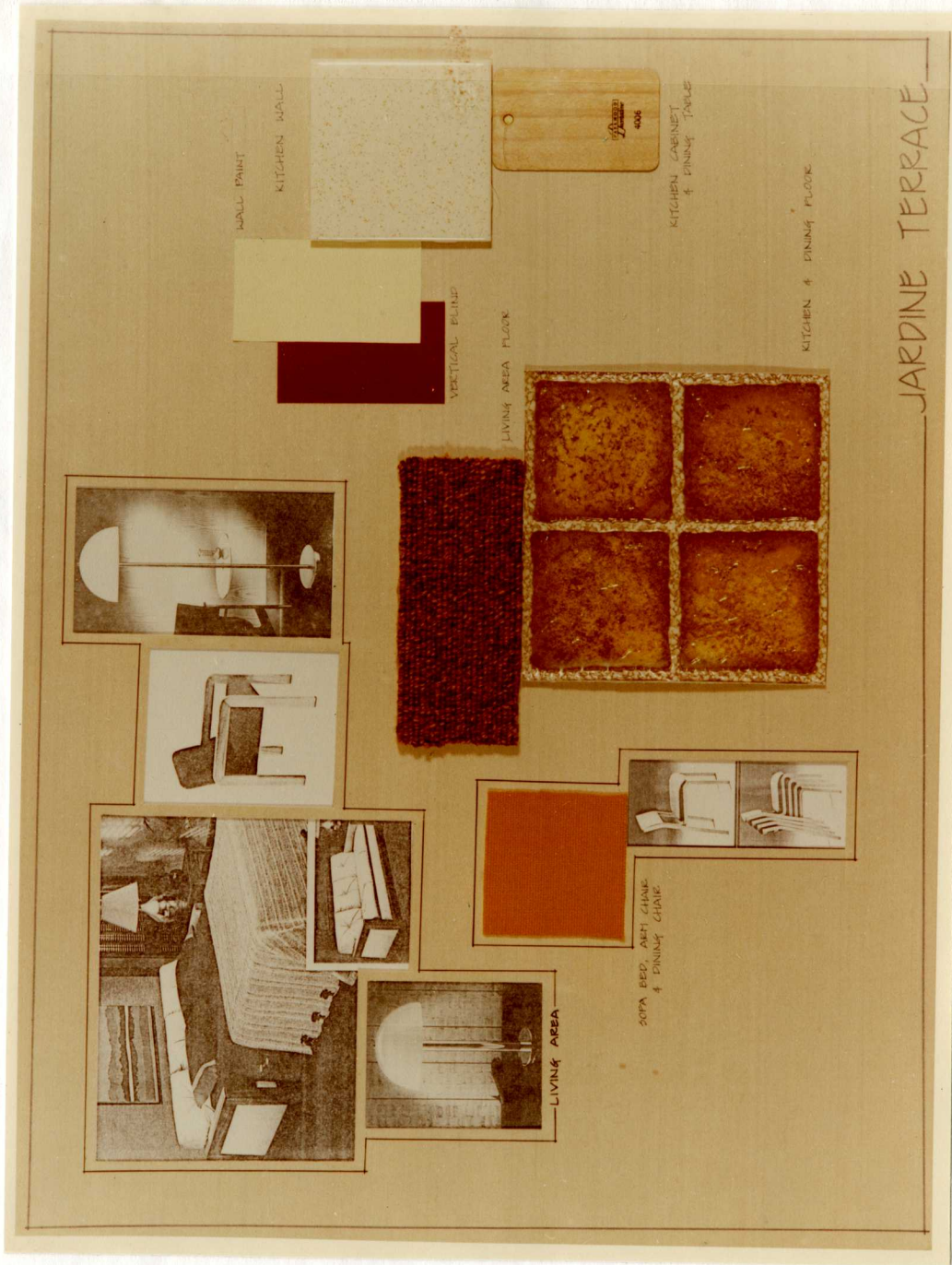


Figure 11. Sample Board

REDESIGNING A ONE BEDROOM MARRIED STUDENT APARTMENT  
FOR CHINESE RESIDENTS

by

SHARLEY HSIA-FENT CHANG

B. A., RIKKYO UNIVERSITY, JAPAN, 1975

M. A., WHITTIER COLLEGE, 1978

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AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Clothing, Textile  
and Interior Design

KANSAS STATE UNIVERSITY  
Manhattan, Kansas  
1982



## ABSTRACT

One-bedroom married student apartment at Kansas State University, Manhattan, Kansas, was redesigned from a cultural viewpoint. Ten Chinese wives from Taiwan were interviewed on functional, social, ease of maintenance, aesthetic, anthropometric and safety aspects of the kitchen-dining area of the apartment. Both the interview results and related literature were referred to in the design process. Drawings of floor plans, electrical plans, reflected ceiling plans, kitchen elevations, sections, product design and a sample board are presented in this paper.