
Florence S. Walker

Follow this and additional works at: http://digitalcommons.unl.edu/ardhistrb

Part of the Human Ecology Commons

http://digitalcommons.unl.edu/ardhistrb/188

This Article is brought to you for free and open access by the Agricultural Research Division of IANR at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Research Bulletins of the Nebraska Agricultural Experiment Station (1913-1993) by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.
Residential Environment Studies Relevant For Research Programs

An Annotated Bibliography

Economic, Aesthetic and Environmental Aspects of Family Housing

Editor
Florence S. Walker

University of Nebraska–Lincoln College of Agriculture
The Agricultural Experiment Station
E. F. Frolik, Dean; R. W. Kleis, Acting Director
North Central Research Committee—54
Economic, Aesthetic, and Environmental Aspects
of Family Housing

Administrative Advisors
Dr. Richard H. Bohning, Ohio Agricultural Experiment Station, 1966–1968.
Dr. T. S. Hamilton, Illinois Agricultural Experiment Station, 1969.
Dr. Virginia Y. Trotter, Nebraska Agricultural Experiment Station, 1970–present.

Agricultural Experiment Station Representatives
Participating in the Development of Bibliography
Margaret Goodyear.................................Illinois
Kathleen A. Johnston..............................Indiana
Margaret Liston......................................Iowa
Gertrude Nygren....................................Michigan
Gertrude Esteros....................................Minnesota
Kate Rogers.........................................Missouri
Florence S. Walker.................................Nebraska
Marion S. Walker..................................North Dakota
Fern E. Hunt........................................Ohio
Agatha A. Norton..................................Wisconsin

U.S. Department of Agriculture Representative
Dr. Ethel McNeil

Editor for Regional Bulletin
Florence S. Walker.................................Nebraska
Doralene Mosher \{ \}
Jane Rogers \{ \} Editorial Assistants, Nebraska
FOREWORD

At the time NCR-54 Committee was activated in 1966, the membership was charged with recommending new directions for housing research by home economists and others associated with Agricultural Experiment Stations.

Basic to this charge, the committee determined to compile a list of housing research publications which had had an impact on the teaching and research responsibilities as perceived by the committee members. The compilation took the form of abstracts of research on selected aspects of housing: i.e., design and aesthetic, physical-physiological and socioeconomic, as well as influential general studies.

The difficulty committee members had in locating some of these research reports and in establishing criteria for inclusion indicated clearly the need for a publication that brings together an accumulation of efforts which focus on housing research. Also, the idea of significant research was defined as research that has had influence on subsequent research, to the extent that it affected the methods and trend of research. These influential studies are identified as “Landmark Studies” and are so marked as they appear in this bibliography.

A collection of abstracts was first compiled by Dr. Fern Hunt (Ohio Station) in 1968. It became apparent that this information should be shared with others interested in housing research. Each year since then the Committee has reviewed the bibliography and added studies until finally, in the fall of 1970, the manuscript was limited to the citations presented herein.

Committee members recognize that there may be important omissions. They also recognize the current trend toward computer information retrieval systems. The next step in this review of housing research will be to translate this bibliography into a computer information retrieval system which will have the advantages of being open for additional references as well as making information more easily available.

CONTENTS

Foreword ................................................................. 2
General ................................................................. 3
Design and Aesthetic Aspects ............................................ 4
Physical-Physiological Aspects .......................................... 8
Socioeconomic Aspects .................................................. 25
Sources of Additional Bibliographies Related to Housing ............. 34
Author Index ............................................................ 36

Issued February, 1972, 1,500

Presents background of events and trends influencing development of research programs in home economics. Points up needs for expanded research endeavors, including area of housing.


Not a research article, but represents a view of what was involved in the study of housing a third of a century ago. The AHEA Committee stated that the concept of housing "... demands that consideration be given not only to the environs, construction, and equipment of the house but also the nature and strength of the economic and social forces concerned in creating and maintaining a home." The syllabus was classified by 12 subheadings.


Summaries of 39 research reports on farm housing sponsored by North Central Regional Research Committee #9. Studies were designed for use in making existing farmhouses more functional and as aids in planning, selecting or building new farm dwellings. Report has seven sections: housing needs and preferences of farm families; climatic, economic, and social aspects of farmhouse planning; physiological aspects of homemaking activities as factors in house design; design of specific areas of the house; utilities; building materials and structural elements; plans for building or remodeling farmhouses.


Housing problems, technological developments, legislation, standards, objectives, education, service, organizations, housing research. One of the 11 publications on this historical conference in Washington, D.C., in December 1931. Pages 253-294 are related to research, with special attention to proposed projects.

* = Landmark Study

Cooperative project between the Social Science Research Council and U.S.D.A. to provide background information in study of research needs in consumption and leisure. Evaluates techniques used in collecting information on consumption of individual families and summaries of information obtained. Includes about 1,500 studies of family living in 52 countries. Data came from individual families and included either total money income or total money expenditures. Explains lack of uniformity in methods used and difficulties in comparing results from two or more studies.

**DESIGN AND AESTHETIC ASPECTS**


A study of ways in which a subject looked at forms, connections between liking for the forms and the ways they were seen, and relationships between such connections and nature. Subjects sorted eight forms on basis of overall similarity and stated preferences. With appropriate verbal sets, subjects made themselves see (and categorize) a group of forms in many ways. However, a natural way of categorizing them was noted which was independent of verbal set and dependent on formation of visual nonverbal concepts. Preference for the forms was partially dependent on the way the forms were seen on the visual similarity dimensions and seemed somewhat comparable to the linkage between hue and brightness. The weak nature of the linkage suggested the hypothesis that the beauty of form can be explained only in terms of the operations performed in the brain of the observer. Aesthetic discrimination was independent of all other kinds of perceptual discrimination.


A review of literature of how color affected people aesthetically. Comments on some scales, accuracy, projectability, etc. Reviews the psychological and physiological base for color preference.


Examines several proposed measures of aesthetic sensitivity. Measures concepts of aesthetic judgment, aesthetic preference and

* = Landmark Study
aesthetic sensitivity. Tests the agreement of aesthetic for odorants, hues, chroma or saturation, values or brightness, colors, polygons, paintings. Graves test-abstract designs, and Bulley test-works of art as stimuli.


Discussion of physiological-ecological bases for response to space and territoriality in vertebrates. Defines flight distance, social distance, and personal distances; then relates each spatial distance to human behavior. Discusses proxemics as: fixed feature space, semi-fixed feature space and dynamic space. Reviews types of space utilization and cultural variations.


Studies the experimental aesthetics of color and the psychological nature of aesthetic appreciation. Sixty sets of colors each containing, on the average, seven items are selected to represent the entire color solid with respect to the seven principal attributes in color-hue, value and chroma. Fifty subjects, 25 women and 25 men, rank colors and designs in order of preference. Uses techniques in colorimetry and statistics not used by earlier color researchers.


Studies relations between colors. Five tests of color harmony given 20 subjects asked to state preferences for varying intervals of color. Includes detailed discussion of techniques. Results lend further support to objective theory of color. Lists five specific conclusions.


Tests color preferences of 20 subjects using three techniques of tiles, free paintings and questionnaire. After four weeks, subjects exposed to stimuli which produce frustration or success to alter color preferences. Concludes that color preferences remained stable over the four-week period and were not affected by the frustration and success stimuli.


*Describes a notation system for the observation of proxemic be-

Landmark Study
behavior (how man unconsciously structures microspace). Compares proxemic behavior with qualifications of a language and finds both have the same essential characteristics; however, proxemic behavior is less specialized than language, is more ionic, fills in what is missing in verbalization and requires a transaction.


Discussion of physiological-ecological bases for response to space and territoriality in vertebrates. Defines flight distance, social distance and personal distance, then relates each spatial distance to human behavior. Discusses proxemics as: fixed feature space, semi-fixed feature space and dynamic space. Reviews types of space utilization and cultural variations.


Examines operation of perceptual contrast in such qualitative dimensions as geometric stability and symmetry or general design quality of a stimulus. Uses two cards (stable context card and unstable context card), each containing identical stimulus figure of a square and a different context design. Forty male subjects identify the “better” square. The square in the disordered context is judged to be geometrically more perfect and stable.


Seventy-eight subjects test the central tendency effect (the tendency for the subject to prefer figures toward the center of the range presented to him). Three series of stimuli (paired triangles) are used to correspond to the lower, middle and upper parts of the range. This tends to eliminate the central tendency effect. Related study to earlier research; of particular interest is mention of a study done on stair railing size and the relationship to central tendency.


Study of the relationship of socioeconomic level of parents and adolescents' aesthetic preferences. Sample consists of 52 adolescents. Use Knapp Tartan Test (30 reproductions of Scottish tartans). Finds that middle class adolescents prefer complex designs, absence of saturated color and striking contrast. Lower class adoles-

* = Landmark Study
cents prefer designs of simple massive configuration and probably saturated color and strong contrast. Preferences of young children and lower classes are similar.

Analyzes criteria children use to evaluate paintings. Uses individual interviews of 120 subjects 6–12 years of age. Shows, in triads, color reproductions of famous paintings. Subjects indicate which is liked best and least and why. Suggests three main developmental levels which presuppose the different types of intellectual functioning Piaget described.

Research for factors of testing or judging art. The six subtests of the scale for art products include domains of differentiation, space, intellectual-structural, kinesthetic-spontaneity, internal movement and nonconformity. Twenty characteristics are divided into the six domains.

Reports five studies of aesthetic preference for abstract designs varying in number of elements (n). Stimulus materials include designs which are random or composed, symmetrical or asymmetrical and presented as drawings, photographs, or slides. Preference rankings or ratings (P') are obtained for four sets of stimuli but not random polygons. Significant inter-S concordance is found even with heterogeneous samples. Both group and individual trends give an inverted-U curve for P' on n, in most cases. In the main study, dispersion of P' scores increases with n. These results are largely compatible with the “information-processing” approach to preferences.

Investigates some semantic correlates of response to color and assesses the strength of association between colors and mood-tones. Method is a constant sum method using constant-stimulus model. Judging to divide 100 points between two stimuli. Scale-values show replication from one group of raters to the other and for the same group over time. Found low and high scale-values are well replicated but increased changes in position occur for intermediate values. When intercorrelations of scale-values between colors and mood-tones are factored, the four are interpreted as
the dimensions of activity-passivity, quality of emotional tone, mood-strength and emotional control.

Semantic differential and regression study of connotative meanings of color. Sample includes 3,660 men and women. Test is conducted with 50 three-inch squares of surface color. Ratings gather 80% of the covariation into six meaningful dimensions—happiness, showiness, forcefulness, warmth, elegance and calmness. Saturated has the most, hue the least linear effect. For hue, increased blueness = increased elegance and calmness but less warmth. Increased saturation and lightness = increased happiness and showiness. Increased saturation = increased forcefulness, warmth and elegance while increased lightness decreases forcefulness, warmth and calmness.

PHYSICAL—PHYSIOLOGICAL ASPECTS

Describes a photographic technique for measuring postural attitudes of subjects at work. Test task is cleaning floor and wall around a toilet stool within varying amounts of confined space common in bathrooms. Designed study to provide an improved method of analysis of effect of work environment on worker which is useful in determining quality and quantity of space required.

Gives ideas and dimensions for remodeling family bathrooms and personal bathrooms to accommodate the disabled as well as arrangements for bedroom-bathroom facilities for the severely disabled. Mentions home planning service available for patients at the institution.

Considers energy expenditure and mechanical efficiency of women while ascending and descending stairs. Includes a detailed descrip-

* = Landmark Study
tion of equipment as well as procedures used. Stair climbing re-
quires 15 times the energy of horizontal walking when performed
at the same rate; the descent of stairs required three times less
than the ascent. Subjects are 12 women college students, age 18–25.
Uses specially designed respiration apparatus generally carried
by operator (soda-lime container and oxygen bags).

Beyer, G. H. and J. H. Rose, 1957. Farm housing: A volume in the
Study to determine the extent to which the farm home is a unique
phenomenon in the United States housing picture. Compares farm
and other rural housing and households, the relationships of dis-
tance from urban centers to farm housing and changes within
the farm housing inventory. The analyses and interpretations can
serve as a basis for projecting future housing trends. Major sources
of data are 1950 and 1940 Census of Population and Housing and
1950, 1945, and 1940 Censuses of Agriculture. Supplementary ma-
terials used are special tabulations of census data and information
obtained from the Housing Research Center of Cornell University.
Chapter 7 suggests further research.

Study contributes new data on the nature and scope of household
work and family living activities, housing preferences and house-
hold possessions of farm operator and owner families in Northeast
Region. Survey conducted in 1947. Marks completion of one phase
of a larger study undertaken cooperatively by agricultural experi-
ment stations in Northeast Region. Provides basic data needed for
a second phase of the larger project—laboratory work for the
development of space requirements for household activities and
development of functional farmhouse plans.

Boalt, C. and U. Leander, 1961. 1000 husmodrar om hemarbetat. Sta-
tens Institut for Konsumentfragor, Konsumentinstitut Meddelar, Nr.,
Stockholm, Sweden.
Interviews 1,000 Swedish homemakers with children of school age
and under. Homemakers kept diaries of their activities for one
week. Inventories made of sanitation facilities, kitchen fittings,
and flooring materials. Included also is information on equipment
for cooking, “washing up,” laundering, sewing, and general house-
work. Emphasis is on time spent and methods used for various
jobs as indication of organization, but implications for housing
were included. Kitchens generally “unsuitably” planned; sinks too
low, equipment scattered, and not enough space for meals.

* = Landmark Study

Factual data for use by builders or designers of farmhouses for North Central Region of the United States. Presents facts for North Central Region from weather records of 62 weather stations, data on social and economic factors (population, income and tenancy for period 1935–1950) and characteristics of existing houses, frequently used by Bureau of Census as measures of housing standards.


An investigation in two Wisconsin counties on housing and associated problems of 429 rural farm persons 65 years of age or older. Includes information on adequacy of space, housing conditions, health, financial insecurity and time usage of those interviewed. Finds that housing needs of rural-farm aged do not differ from those of other aged persons; however, certain characteristics of rural farms might contribute to low percentages of persons having optimum housing.


Continuation of report on studies exploring cooling problems in rural California homes and improving living comfort in hot regions. Obtains data on temperature control practices of rural central California residents (R. D. Cramer, V. G. Kay), observes temperature control with shading devices (L. W. Neubauer, R. D. Cramer, R. B. Deering) and explores mechanical cooling devices (R. D. Cramer, L. W. Neubauer).


Three women subjects participate in time use and respiration studies in 1939–1940 in Dortmund in their homes. Authors believe that differences in skill, punctuality, cleanliness and “accuratesse” can result in differences in requirements of time and calories for the same work. They suggest that with the large number of women working in the home, a time and calorie savings can relieve the country’s economy. Uses stopwatch for time studies, Douglas-Haldane masks for measuring caloric consumption.

* = Landmark Study

A detailed report of techniques and equipment used in study of energy expenditure by means of analysis of expired air. Compares use of Kofranyi-Michaelis respirometer and Benedict-Roth metabolism apparatus. Procedure also given for use of Beckman Analyzer, Model E2.


Evaluates energy expenditures of women performing activities of bed-making, stair-climbing with and without loads, and cleaning of stairs covered with hard and soft surface materials. For the four subjects used in the bed-making study, the height of the bed is found to be inversely related to energy expended. In ascending and descending stairs, a group of 10 older women (63–73 years) require more calories to ascend the stairs than does a group of 10 younger women (26–36 years). With the 10 older subjects during stair-cleaning, energy expenditure is greater using hand tools than motor driven tools with the exception of the upright cleaner with attachments on carpeted stairs. Uses Kofranyi-Michaelis respirometer and Beckman oxygen analyzer.


A series of studies that explore cooling problems in rural California homes and means of improving living comfort in hot regions. Observes effects on temperature of orientation of house, house design and use of plants and home furnishings. Uses mobile unit resembling a “typical” low-cost frame house.


Studies space allowance needs for dining areas, for meal preparation, serving and cleanup, and for storage of dishes and utensils. Also studies effect of three kitchen arrangements on space needed and location of utensils and dishes. Good description of methods: written observation and memomotion film.


Four homemakers, age 33 to 42, of varying body build serve as
subjects. Memomotion photographic techniques are used to study angles. Effects of counter dimensions, placement of electric outlets, appliance design and storage location are evaluated.


Four homemakers, age 33 to 42, of varying body build serve as subjects. Memomotion photographic technique is used to analyze body mechanics associated with six arrangements of counter, surface cooking units and oven. Wall-type oven above surface unit is least preferred arrangement. L-shaped arrangement is preferred to straight-line.


Six homemakers, age 32 to 55, college graduates, serve as subjects. Uses memomotion technique and specially constructed projection box which accommodates direct measurement of body bends and motions on screen. Oven placement at 90 degree angle to right of the counter is judged most convenient. Uses 16 mm camera, full-length mirror, and stop-motion analysis projector.


Reports a field survey and case studies to determine location of family and individual leisure activities in home and the space furniture and equipment used. Uses interviews of 400 rural Rhode Island homemakers (¾ in middle economic level; remainder divided between upper and lower levels) and four consecutive week records from 50 of the families. Reports patterns of leisure activities by numbers of persons participating in the activity, type of activity, room in which activity occurred and furniture and equipment involved as well as seasonal influences. Two-thirds of families desire more leisure equipment; good proportion desire house structure changes.


Homemakers are studied while at work doing their own housecleaning. Amount of motor activity, amount and quality of cleaning, degree of orderliness are observed and presence or absence of fatigue as stated by worker is recorded. Clutter, indecision and distaste for work were factors found to be contributing to the state identified as fatigue. Subjects were 20 women, pre-menopause, married for 10 years or longer, having one or more children.
Fatigue considered to be “a personal state of aversion with reference to activity involving a feeling of bodily discomfort and inadequacy.”

Investigates space needs for storage of utensils at range, sink, and mix center; storage of packaged supplies of all types; and storage of china, glassware and other accessories. Method consists of formulation of basic list of items to be stored; determination of depth, length, and height of shelves through pilot studies; and development of designs for functional storage cabinets for each area, based on space needs and normal work curve.

Studies use frequency of centers and relationship between centers to develop guides for grouping integrated work and storage centers. Four test kitchens used to record distances traveled in food preparation and clean-up. Includes description of method.

Study to determine space needs and storage arrangements accessible and convenient for liberal and limited amounts of equipment. Indicates most acceptable arrangements chosen by laboratory participants. Also determines space needed outside unit for convenient use.

Research study on determination, relative importance, coincidental effects and possible control of various sources of humidity in houses. Finds majority of moisture-liberating operations occur in kitchen. Lists various moisture sources and discusses ventilation aids.

A study of housing preferences and household activities related to housing needs of owner-operated farm families in Southern Region. Study provides the first stage of a larger study for the development of functional farmhouse plans in South.

* = Landmark Study

Investigates counter space requirements for efficient arrangements of counters and equipment for food preservation (canning) in farm families and storage requirements for equipment and product. Tests adequacy of resultant counter space for freezing and meal preparation. Gives description of method.


A report of the first study in this temperature range in the ASHRAE environmental laboratory at Cleveland. Gives description of method plus references.


Laboratory study of 81 college juniors and seniors, age 19 to 30, and 57 homemakers, age 23 to 62, to determine limit of space for a seated worker using tools and supplies. Minimum distance related to arm length: maximum reach to sum of trunk and arm lengths. Seated worker faces pie-shaped board with center cut out for measurement.


Laboratory study of space needs for each part of the laundry process from sorting through ironing and of arrangements for component parts (sorting; pre-treating; sprinkling; storage of supplies; washing with wringer-type, spindryer, and automatic washers; drying by line and by dryer; ironing by hand and by ironer and arrangements or flow of work for each of the washer types and the ironer). Recommendations from the findings are made. Gives description of method and techniques and results for each part of the study.


Laboratory and home study of space needed for components of sewing process, to determine machine cabinet dimensions that will reduce fatigue and permit ease of work, to determine storage needs of sewing supplies and to set up efficient arrangements for sewing process. Gives description of method and results.

* = Landmark Study

Studies 10 subjects, age 25 to 35, 64 to 66 inches in height, and 130 pounds in weight (plus or minus 10%). Motion pictures taken of stair-climbing activity, then projected on polar co-ordinate paper to measure the angles. Energy expenditure determined by an indirect method of calorimetry. Correlations between angles of body movements and energy expenditure in stair-climbing indicate a positive relationship. Angle of knee bend correlates more closely with energy expenditure than any other measure for stair-climbing.


Investigates factors basic to space needs and design of fixtures for bathrooms. Study has three major phases: a search of literature, field survey of current attitudes, practices, and problems and a laboratory study of problems and needs in relation to principal personal hygiene activities.


Analysis made of posture, metabolic rate, heart rate, blood pressure and pulmonary ventilation of four subjects (homemakers, age 22 to 40) while ironing at standard 31-inch table heights and at preferred table heights during series of tests. All subjects respond similarly in that those body processes are more accelerated when ironing at low conventional heights than at higher preferred heights. Increases: postural bend, 5 to 77%; force exerted, 2.4 to 48%; caloric requirement, 14 to 32%; heart rate, 28 to 30%; pulmonary ventilation 10 to 51%; pulse pressure, 2 to 20.7% above those when ironing at preferred table heights.


Study of farm family homes with provisions for play areas. Observations made of space needs of children at play in original areas and in designed areas developed to better organize area. Gives summary of data.


Study of 450 rural white and Negro families to determine where and with whom children's activities occur and how satisfactory

* = Landmark Study
locations are. Reports data on family use by type of house, weather, participation of child in activities and location used by child in activities by type of house. Need seen for more storage and floor space for children's activities.


Compares use of respiration calorimeter to determine energy expenditure directly by calorimetric measurements of heat produced by body and indirectly by computation from amount of oxygen consumed and carbon dioxide produced by subject. Both methods give practically identical results. Calories used per hour per kg. of body weight: resting, 1.22; knitting, crocheting, and hand sewing while seated, 7–10; dressing an infant, 23.6; sweeping the floor, 29; washing clothes, 49.6; ironing, 24. Dishwashing at correct height, 21; height too low, 30; height too high, 28 calories. Subject: one woman, age 22, weight 110 lbs., height 5'4". Uses metronome for counting rate of movements; respiration calorimeter specially designed to increase reliability of oxygen measurement.


Reports experiences gained by numerous visits to homes of wheelchair patients and on studies conducted at Institute to formulate general principles useful for planning houses or apartments for handicapped (one who manages the household affairs—usually housewife but occasionally the father). Determines standard requirements for space around doors, cupboards, drawers and other furniture, including measures for proper placement of handles, switches, etc. Covers room for manipulating wheelchair in work areas as well as problems connected with changes from indoor to outdoor transportation.


Deals with design of furnishings and layout of kitchens for homemakers confined to wheelchair. Analyzes reaching capacity of sitting wheelchair occupant. Includes optimal heights, depths, surface areas and mutual placement of counter, sink, cupboards, refrigerator, range, etc. Considers working position of homemaker,

* = Landmark Study
both frontal and lateral, in dimensions and arrangements of kitchen furniture. Examples and illustrations of useful, inexpensive gadgets such as pullout shelves, revolving racks for pots and pans, storage and transportation appliances, faucet handles, window openers and their placement.


Subjects were homemakers, age 20 to 46, of average height and weight (62-65 inches and 110-160 lbs.). Energy values computed in calories per minute. Energy requirements increase when floor cabinet shelf is raised above or lowered below 36 inches. Increase is greater when shelf lowered than when raised. Energy requirements increase in vertical reach with increased horizontal reach-over distance. Uses Muller respirometer and Pauling type electronic oxygen analyzer.


A review of housing and equipment research from 1925-1950 to indicate areas needing emphasis and help in establishing guidelines for further research. Information obtained from U.S. Bureau of Human Nutrition and Home Economics and from home economics degree granting colleges in U.S.


Twenty women students at University of Illinois and six off-campus volunteers, age 18 to 81, confined to wheelchairs participated in series of tests carried out in housing research laboratory to determine some design requirements for handicapped. From measurements of wheelchairs and vertical and horizontal reaches of subjects, comfortable work heights and necessary clearances are determined. Tested three laboratory kitchen setups. In planning for wheelchair use, allow a minimum of five feet of free space between cabinets and appliances that are opposite each other. Uses caliper for measuring arm lengths, anthropometer for measuring eye heights, movable panels and straight wall for measuring space for making complete turn in chair, and adjustable work table for measuring horizontal reaches.


Laboratory study to determine limited and liberal space requirements for leisure activities showing efficient arrangements for these,
to investigate multiple use of space, and to develop storage facilities for supplies and equipment used in these activities.

Laboratory study to determine limited and liberal space requirements for cutting, stitching and pressing and to develop four arrangements for sewing areas. From the findings a complete sewing unit and sewing cabinet are designed. Gives description of method and detailed drawings for sewing cabinet and sewing unit.

Studies space requirements and efficient arrangements for equipment and facilities used in home laundry to design minimum and desirable areas for work. Storage facilities are developed. Washing procedures are observed in laboratory and home.

Describes laboratory method used to determine minimum and adequate space requirements for baking centers. Cabinets designed and placed in farm homes for evaluations. Methods of evaluation included finger tremor.

Conducts a study of sound levels and frequencies of sound in 20 houses. Tape recordings of noisiest hour are analyzed to determine range of frequencies. Object is to evaluate usual sound levels in family residences during regular activities which serve as basis for sound levels in controlled lab studies. Uses recording equipment, a sound-level meter with four microphones, a decade amplifier, and a graphic-level recorder.

Study compares estimated space needs, by use of body measurements while maintaining specified working postures, within space used by women at work in laboratory bathrooms and stalls. Adequacy of the observed working space was rated from "limited" to "liberal." (An application of information given in Monroe, M., 1959).

Describes two approaches to problem of measuring working space. Part I concerns determination of maximum space needs based on calculations from body measurements taken in several designated postures. Part II deals with determination of minimum space needs based on observations of women performing specified tasks. Gives details of method and findings.


Survey of housing preferences and household activities of owner-operated farm families in open-country portion of North Central Region. Study provides information to guide architects and engineers and other professional persons in planning houses for farm families in region. Provides information about household activities needed by research workers for determining space requirements for activities in home.


Determines characteristics of existing farm dwellings as well as activities and attitudes affecting housing requirements of Pennsylvania farm families. (Part of a more extensive study.) Data obtained from 438 families living in 53 Pennsylvania counties. Information used as basis for conducting laboratory studies on space and facility requirements of farm families.


Represents completion of farm housing research program started in 1946. Undertaken cooperatively by Northeast Region Agriculture Experiment Station and U.S.D.A. Report has three sections: I. Extensive review of literature on specific household activities. II. Data on household activities collected from 207 families living in that region of USA. Each family was observed an average of six times, distributed throughout the year, for periods lasting 2–3 hours. Observation days also varied according to day of week. III. Guides for house plans based on family activity patterns as determined by this study, showing differences according to stage

* = Landmark Study
of family life cycle. Part II gives findings as percentages of individual family member’s time spent in each room of the house as well as an analysis of the simultaneous activities occurring in the same general area and in different areas of the home.


Compares Kofranyi-Michaelis Calorimeter with Douglas bag as standard procedure in four different activities. Subjects were two men. Stairs consisted of 53 steps, 15.3 cm. high; horizontal distance covered, 37.2 cm. Each ascent or descent was made in one minute. Oxygen measurements were made after five minutes of exercise. Metabolic cost of walking upstairs is from three to four times that of walking on level. Metabolic rate in descending stairs is 50 to 75% higher than walking on level. Authors emphasize that in any task a large proportion of the energy expended is in maintaining body posture and that if this amount is subtracted from the total cost, the resulting estimated efficiency of the external mechanical work is high.


Humidity and temperatures in a control room are evaluated while using different equipment in cooking pot roasts. Use of an oven requires the highest energy consumption and gives off the most heat. However, evaporative losses are among the lowest with oven use. Author concludes that selection of pan, unit, and method reduce fuel costs by two-thirds and evaporative loss from more than 1 quart to nearly ½ cup. Such selection holds temperatures of the range top 20 degrees lower and those near the range and remote places, seven degrees and five degrees lower, respectively.


Studies usefulness of storage walls, usefulness of movability and design of storage walls for all storage needs throughout the house, using both field and laboratory methods. Gives report of methodology and evaluation of study.


Laboratory and home study to determine dimensional requirements for folded storage and to design suitable storage units. To

* = Landmark Study
test suitableness of units, families use various units, criticize them, and express their preference. Illustrations of designed units for minimum, moderate, and liberal level of ownership (parents, two girls or two boys).


Determination of rod space as well as height and depth needed per garment. Develops estimations of closet space allowances based on space per garment as well as on replies to survey of 751 owner-operator farm families in South. Recommendations given according to levels of clothing ownership: minimum, moderate and liberal, for these age-sex groups; married men, 20 to 39; women, 20 to 39; unmarried men, 20 to 39, and girls, 15 to 19 years old.


Physiological responses of eight healthy homemakers, age 42 to 51, ascending and descending stairs are evaluated through oxygen consumption, pulse rate, blood pressure, oral temperature and weight loss. There is a positive relationship between stair design and energy expenditure. Uses McKesson Metabolar for basal metabolism tests, Muller-Franz respirometer for collecting and measuring expired air, Beckman electronic oxygen analyzer and an adjustable stai-step treadmill with tachometer.


Comparisons made of relative energy expenditures of nine women (62 inches to 65 inches and 110–160 pounds with a range of −15 to +15% variation in their basal metabolic rate) lying, sitting and standing, walking and bending. Findings are on the basis of 132 tests for each person in each postural position. Results are given in calories per hour. As number of steps increased calories increased. Turning in a walk (90° and 180°) increased energy expenditures over walking in a straight line. Pulling a load in a cart does not take more energy than walking at same rate without a load. Gives details of research and methods plus list of references of research on energy expenditures for household activities.


Study to determine basic design measurements for sitting while
dining, writing or playing table games, for sitting while relaxing, and for sitting while talking, viewing or listening. Heights of table surfaces for dining, writing or games are investigated. Reports methodology and findings.


Indirect calorimetry method employed in series of studies of energy costs of certain household tasks. Uses Douglas bag and Haldane gas-analysis method. Author suggests that analysis of psychophysiologic, sensory and energy costs be evaluated in fatigue studies. The opportunity for constructive research can be greater through duplicating home conditions in the laboratory than industrial study and through these solutions contributions might be made to industry.


An old book but a useful reference on method, instrumentation, and ways of reporting results.


Description of facilities and methodology. Work carried out in specially-built reverberation room. Sound absorption and noise reduction coefficients are obtained for 12 carpeting materials with and without three types of underlays and for four drapery fabrics. A cooperative study between agricultural engineering and home economics.


Measures intensity of sound in decibels. A change from 45 decibel background to 65 created by a dishwasher can be annoying. Recommended treatments for noise: better design of mechanical and structural parts, reduction of airborne sound energy by applying absorption materials or noise barriers, and reduction of structurally borne sound radiations by panel-deadening materials or vibration isolators. Noise output of four built-in and three portable dishwashers is measured and findings confirmed by a panel of 16 housewives who evaluate desirable vs. undesirable sounds. Tape recorder used for recording dishwasher sounds.

* = Landmark Study

A study of interrelationship of space and time for activities of all family members. Time spent on activities, location of activities, and changes made from one activity to another are observed for 100 farm families, divided into four types based on ages of children. Gives applications of findings to house planning.


A collection of guides for planners and builders of rural homes in Southern Region of United States based on space and facility requirements for various household activities. Information included on storage requirements and activity space for food preparation, food preservation, dining, laundry, children's play and storage. Recommendations given for liberal and limited or minimum levels of adequacy.


Summarizes and evaluates present methods of studying human costs of work evaluated in relation to problems of arrangement and design of workplaces, requirements for carrying out tasks, and demands placed on worker. Means of recording data are examined. References cite complete list of Cornell publications applicable to household work investigations.


Study summarizes and compares trips made for preparation of 100 meals for four persons in seven controlled laboratory situations, using eight methods of studying trips and pattern of work. Gives appraisal of methods plus principles and guides for planning centers.


The part of a state survey to determine adequacy of space in Nebraska farm houses that pertains to multistory tee shaped houses. Of the 1,487 houses investigated, 265 (17.8%) were multistory tee shaped, the most common farmhouse design in Nebraska. Com-

* = Landmark Study
pares data to standards of housing adequacy as published by the American Public Health Association in 1950. Finds that most houses are more than ten years old; lack modernization, good traffic patterns and storage space; however, two-thirds of houses have adequate floor space for conducting basic household activities. Other factors surveyed are number of owned and rented farms, stage of family life cycle, income, and house placement in relation to public road and other farm buildings. Purpose of study is to provide information to aid in remodeling.


Survey of Nebraska farm family preferences, activities and possessions as they relate to housing needs. Data obtained in 1948–1949 from interviews of 558 farm families scattered throughout 86 of Nebraska’s 93 counties. Study coordinated with survey, “Farm Housing Needs and Preferences in North Central Region” (North Central Regional Publication 20, Iowa State College, Feb. 1951). Designed to interpret housing needs of Nebraska farm families, differences in housing needs and preferences of farm families in various areas of the state and to identify ways in which these differences vary from those reported for the North Central Region.


An annotated bibliography.


Detailed instructions to follow when planning a kitchen, telling how to plan cabinets, determine space needs, determine work surfaces, and test a proposed plan. Gives recommendations for kitchen planning and characteristics of a good plan. Written for use by homemaker. Results based on extensive unpublished research.


Field study to obtain data for aid in establishing standards for dimensions of parts of house used mainly by women. 562 women participate (79% full-time homemakers, 57.3% from farms or vil-

* = Landmark Study
lages of less than 2,500 population). Observes and analyzes size preferences and physical requirements for 13 work areas in home. Majority of sample would be well served by equipment planned for average-sized individual. Lists dimensions to be used as guide for home designers.


The part of a state survey to determine adequacy of space in Nebraska farmhouses that pertained to two-story square-shaped farmhouses. Of the 1,487 farmhouses investigated, 167 (11.7%) were square-shaped. Findings include information on adequacy of the house in terms of minimum health requirements, the condition of the house structure, floor plan, existing utilities, work areas and storage space as well as placement on farm in relation to the public road and other farm buildings. Purpose of study is to provide information to aid in remodeling.


Establishes storage space dimensions per unit of commonly used household textiles and determines measurements for storage facilities to accommodate the quantity of household textiles owned by farm families. Uses inventories obtained from four regional surveys of farm families with unit-space dimensions as basis for planning.


A survey in the first phase of a larger regional research project to determine functional requirements of rural homes in Western region to provide basic information concerning rural families and environmental conditions to consider when developing plans suited to the various areas of Western states. Data were obtained from interviews with homemakers.

SOCIOECONOMIC ASPECTS


A brief analysis of economic aspect of housing in rural fringe area surrounding a metropolitan center is included in the section,
"The Impact of Migration on Property Value, Public Services and Taxes."


Study made in Puerto Rico to lead to an understanding of the relocation process and give a miniature picture of individual reactions to social change. A cross-sectional survey is made of 275 households, randomly sampled from six population groups. Three groups are residents of slum areas in various stages of clearance; one group, residents of public housing projects; one group, former residents of slum areas which had been the clearance areas for the public housing projects; and one group, former residents of public housing projects. Results are reported in terms of living conditions, housing aspirations, attitudes toward a move to public housing, change and personality, and perception of housing projects.


Summary given of environmental elements and theories. Discusses objective space, ego space and immanent space. For experimental convenience these are placed into five simple dichotomous variables. Gives a summary of "A Comparative Study of Spatial Meaning" (unpublished Master's thesis by Robert Beck, 1964, Univ. of Chicago). In this research a spatial test is used with pairs of figures composed of simple geometrical shapes, points and lines representing the five dichotomous variables; 116 subjects choose the symbol figure they prefer from each of 67 pairs (unsure conclusions).


Study focuses on values families hold for housing. Suggestions given for builders and for researchers interested in methodology.


Reports a long and extensive study of housing in United States. Gives factual findings organized under two parts: I. The Production of Housing and II. The Marketing of Housing. Also discusses housing problems as developed by the Housing Committee which conducted a study for the Twentieth Century Fund during early years of World War II. Urban and rural housing are discussed.

*= Landmark Study

26

Study designed to develop an instrument to help individuals and families make satisfying housing choices by clarifying their thinking as to their housing needs in order to discover and consider housing values of functional importance to all family members. A representative cross section of families in the study indicated some of the differences in housing needs and values associated with socioeconomic status and family size.


From a three-year study of Chicago housing, the authors present a complete look at city housing. Analyzes differences in quality, availability, and price of metropolitan housing attributable to such factors as income, race, age, recency of immigration and stage in family life cycle. This book meets an urgent need for an overview of metropolitan housing in relation to which planners, social workers, administrators and interested citizens can evaluate the complexities and particular problems of urban life.


Attitudes of residents and nonresidents of a housing project tend to consider those living in the project as “low class.” By a program of community activities including both groups, an effort is made to change the undesirable attitudes. Results indicate that attitudes are improved only for those individuals who have been initially favorably disposed toward the program.


Uses interviews and sociometric techniques to study the friendships and community life in a housing project for 260 married veterans at M.I.T. In this relatively homogeneous group, proximity is a striking factor in the formation of friendships. Group standards, as shown by uniformity of community attitudes, exist within any one housing unit in the measure that there are many friendships (high degree of cohesion) within that unit. Presents a chart by a housing expert and one by an architect applying the author's findings and raising questions about housing which psychologists might help to answer. One chart is devoted to quantitative techniques for summarizing sociometric data.

* = Landmark Study

Sociological interpretation, using participant observation of life in the Westside area of lower Beacon Hill in Boston. Special attention is given to the neighborhood, the people, their patterns of living and their attitudes. Pages 11 to 24 relate to housing in the area considered as a slum by most outsiders but not by most residents.


An investigation of architectural design as a means of manipulating social relationships. Discusses two projects: a student’s study for a mental hospital and a residence hall group from the University of Delaware. Study illustrates how logical planning and concern for human element in specific housing situations can be used as a design method.


Identifies basic social characteristics of 100 families served by Family Centered Project of St. Paul. Exploratory study of factors contributing to family disorganization. Theoretical structure of study based on role formation, role function and role relationships. Studies nine major categories of “social functioning”: family relationships and family unity, individual behavior and adjustment, care and training of children, social activities, economic practices, household practices, health conditions and practices, relationships to Family Centered worker, and use of community resources. Recommends conceptual approach correlating family functioning or malfunctioning with completeness or incompleteness of family structure.


Complete review of theories of perception—space and form.


Study of transfer in a Scottish burgh from “inner city” to dormitory suburbs (housing estates). Uses nondirective interviews held four or five times in one year, once in the old house and the rest in the new housing, with a sample of 88 rehoused persons. Pertinent to aesthetics, in the interviews only 7% spoke of physical
conditions while most spoke of social relations. Aesthetics play no part in assessment of external appearance of dwellings. Tenants fail to conceive of the housing estate as an entity in itself. When questioned directly, only 1/5 wanted more “variety.” Suggests that people like what they have until shown something better.


Survey of policies and practices in making loans for purchase, construction and improvement of rural homes in parts of Alabama, Georgia, Mississippi and South Carolina. Data collected in 1959 from 171 lending institutions. In addition, 665 rural residents from Alabama surveyed to determine their ability and desire to utilize housing credit. Concludes that rural residents’ housing needs are not met because of reluctance to use credit and inability to utilize available credit. (Companion report to Rose, Hurst and Yeager, 1961).


Study of 80 housing projects in 15 cities conducted by field observations and conversations with local housing experts. Investigates aspects of intensity of development and quality-livability. Intensity of development refers to density (of buildings to land), coverage, floor area ratio, type and size of buildings and spacing. Quality-livability considered privacy, usable open spaces, individuality, diversity of housing types, location, proximity to community facilities, safety and health, circulation, auto-storage, blending of new housing into surroundings, site details and views to and from site. Excludes interior design and all aspects of housing except physical design.


Examines attitudes and practices related to personal hygiene activities as a basis for establishing criteria for bathroom design. Deals with characteristics of existing bathrooms; attitudes and practices related to privacy; practices in use of bathroom-bathing, grooming, child care, laundry, and cleaning; and what people want in a bathroom.


One of a series of University of Chicago studies on metropolitan
problems. Follows the tradition of earlier studies in applying rigorous methods of sociological research to the investigation of a salient urban social problem. However, this study is unique in its systematic comparative framework. Ten cities included in study: Boston, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Philadelphia, Pittsburgh, St. Louis and Syracuse.


Study of two types of space: perceptual distance and accessible space. Sample size of 75 persons. Uses a variety of interviewing media: evaluation of photographs, statements of ‘ideal’ urban environments, information on interpersonal activities, and use of present and past neighborhoods. Gives findings in terms of physical-social relationships. Concludes that most of our current segregation in cities by income and family size represents the rigidities of the housing market and conceptions of what cities should look like, not socially based desires of people.


Study of modification in attitudes which occur during slum clearing or slum prevention process and after a certain stage is reached. Studies sections of Chicago, Miami, New Orleans and Baltimore. Findings: prevention and eradication of slums not to be accomplished by physical measures alone or by measures limited to the condition of housing. Suggests need for profound changes in hearts and minds of people, both in and out of affected areas. Any let-down in effort means retrogression; in short, eternal vigilance and unremitting endeavor are the price of a good neighborhood.


A study of housing images of undergraduate women in four geographic regions of the United States. Specific concerns of the study are nature and content of housing images, extent to which geographic location affects housing desires, housing expectations, and factors affecting ideas about housing.


A study of conditions of rural housing, satisfaction of owner-

*= Landmark Study
occupants with their housing, extent and manner in which families upgrade their housing, and goals toward which families move. Analytical variables for study are socioeconomic status, age, family life cycle, education and occupation.


In contrast to long-accepted theory, this study of the relation of housing, its (economic) values and rents, to normal and expected long-run income, concludes that the proportion of income spent on housing rises as income increases. Uses data from surveys and censuses from 1918–1960 to assess such factors as short-run income change, error in reporting income, cyclical change, composition of households, mobility of population and market price of housing. Shows that the rise in price of housing has a marked tendency to decrease housing consumption.


Survey of housing conditions and desires of 665 rural residents in Alabama, Mississippi, Georgia and South Carolina. Describes rating system used to determine housing adequacy. Average score for adequacy for houses in study is 67; high score 100, interpreted to mean adequate, while low score means inadequate. When rural residents express priorities for future expenditures, it is found that preference for improving housing is below that expressed for non-housing non-business items such as television sets, boats, appliances and automobiles. (Companion report to Hurst, Rose and Yeager, 1961).


A study conducted in Chicago as an example of how modern research methods can be used to draw generalizations concerning the social psychology of residential mobility. Households are interviewed in census tracts selected to represent a matrix of mobility rates and socioeconomic status. The conclusion is that mobility is the process by which families adjust their composition coincident with changes in life cycle. Mobility is greatest when families experience greatest growth.


Examines relationship between housing, continuing poverty and
insecurity in United States. Reviews studies and research of the effects of substandard housing and blighted neighborhoods on the people who lived in them. Includes bibliography of 271 references.


   Social research designed to describe and understand the human relationships that develop in a "typical suburban community." Information obtained from interviews of families. Chapters on space, shelter and time of particular interest to housing researchers.


   A joint anthropological-psychological, cross-cultural study concerning the role of culturally determined experiences in visual perception. Data collected over several years. Presents a detailed report of research that demonstrates cross-cultural differences in the perception of illusory line-drawings. Data support the two seemingly disparate social sciences. Gives principles of cultural relativism and the influence of learning on perception.


   Two research reports concerning spatial influences on friendship in mental hospitals. Discusses personal space vs. territory, physical relationship between conversers, room geography, sociofugal vs. sociopetal architecture, wards and corridors, etc. Particularly the research on space and design could be expanded to include other aesthetic aspects.


   Cross-cultural study of environmental perception to establish the range of conscious environmental attitudes, preferences and sensitivities of different populations and possible reasons. Uses 50 pairs of photo slides with four environments varied in vegetation, topography, water features and temperature. Sample includes Eskimo and non-native population from same area, students of Univ. of
Delaware and junior high school students. Concludes that landscape and space represent different kinds of environmental experience, space and landscape requirements cannot be universally specified, and both adjustment and adaptation are effective for assessing spatial and landscape problems. Suggests real problems of future environment are not so much spatial and aesthetic as they are ecological.


Study concerning the amount of time and kinds of activities shared by various members of the family. Differences between farm and town families are compared.


Uses design similar to the study Family Use of Farm Homes, by same authors. Families live in small cities. Compares findings for farm and city families and activities within homes.


Study of activities carried on in home, rooms and facilities used for these activities and the attitudes and opinions about the home held by all family members. Conclusions give implications for house designs. Methodology: interviews plus time records.


A study of the contact hypothesis.


Reviews a sample of 40 studies relating to housing quality, variously measured or defined, and various physical and social aberrations. Location of sample: 16 in Europe and 24 in America. Of these, 26 show possible associations between housing and health or housing and social adjustment. In 1954, a study made in Baltimore, Maryland, sponsored by the School of Hygiene and Public Health, Johns Hopkins University. Two samples are each surveyed 11 times during a three-year period. One group has 300 slum families who moved; the other 300 families who did not move. Concludes that adjustment findings were limited and incidence of illness and disability are much lower with better housing conditions.

* = Landmark Study
SOURCES OF ADDITIONAL BIBLIOGRAPHIES RELATED TO HOUSING


Natl. Housing Center Library.
Center publishes a number of reference lists relating to housing. Ask to be put on mailing list.

Natl. Insts. of Health, Bethesda, Md.
Medical Literature Analysis and Retrieval System (MEDLARS). A computerized medical literature searching system producing bibliographies from worldwide medical literature. Requests for searches may be made at MEDLAR Centers at many of the major U.S. medical colleges. Restricted to qualified researchers on cost basis.

Research and Design Inst. P.O. Box 307, Providence, R.I.
Behavior and Environmental Design Directory.
Listing of those who have engaged in research, have published material dealing with or having some special interest in the integrative field of environmental design and human behavior. Cross-indexed to identify the spectrum of interests of those listed. Published biennially since 1965.

Science Information Exchange.
Computer annotated bibliography on special subjects. Submit topics when requesting information. On cost basis, determined by number of topics submitted. Periodic mailings of subject information titles on subscription basis.


Current research Information System (CRIS).
An automated information storage and retrieval system designed to improve communications among scientists regarding research currently in progress. A scientist may query CRIS and receive a listing of specific projects which fit his inquiry. The listing includes who is doing the work, where, nature of the work, progress, and citations of publications from the research. On request basis.


Most comprehensive index to current literature in housing, urban development, and related subjects published (1948 to date). Includes periodicals, books and documents received in the Department of HUD Libraries. Listed by geographic region, HUD author and publication indexes. On subscription basis, bimonthly.

HUD Library.
Issues annotated bibliographies on special subjects. On request basis.
# Bibliography of Residential Environment Relevant to Research Programs

## Author Index

### General

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Adams, G.</em></td>
<td>1959</td>
<td>3</td>
</tr>
<tr>
<td><em>American Home Economics Association Committee on Revision of the Syllabus for Home Economics, JHE, 1935</em></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><em>North Central Regional Research Committee #9, 1958</em></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><em>The President's Conference on Home Building and Home Ownership, 1932</em></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><em>Williams, F. and C. C. Zimmerman, 1935</em></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

### Design and Aesthetic Aspects

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexander, C.</td>
<td>1960</td>
<td>4</td>
</tr>
<tr>
<td>Ball, V. K.</td>
<td>1964</td>
<td>4</td>
</tr>
<tr>
<td>Child, I. L.</td>
<td>1964</td>
<td>4</td>
</tr>
<tr>
<td>Granger, G. W., 1955, (Colour Preferences)</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Granger, G. W., 1955, (Colour Harmony)</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Haas, W. A.</td>
<td>1963</td>
<td>5</td>
</tr>
<tr>
<td><em>Hall, E. T., 1963</em></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td><em>Hall, E. T., 1963</em></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Immergluck, L.</td>
<td>1962</td>
<td>6</td>
</tr>
<tr>
<td>Kennedy, J. E.</td>
<td>1961</td>
<td>6</td>
</tr>
<tr>
<td>Knapp, R. H., J. Brimmer, M. White</td>
<td>1959</td>
<td>6</td>
</tr>
<tr>
<td>Machotka, P.</td>
<td>1966</td>
<td>7</td>
</tr>
<tr>
<td>Rouse, M. J.</td>
<td>1968</td>
<td>7</td>
</tr>
<tr>
<td>Rump, E. E.</td>
<td>1968</td>
<td>7</td>
</tr>
<tr>
<td>Schaie, K. W.</td>
<td>1961</td>
<td>7</td>
</tr>
<tr>
<td>Wright, B. and L. Rainwater</td>
<td>1962</td>
<td>8</td>
</tr>
</tbody>
</table>

* = Landmark Study
<table>
<thead>
<tr>
<th>PHYSICAL—PHYSIOLOGICAL ASPECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agan, T., E. Anderson, I. L. Reis and A. M. Carson, 1965</td>
</tr>
<tr>
<td>American Home Economics Association, 1970</td>
</tr>
<tr>
<td>*Benedict, F. G. and H. S. Parmenter, 1928</td>
</tr>
<tr>
<td>Beyer, G. and J. H. Rose, 1957</td>
</tr>
<tr>
<td>*Beyer, G., 1949</td>
</tr>
<tr>
<td>Boalt, C. and U. Leander, 1961</td>
</tr>
<tr>
<td>Cowles, M. L. and M. H. Irwin, 1953</td>
</tr>
<tr>
<td>*Cowles, M. L., 1956</td>
</tr>
<tr>
<td>Cramer, R. D., R. B. Deering, V. G. Kay and L. W. Neubauer, 1958</td>
</tr>
<tr>
<td>*Droege, W., E. Kofranyi, H. Kraut and L. Wildermann, 1959</td>
</tr>
<tr>
<td>Elliot, D. E. and M. B. Patton, 1963</td>
</tr>
<tr>
<td>Elliot, D. E., M. B. Patton and M. E. Singer, 1963</td>
</tr>
<tr>
<td>Everson, G. J., L. W. Neubauer, and R. B. Deering, 1956</td>
</tr>
<tr>
<td>Gasset, L. J., 1957</td>
</tr>
<tr>
<td>Grady, E. R., 1965</td>
</tr>
<tr>
<td>Grady, E. R., 1964</td>
</tr>
<tr>
<td>Grady, E. R., 1962</td>
</tr>
<tr>
<td>Grady, E. R., G. H. Smith, and B. M. Kuschke, 1953</td>
</tr>
<tr>
<td>Gross, I. H. and S. H. Bartley, 1951</td>
</tr>
<tr>
<td>*Heiner, M. K. and H. E. McCullough, 1948</td>
</tr>
<tr>
<td>Heiner, M. K. and R. Steidl, 1951</td>
</tr>
<tr>
<td>Hinson, T. and J. Mize, 1963</td>
</tr>
<tr>
<td>*Hite, S. C. and J. L. Bray, 1948</td>
</tr>
<tr>
<td>*Howard, M. S. and G. Tayloe, 1956</td>
</tr>
<tr>
<td>Jennings, B. H. and B. Givoni, 1959</td>
</tr>
<tr>
<td>Johnston, K. A., 1957</td>
</tr>
<tr>
<td>Johnston, K. A., and C. Sinden, 1959</td>
</tr>
<tr>
<td>Keiser, M. B. and E. K. Weaver, 1962</td>
</tr>
<tr>
<td>*Kira, A., 1966</td>
</tr>
<tr>
<td>*Knowles, E., 1956</td>
</tr>
<tr>
<td>*Kremer, J. and S. Day, 1959</td>
</tr>
<tr>
<td>*Kremer, J. and S. Day, 1957</td>
</tr>
<tr>
<td>*Langworthy, C. F. and H. G. Barott, 1920</td>
</tr>
<tr>
<td>Leschly, V., I. Exner and J. Exner, 1959</td>
</tr>
<tr>
<td>Leschly, V., A. Kjaer and B. Kjaer, 1960</td>
</tr>
<tr>
<td>McCracken, E. C. and M. Richardson, 1959</td>
</tr>
<tr>
<td>McCullough, H. E., 1953</td>
</tr>
</tbody>
</table>

* = Landmark Study
McCu llough, H. E. and M. Farnham, 1960 .................................. 17
Mize, J., 1962 ........................................................................................................ 17
Mize, J., 1959 ........................................................................................................ 18
Mize, J., 1957 ........................................................................................................ 18
Mize, J., 1956 ........................................................................................................ 18
Monroe, M., 1960 ................................................................................................. 18
Monroe, M., 1959 ................................................................................................. 19
*Nickell, P., M. Budolfson, M. Liston, and E. Willis, 1951 ......................... 19
*Northeastern Farm Housing Tech. Comm., 1959 ........................................... 19
*Orsine, D. and R. Passmore, 1951 ................................................................. 20
Philson, K., 1965 ................................................................................................. 20
Philson, K., 1963 ................................................................................................. 20
Philson, K., 1962 ................................................................................................. 20
Philson, K., 1960 ................................................................................................. 21
Richardson, M., 1966 ......................................................................................... 21
Richardson, M. and E. C. McCracken, 1960 ................................................... 21
Ridder, C., 1959 ................................................................................................. 21
*Ryan, A. H., 1928 .............................................................................................. 22
Simons, J. W. and F. B. Lanham, 1951 ............................................................. 22
Smith, D. B., 1964 .............................................................................................. 22
Smith, R. H., M. Q. Gerhold and L. G. Kivlin, 1961 ...................................... 23
Steidl, R., 1963 .................................................................................................... 23
Steidl, R., 1962 .................................................................................................... 23
*Trotter, V. Y., 1958 ........................................................................................... 23
*Trotter, V. Y. and M. I. Liston, 1954 ................................................................. 24
Weaver, E. K., M. E. Singer and D. Teater, 1956 ........................................... 24
*Wilson, M., 1950 ............................................................................................... 24
*Wilson, M., E. H. Roberts and R. Thayer, 1937 .......................................... 24
*Withrow, J. L. and F. McKinney, 1959 ............................................................. 25
*Woolrich, A., 1955 ............................................................................................ 25
*Woolrich, A., E. Beveridge and M. Wilson, 1952 ........................................ 25

SOCIOECONOMIC ASPECTS

Back, K. W., 1962 ............................................................................................... 26
Beck, R., 1967 ..................................................................................................... 26
Beyer, G. H., T. Mackesey and J. Montgomery, 1955 .................................. 26
*Coleman, M. L., 1944 ....................................................................................... 26

* = Landmark Study
*Cutler, V. F., 1947.........................................................27
Duncan, B. and P. M. Hauser, 1960.........................................27
*Festinger, L. and H. H. Kelley, 1951.....................................27
*Festinger, L., S. Schlacter and K. Back, 1950..........................27
Gans, H. J., 1962..........................................................28
Geddes, R. and O. Humphry, 1965..........................................28
Geismar, L. L. and B. Ayres, 1958.........................................28
Gibson, J. J., 1950..........................................................28
Hole, V., 1959..............................................................28
Hurst, J. R., B. B. Rose and J. H. Yeager, 1961.........................29
Katz, R. D., 1963..........................................................29
Langford, M., 1965........................................................29
Lieberson, S., 1963........................................................29
Michelson, W., 1966........................................................30
*Millspaugh, M., G. Breckenfeld and M. L. Colean, (eds.), 1960....30
*Montgomery, J. E., 1963..................................................30
Reid, M. G., 1962..........................................................31
Rose, B. B., J. R. Hurst and J. H. Yeager, 1961........................31
Rossi, P., 1955............................................................31
Schorr, A. L., 1963........................................................31
Schultz, D. B., 1965.......................................................32
Seeley, J. R., R. A. Sim and E. W. Loosley, 1963.........................32
Segall, C. H., 1966.......................................................32
Sommer, R., G. Sommer and G. Witney, 1960.............................32
Sonnenfied, J., 1966.......................................................32
*Thorpe, A., 1957........................................................33
Thorpe, A. and I. H. Gross, 1955.........................................33
Thorpe, A. and I. H. Gross, 1952.........................................33
*Wilner, D. M., 1955.......................................................33
Wilner, D. M., 1962.......................................................33

**SOURCES OF ADDITIONAL BIBLIOGRAPHIES AND OTHERS RELATED TO HOUSING**

American Home Economics Association..................................34
National Association of Home Builders..................................34
National Institutes of Health...........................................34
Research and Design Institute, Providence, R.I........................34
Smithsonian Institution..................................................35
U.S. Department of Agriculture..........................................35
U.S. Department of Housing and Urban Development..................35

* = Landmark Study