Foreword

This study was sponsored originally by the Research Committee of the Housing Division of the American Home Economics Association in 1947-1949. The Housing Committee of the Home Economics Research Section of the Association of Land-Grant Colleges and Universities also contributed to the study in 1949. The author, who participated in the work of these committees, expanded the scope of the investigation and prepared this report. Both committees approved the use of their data by the Illinois Station.

Acknowledgment is given to Tessie Agan who, as chairman of the Research Committee of the Housing and Household Equipment Division of the American Home Economics Association for 1947 to 1950, assisted with the collection and analysis of the data originally assembled and checked the final manuscript; and to Deane G. Carter and Maud Wilson for reading the manuscript. Appreciation is expressed to those persons in the contributing institutions who generously gave of their time in supplying and checking data used in the analysis.
HOUSING AND HOUSEHOLD EQUIPMENT RESEARCH in Home Economics: 1925-1950

By Helen E. McCullough, Assistant Professor of Home Economics

In the earliest home economics curricula, housing was included as one of the three major fields of study: food, clothing, and shelter. Research in housing developed slowly, however, and aroused little widespread interest until the passage of the Research and Marketing Act in 1946. This act provided funds for housing research in the agricultural experiment stations at a time when the public was conscious of an acute shortage in dwellings. The need for more scientific knowledge about housing was apparent, and the time was ripe for research on a large scale. Home economists were suddenly confronted with the fact that not only were few of them trained to do such research, but there was little information available about what had been done.

This study was undertaken, therefore, to give an over-all picture of housing and equipment research by home economists completed or in progress during the years 1925 through 1950: when, where, by whom it was done or is being done; the sources of funds; the phases of housing covered; the methods used; and the availability of the findings. In this field of research where facts are wanted quickly and personnel is limited, such information is needed to point up the areas that call for emphasis, to help in classifying and establishing effective procedures for research, and to give guidance in the training and placing of personnel.

HOW THE STUDY WAS MADE

All colleges and universities in the United States that grant degrees in home economics and the U.S. Bureau of Human Nutrition and Home Economics were asked for a complete list of research studies in housing and in the related fields of home management and household equipment. Only those studies made entirely or in part by home

3 The course of domestic science as given in the Catalog of the Industrial University of Illinois for the year 1875-76 includes home architecture. The Lake Placid Conference on Home Economics, Proceedings 1-10, 1899-1908, lists among the standing committees one on shelter and household appliances.
economists or by persons under the direction of home economists were to be included. A form was provided for the information requested. Subsequent letters were sent to institutions not answering the first letter until replies were received from all.

The resulting list of studies and projects was cross-checked with the following sources to insure completeness:

- **Active and Completed Projects in Housing and Household Equipment** Division of the Bureau of Human Nutrition and Home Economics. August, 1949. Lists all research pertaining to housing and equipment carried on at the Bureau from 1927 to 1949.

- **Theses Completed in Family Economics and Home Management or by Persons Active in These Fields: 1920-1949.** Prepared by the Family Economics, Home Management Division of the American Home Economics Association. Some of these studies pertain to housing or closely related fields and are listed in the present report. Most of the studies were unpublished.

- **Bibliography of Agriculture.** Published monthly by the U.S. Department of Agriculture Library.

- **Experiment Station Record.** Published twice yearly up to 1946 by the U.S. Department of Agriculture. The studies pertaining to housing and household equipment were checked for this report.

The studies from the above sources were carefully screened for those actually pertaining to or having a direct bearing on some phase of housing. This was particularly true for those in home management and household equipment. Because research in household equipment has not previously been listed in one place, as have studies in management, the complete list of equipment studies is reported separately in Part II of this publication.

The questionnaire called for a descriptive title of the study; the date; the name of the researchers; whether experiment station, state, or student research; the source of the funds; subject matter; type of research; and the kind of publication which resulted. Data were classified and summarized under these headings. Findings were interpreted and returned to the respective institutions for verification, additions, and corrections at least three times in order to make this report as complete and accurate as possible.

Obviously difficulties were encountered in assembling and interpreting data from so many varied sources and covering so long a period. Staff changes made it hard to obtain complete and precise information in all cases. Also the lack of an objective criterion for evaluating research increased the difficulty of making decisions regarding the many points considered. Those who submitted the data and those who did the analyzing were responsible for final decisions. The possibility of error was minimized by the frequent return of the data to the insti-
tutions for rechecking, and by comparing their listings with published lists, abstracts, and reports.

It is to be expected that the studies considered vary widely in value, even as they do in subject matter and method of research. Approximately half are graduate theses, special problems, or limited studies not sponsored by a regular research agency such as the experiment stations. Fewer than half the studies have been published.

Despite the fact that some of the studies have been limited, fragmentary, and obviously exploratory, their recording in one place should help to prevent duplication of research in the future and suggest fields for further investigation.

PART I: HOUSING RESEARCH

Development of Interest

During the twenty-six years from 1925 through 1950, the 255 research studies in housing reported here were undertaken by home economists in American colleges and universities and in the U.S. Bureau of Human Nutrition and Home Economics. Over half of these were underway during the four years from 1947 through 1950.

Two events, the President's Conference on Home Building and Home Ownership in 1931 and the Research and Marketing Act in 1946, were noteworthy for their influence on housing during these twenty-six years. After the President's Conference home economists were more conscious of the possibilities of housing as a subject in the home economics curriculum and of the research needed. Their interest is reflected in the large number of articles on housing published in the Journal of Home Economics during the years 1934 to 1937. Research, however, grew slowly until the passage of the Research and Marketing Act in 1946. The great increase in the number of research projects in the land-grant colleges following 1946 is evident in the graph shown in Fig. 1 and the data in Table 1.

In 1925 two studies that could be classified as housing research were made at the University of Nebraska. From 1926 to 1934 no more than three studies were started in any one year, and six were reported in 1935. By 1942 the number of new studies reached a high of 13, then declined until 1946. In 1947, as a result of the Research and Marketing Act approved the previous year, the number of new projects increased to 48. A “farm housing study” undertaken cooperatively by a large number of the agricultural experiment stations and the Bureau

The slow, uneven growth of housing research before 1946 contrasts sharply with the remarkable upsurge following the passage of the Research and Marketing Act.

(Fig. 1)

of Human Nutrition and Home Economics accounted for most of the new projects. Twenty-three new projects were begun in 1948, 25 in 1949, and 38 in 1950.

Not only was there a great increase in the number of housing research studies after 1946, but the cooperative nature of many of the projects called for definite research programs. For the first time serious attention on a wide scale was given to research procedures and methods. The years preceding 1947 may therefore be said to cover the preliminary and exploratory period of research. It is logical to expect the years that follow 1947 to be characterized by an increasing emphasis on the scientific approach to housing research.

Types of Institutions Where Research Was Done

Thirty-eight land-grant and ten other colleges and universities are represented in the housing studies reported here. Also two divisions of the U.S. Bureau of Human Nutrition and Home Economics\(^1\) made

\(^{1}\) Although the Bureau of Human Nutrition and Home Economics is thought of as an agency rather than an "institution," for simplification it is included with the institutions.
### Table 1: Number of Housing Research Projects Started Annually, 1925-1950

<table>
<thead>
<tr>
<th>Year</th>
<th>Total projects</th>
<th>Institution* and number of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1925</td>
<td>2</td>
<td>Nebraska 2</td>
</tr>
<tr>
<td>1926</td>
<td>3</td>
<td>Chicago, Nebraska, Ohio St. U., 1 each</td>
</tr>
<tr>
<td>1927</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>1</td>
<td>Cornell 1</td>
</tr>
<tr>
<td>1929</td>
<td>1</td>
<td>Chicago 1</td>
</tr>
<tr>
<td>1930</td>
<td>2</td>
<td>Illinois, Oregon, 1 each</td>
</tr>
<tr>
<td>1931</td>
<td>3</td>
<td>Washington 1; Iowa 2</td>
</tr>
<tr>
<td>1932</td>
<td>1</td>
<td>Iowa 1</td>
</tr>
<tr>
<td>1933</td>
<td>1</td>
<td>Oregon 1</td>
</tr>
<tr>
<td>1934</td>
<td>4</td>
<td>Cornell, Vermont, Washington, BHNHE, 1 each</td>
</tr>
<tr>
<td>1935</td>
<td>6</td>
<td>Cornell, Rhode Island, 1 each; Iowa, BHNHE, 2 each</td>
</tr>
<tr>
<td>1936</td>
<td>2</td>
<td>Iowa, Minnesota, 1 each</td>
</tr>
<tr>
<td>1937</td>
<td>3</td>
<td>Ohio U., Oregon, Washington, 1 each</td>
</tr>
<tr>
<td>1938</td>
<td>8</td>
<td>Kansas, Tennessee, Texas St. for Women, 1 each; Cornell 2; Oregon 3</td>
</tr>
<tr>
<td>1939</td>
<td>9</td>
<td>Kansas, Kentucky, N. Carolina, Texas St. for Women, Stout, 1 each; Oregon 4</td>
</tr>
<tr>
<td>1940</td>
<td>10</td>
<td>Missouri, Nebraska, Oregon, Rhode Island, Vermont, 1 each; Texas St. for Women 2; Cornell 3</td>
</tr>
<tr>
<td>1941</td>
<td>9</td>
<td>Tennessee, N. Texas St. Teach., Vermont, BHNHE, 1 each; Virginia St. 2; Oregon 3</td>
</tr>
<tr>
<td>1942</td>
<td>13</td>
<td>Syracuse, Ohio St. U., Ohio U., Prairie View St. (Tex.), U. Texas, Wisconsin, 1 each; Oregon 7</td>
</tr>
<tr>
<td>1943</td>
<td>4</td>
<td>Oregon, BHNHE, 1 each; Purdue 2</td>
</tr>
<tr>
<td>1944</td>
<td>9</td>
<td>Chicago, Illinois, Purdue, Cornell, N. Carolina, Oregon, Wisconsin, 1 each; Syracuse 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Total projects</th>
<th>Institution* and number of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>12</td>
<td>California, Illinois, Iowa, Kansas, Cornell, Syracuse, Oregon, Rhode Island, Washington, 1 each; BHNHE 3</td>
</tr>
<tr>
<td>1946</td>
<td>18</td>
<td>Purdue, Nebraska, Clemson, Rhode Island, 1 each; Oregon, BHNHE, 3 each; Cornell, Washington, 4 each</td>
</tr>
<tr>
<td>1947</td>
<td>48</td>
<td>Alabama, Arizona, California, Colorado A. &amp; M., U. Colorado, Connecticut, Georgia, Chicago, Kansas, Louisiana, Maine, Michigan, Minnesota, Missouri, Syracuse, Rutgers, Ohio St. U., Rhode Island, Tennessee, Utah, Vermont, Virginia Poly., Washington, W. Virginia, Montana, 1 each; Cornell, Oregon, Pennsylvania, Clemson, BHNHE, 2 each; Purdue, Nebraska, Wisconsin, 3 each; Illinois 4</td>
</tr>
<tr>
<td>1948</td>
<td>23</td>
<td>Arizona, Colorado A. &amp; M., Georgia, Maine, Mississippi, Montana, Rhode Island, Washington, Wisconsin, 1 each; Iowa, Cornell, Ohio St. U., 2 each; Purdue, Kansas, 4 each</td>
</tr>
<tr>
<td>1949</td>
<td>25</td>
<td>Arizona, Arkansas, Illinois, Kansas, Maine, N. Carolina, Ohio St. U., Oklahoma, Tennessee, Texas Tech., Vermont, Wisconsin, BHNHE, 1 each; Montana, Rhode Island, Washington, 2 each; Cornell, Pennsylvania, 3 each</td>
</tr>
<tr>
<td>1950</td>
<td>38</td>
<td>Alabama, Arizona, Arkansas, Colorado A. &amp; M., Delaware, Georgia, Kansas, Tennessee, N. Texas St. Teach., Texas St. for Women, Vermont, W. Virginia, Stout, BHNHE, 1 each; California, Illinois, Iowa, Cornell, Utah, Washington, 2 each; N. Carolina, Ohio St. U., Oklahoma, Oregon, 3 each</td>
</tr>
</tbody>
</table>

* For more complete names of institutions, see Table 4, page 13. Here, for brevity, only the state is given when only one institution from that state is listed in Table 4.
Table 2. — Number of Housing Research Studies at Each Institution

<table>
<thead>
<tr>
<th>Institution*</th>
<th>Number of studies</th>
<th>Institution*</th>
<th>Number of studies</th>
<th>Institution*</th>
<th>Number of studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. Virginia</td>
<td>2</td>
<td>*Texas St. for Women</td>
<td>5</td>
<td>*Stout (Wis.)</td>
<td>2</td>
</tr>
<tr>
<td>Cornell (N.Y.)</td>
<td>23</td>
<td>Arizona</td>
<td>4</td>
<td>*U. Colorado</td>
<td>1</td>
</tr>
<tr>
<td>*BHNHE</td>
<td>15</td>
<td>California</td>
<td>4</td>
<td>Connecticut</td>
<td>1</td>
</tr>
<tr>
<td>Washington</td>
<td>14</td>
<td>*Chicago</td>
<td>4</td>
<td>Delaware</td>
<td>1</td>
</tr>
<tr>
<td>Purdue (Ind.)</td>
<td>11</td>
<td>Montana</td>
<td>4</td>
<td>Kentucky</td>
<td>1</td>
</tr>
<tr>
<td>Iowa</td>
<td>11</td>
<td>Oklahoma</td>
<td>4</td>
<td>Louisiana</td>
<td>1</td>
</tr>
<tr>
<td>Illinois</td>
<td>10</td>
<td>Colorado A. &amp; M.</td>
<td>3</td>
<td>Michigan</td>
<td>1</td>
</tr>
<tr>
<td>Kansas</td>
<td>10</td>
<td>Georgia</td>
<td>3</td>
<td>Mississippi</td>
<td>1</td>
</tr>
<tr>
<td>Ohio St. U.</td>
<td>10</td>
<td>Maine</td>
<td>3</td>
<td>Rutgers (N.J.)</td>
<td>1</td>
</tr>
<tr>
<td>Nebraska</td>
<td>8</td>
<td>Clemson (S.C.)</td>
<td>3</td>
<td>*Ohio U.</td>
<td>1</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>8</td>
<td>Utah</td>
<td>3</td>
<td>Prairie View St. (Tex.)</td>
<td>1</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>7</td>
<td>Alabama</td>
<td>2</td>
<td>*Texas Tech.</td>
<td>1</td>
</tr>
<tr>
<td>*N. Carolina</td>
<td>6</td>
<td>Arkansas</td>
<td>2</td>
<td>*Texas Tech.</td>
<td>1</td>
</tr>
<tr>
<td>Vermont</td>
<td>6</td>
<td>Minnesota</td>
<td>2</td>
<td>*U. Texas</td>
<td>1</td>
</tr>
<tr>
<td>*Syracuse (N.Y.)</td>
<td>5</td>
<td>Missouri</td>
<td>2</td>
<td>Virginia Poly.</td>
<td>1</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>5</td>
<td>*N. Texas St. Tech.</td>
<td>2</td>
<td>Virginia Poly.</td>
<td>1</td>
</tr>
<tr>
<td>Tennessee</td>
<td>5</td>
<td>Virginia St.</td>
<td>2</td>
<td>Total</td>
<td>255</td>
</tr>
</tbody>
</table>

* For more complete names of institutions, see Table 4, page 13. Here, for brevity, only the state is given when only one institution from that state is listed in Table 4.

* Non-land-grant institutions are starred. Studies made in them totaled 43, or 17 percent of all. Land-grant studies totaled 212, or 83 percent of all studies.

Contributions to this research — the Divisions of Housing and Household Equipment and of Family Economics. Table 2 shows the institutions carrying on projects.

Two hundred twelve studies, or 83 percent of the total 255, were made in land-grant institutions. This is to be expected because of the availability of federal funds for research in these institutions. Twenty-eight studies were in colleges and universities other than land-grant, and 15 were in the Bureau of Human Nutrition and Home Economics.

**Number of Projects per Institution**

The number of projects carried on by each of the 49 institutions that have contributed to home economics housing research is given in Table 2. Twenty-eight, or 57 percent, contributed three or more studies each, accounting for 89 percent of all the research. The other 21 institutions had one or two projects each.

Number of studies obviously is not necessarily related to quality of research. The number that meet experiment station standards, the strength of the graduate program, and number of projects on which results have been published are more important. The character and extent of interdisciplinary research and the availability of personnel with talent for research, factors not considered in this study, would be needed for a true evaluation of the quality of the work done in the various colleges and universities.

However, the institutions which rank highest in number of studies also rate high in these other qualifications. Oregon State College, for
example, with a total of 32 studies, ranks third in number of experiment station studies, first in number of publications among colleges and universities, and has a strong graduate program with the largest number of Master's theses in housing.\(^1\)

As is to be expected, the institutions which rank highest in the various aspects of housing research have been in the field long enough to accomplish certain noteworthy results. Many of the institutions with only one or two studies have entered the research field very recently, most of them since 1946. The work being done by these schools, particularly those carrying on regional cooperative research in agricultural experiment stations, already shows evidence of high standards, development of new methodology, and promise of and provisions for excellent training for the women who are working on the projects.

**Subject-Matter Areas**

*Housing* includes such wide and diverse subjects as design, construction, decoration, landscaping, equipment, economic and legal aspects, community planning, housing for special groups, home management, and family living as related to housing. Many of these are fields of research for the architect, the engineer, or the sociologist. The distinctive contribution of home economists has been in interpreting family needs and applying such interpretation to the design and use of the house. Even when she so limits herself, the home economist has a broad field in housing research.

The various phases of housing research done by home economists fall logically into the following divisions: house planning, home management, economics, home economics education, household equipment, interior decoration, and to a limited extent, sociology, and social economics. These are the divisions used in this analysis.

**House planning.** House planning studies, 182 in number, were varied in content and approach (Table 3). Surveys made on housing needs and preferences and on conditions of houses are included under this heading since their purpose was to obtain data on which to base the improvement of houses.

The 69 surveys, 27 percent of the total housing studies or 38 percent of house-planning studies, made up by far the largest single group.

The studies on requirements of rooms or areas of the house, 48 in number, comprise 26 percent of the total house planning studies. This

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\(^1\)This pre-eminence of housing research at Oregon State College is well recognized as due largely to the outstanding work and leadership of Maud Wilson. Miss Wilson states that her work at Oregon was done under a continuous and evolving project from 1930 to 1950. Obviously this “enabling” project covered many studies that would have been organized as short-term projects in other institutions. This type of organization has made it difficult to present clearly or even give full credit for the numerous individual studies made by Miss Wilson.
### Table 3. — House Planning, Home Management, and Household Equipment Studies That Apply to House Design

<table>
<thead>
<tr>
<th>Institutions</th>
<th>Needs, preferences, conditions</th>
<th>Rooms or areas of the house</th>
<th>Other</th>
<th>Total</th>
</tr>
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<td></td>
<td>Storage 1</td>
<td>2</td>
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<td></td>
<td></td>
<td></td>
<td>3</td>
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<td>Arkansas</td>
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<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>California</td>
<td></td>
<td></td>
<td>Storage 1, equipment 1</td>
<td>4</td>
</tr>
<tr>
<td>Colorado A. &amp; M.</td>
<td></td>
<td></td>
<td>Environmental 1</td>
<td>3</td>
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<td>U. Colorado</td>
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<td></td>
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<td>Prairie View St. (Tex.)</td>
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<td>Virginia St.</td>
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<td>Washington</td>
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* For more complete names of institutions, see Table 4, page 13. Here, for brevity, only the state is given when only one institution from that state is listed in Table 4.

b For the handicapped person.
group includes general arrangement and use of rooms, specific rooms, and space requirements for special activities. The space needs of children are considered in 11 projects; kitchens rank next with 8 studies; 5 are devoted to sewing rooms and 4 to laundries; living rooms have 3; combination rooms, general arrangement, room use, dining rooms, bathrooms, and dressing areas have 2 studies each; reading areas, clothing areas, kitchen utilities, ironing, and business centers are each considered in a single study.

Fifteen projects concern schools, laboratories and home management houses, and one, church kitchens. Twenty are on storage, 12 on design, 7 on lighting, and 3 on floor finishes. Two each are on remodeling, evaluating plans, and environmental influences, and one is on work surface materials.

**Home management.** Only those studies in home management having a direct bearing on housing were included in this report. The 17 studies listed under this subject include motion-time studies on work procedures which might affect room design; studies on house care which might influence the choice of building and finishing materials; and management practices which would affect house design.

Cornell University leads with 5 management studies having a housing application; Oregon, Vermont, and Washington State College have two each; and Chicago, Illinois, Nebraska, Syracuse, Ohio State University, and Rhode Island have one each (see Table 3).

**Economics.** Twenty studies covered various financial aspects of housing. The largest number, 9, were contributed by the Family Economics Division of the U.S. Bureau of Human Nutrition and Home Economics.

The University of Chicago and the University of Wisconsin have 3 each; the University of Illinois, 2; and the University of Arizona, Purdue University, and Kansas State College have one each.

**Home economics education.** The 12 studies included under this heading contribute specific information, aids, or methods for the teaching or the improvement of housing courses and programs. (Studies on the planning of school buildings and laboratories are included under house planning.) Iowa State College, Syracuse University, and Texas State College for Women have two studies each; and the University of Illinois, Purdue University, Cornell University, Oregon State College, Texas Technologic College, and Stout Institute have one each.

The Cornell study on the development of educational instruments for evaluating the choice of a house, which has attracted wide attention, and the present report are examples of research projects included under education.
Household equipment. The household equipment studies, 9 in number, listed under house planning have a direct bearing on the design, space requirements, or construction of the house. They consist of studies on the amount of equipment required for certain purposes, which would affect the kind and amount of storage space needed; and the use of equipment for specific activities, which would affect the arrangement of and space required for certain areas of the house. Oregon State College has 3 such studies; the Universities of California, Maine, Nebraska, and Rhode Island, and Ohio State University, and the Bureau of Human Nutrition and Home Economics have one each (see Table 3).

Sociology. The 6 studies on the sociological aspects of housing have to do primarily with the effects of housing on people. Two sociological studies each were made at Purdue University and Washington State College; and one each at Texas State College for Women and Virginia State College. Some of these studies touch on psychological influences but no predominantly psychological study appears to have been undertaken in the period covered by this report.

Interior decoration. The 5 studies in this field pertain specifically to furniture, which might affect the design and arrangement of the house, and to color, which might influence the choice of finish for a house or its walls. The University of North Carolina and Washington State College have 2 each, and Iowa State College has one.

Social economics. Four studies come under this classification. Kansas State College, Cornell University, the University of Tennessee, and the University of Wisconsin have one each. That made at the University of Wisconsin is representative of the group: "The Effects of Income, Tenancy, Family Composition, and Other Factors in Farm House Requirements."

Types of Housing Research

Research in this report was considered to be the production of verified knowledge in the field of housing through the collection, organization, and analysis of data, with conclusions drawn from these procedures. The type of research was determined by the way in which the data had been collected. The methods used in the 255 studies reported show that housing research can be classified as survey, library, case study, or experimental. The experimental in turn is classified according to testing techniques as physical, physiological, or motion-time, the classification followed in Table 4. Other kinds of research may be necessary in the study of some phases of housing,
such as chemical in testing building materials, but were not used by home economists during the period covered.

**Survey.** Approximately 61 percent of all the 255 studies reported were made entirely or in part by the survey method, which consists

<table>
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<tr>
<th>Institution</th>
<th>Survey</th>
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<th>Case study</th>
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Housing and Household Equipment Research 13

BHNE
Housing and Household Equipment Division 3
Family Economics Division 9

Total 156 12 9 60 2 16 255

Percent 61.2 4.7 3.5 23.5 0.8 6.3 100

*Whenever a combination of methods was used, the predominating method is indicated.*
of securing data through questionnaires, either mailed or used in interviews. An example is the nation-wide survey of rural housing conditions and requirements made with funds provided by the 1946 Research and Marketing Act. This method of research has been greatly improved in recent years by the application of sound statistical principles.

To date most surveys have been limited to rural housing owing to the fact that agricultural experiment stations have federal funds that may be used for such research. Comparable surveys of urban housing are greatly needed.

**Library.** Library research consists of using published material, such as census data, as the source of information for the study. Practically all research involves the review of published material, but only 12 studies are classified in this report as based exclusively on library research.

**Case study.** In case studies data are secured by observing the activities and reactions of one person or a group of persons to specified situations, with no special controls imposed. The group may consist of one or more families or a number of persons in a similar age, social, or economic range. The interesting results from the nine case studies made in housing research indicate the possibilities in this field, particularly as this method might be used in psychological and sociological projects.

**Experimental.** The experimental method as employed in housing research, consisting of laboratory tests made under controlled conditions, has contributed valuable information available through no other sources. Home economists have pioneered in developing physical tests to determine space standards for the house, in using motion-time techniques and in applying physiological tests in certain phases of housing research. The fact that architects and builders, as well as research groups in other areas than home economics, are beginning to turn to home economists for verified information on certain phases of housing is an indication of the contribution this group is making in experimental research.

*Physical tests* constitute the largest group of experimental studies, 60 in all, representing 77 percent of the experimental studies and 24 percent of all studies. They include the studies on space needs and use, design, construction, decoration, house care, lighting, decoration, and, as indicated in Part II, performance of equipment.

*Motion-time studies* account for 20 percent of the experimental studies in housing research and 6 percent of all the studies. Records of trips have progressed from the pin-string method used in early
studies to the trip charts and dye patterns used recently. Observations are recorded not only in writing but also on tape; and memomotion pictures are providing an excellent means of securing complete records for both motions and time.

Only two experimental studies were based on physiological reactions to various situations. This small number is not in proportion to the importance of these studies nor their potentialities.

Cornell University has in recent years entered this field of research with two significant studies. In one, metabolic rate, heart rate, respiration, and blood pressure were used to measure some of the effects of height of ironing surface on the worker. The equipment and techniques developed are worthy of careful study by all interested in the development of this kind of research. The second study measured, by determining the amount of oxygen consumed, the energy expended in certain household tasks involving bending, lifting, reaching, stooping, pushing, pulling, and twisting.

A new technique for experimental research, taken from the field of psychology, is being investigated for its possibilities in housing research at the University of Georgia. This is the tremor test, an attempt to measure the emotional responses of the worker to her working environment. The instrument used is a tromometer which measures the three-dimensional movements of the finger of the worker and indicates quantitatively the effect of certain conditions upon involuntary movements. A comparatively simple test, it will be a welcome addition to housing research if it proves reliable in testing the worker’s reactions to household tasks, particularly those not requiring enough energy to warrant the use of a metabolism tester.

Some observations regarding experimental research. Physical tests to determine space needs for the many and varied activities carried on in the house, and for the numerous kinds of household equipment, supplies, and furnishings used in the house have been carried on more continuously and more thoroughly than any of the other kinds of laboratory research. This has been so because the need for such information has been urgent and the methods for making these tests comparatively simple. Even since the regional housing surveys made in 1947 and 1948 there has been a marked acceleration.

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in this kind of research, characterized by improved techniques and by planned programs of work in each region. Because of changing concepts of housing, new designs for equipment and furniture, and incomplete data on activity measurements of people, there will be a continuing need for space studies in housing.

Work-simplification research, originating in industry, has set up valuable principles that can be applied by homemakers for saving motions and time. However, it must be recognized that such research is conducted under minutely controlled conditions which are not normally duplicated by the homemaker. No two women work exactly alike, or under identical situations, or with identical equipment. Neither does a woman necessarily do a task in exactly the same way when she repeats it. Unavoidable interruptions and different combinations of tasks often make this impossible. Thus the emphasis for the homemaker must be on principles of work simplification developed by motion-time studies rather than on set arrangement or set procedures, resulting from work-simplification research.

Physiological tests give promise of providing a more precise method for certain kinds of housing research than some of the other methods used. This is because the physiological mechanism of the human body, in spite of individual differences in reactions to conditions and activities, is stable and unchanging as compared with the number and kind of household possessions, the methods of housekeeping and food preparation, the types of houses, the building practices, and the patterns of family living which have furnished the raw materials for much of the physical and work-simplification research conducted in home economics to date.

Nevertheless, there are certain problems that must be faced and solved before physiological research can be generally used in the housing field. One is the lack of home economists trained in this highly specialized area. Lack of training need not be a handicap, however, if the home economist recognizes her limitations and seeks the cooperation of the physiologist, the physicist, and other needed specialists, as was done in the Knowles study at Cornell.

Another problem is that suitable equipment must be designed, constructed, and tested. At present, for example, no really satisfactory metabolism tester is available for prolonged household activity tests. In the Knowles study, which involved other physiological reactions in addition to metabolic rate, it was necessary to design and build costly equipment since none of the kind needed was available on the market.

A third problem in physiological research more difficult to solve than training the researcher or obtaining equipment arises from the variability in individuals' physiological responses caused by the
psychological or emotional factor. People cannot be standardized or calibrated like machines. They react emotionally as well as physically and it is a question whether the types of reaction can be separated. The psychological element causes the most variation in physiological responses and is more difficult to control than the physical. This fact was evident in the Knowles study, in the activity-measurement studies made by McCullough, and in the tremor tests checked by Hood. An encouraging fact, as stated by Bratton, is that the pattern of relationships in oxygen consumption in the activities tested in her study was similar for all the individuals even though the variation among them was high.

Presumably the time will come when the psychological and sociological reaction of people to housing will be given as serious consideration in research as the physical aspects are now being given. A beginning along this line has been made, for example, at the University of Illinois in the Small Homes Council space-laboratory projects. In this experiment, families live in a house with flexible walls for a given number of months, during which time several different floor plans are tested through actual use. The reactions of individuals and families to the various arrangements afford excellent data for psychological and sociological study.

**Extent of Cooperative Research**

Approximately one-fourth of the 255 studies have been conducted by two or more institutions cooperating. Of these 65 studies, 57, or 22 percent of the total, were regional cooperative projects; 7 were made by state experiment stations and the Bureau of Human Nutrition and Home Economics; and one was made by two experiment stations (Oregon and Washington State Colleges).

The regional projects were organized under the direction of technical committees in each of four principal regions of the United States: the Northeast, the North Central, the South, and the West. The original regional projects consisted of surveys of rural housing conditions and of family needs and preferences with regard to housing in each region, and were actively participated in by thirty-one states. After the surveys were made, the project in each region was divided into subprojects which were either assigned to individual stations or were continued by the regional group in cooperation with the Bureau.

**Graduate Research**

Each institution was asked to scrutinize its student studies with particular care and include only those which might be rated as research. Obviously many graduate studies are "academic exercises"
intended to give experience in methods of conducting and reporting research rather than to make any vital contribution to subject matter. How well the schools screened their entries is a question since there is a lack of objective standards for judging research in housing. Some schools submitted all their graduate studies, including those which were problems instead of theses; others weeded the studies carefully, submitting only those which, according to their judgment, met the standards of research.

Worth-while research, however, has been done by graduate students. Seventeen of the studies were made in experiment stations, and of the total 131 studies, 23 were published. No doubt there is valuable material in other student studies that has not received the publicity it deserves.

Five of the six studies for the Ph.D. degree were done at Cornell University, one at the University of Minnesota.

Oregon ranked highest in number of master's theses, with 22. Purdue University and Iowa State College were second with 10 each. Washington State College and Cornell had 9 each, Ohio State University 8; Kansas and Texas State College for Women, 5 each. The universities of Chicago, Syracuse, and Wisconsin, the Woman's College of the University of North Carolina, and Oklahoma A. and M. had 4 each; Tennessee, 3. Other institutions contributed either one or two studies each.

Of the 23 graduate studies published, 8 were by Cornell, 4 by Washington State College, 3 by Oregon State College, 2 each by Wisconsin and Ohio State University, and one each by Chicago, Purdue, Kansas State College, and Syracuse. The 23 studies appeared in 26 publications: 9 experiment station bulletins, 5 extension bulletins, and 12 professional or technical magazines.

Sources of Funds

Nearly half the projects listed in this report have been supported entirely or in part by agricultural experiment station funds, and about one-tenth have received state, Bureau of Human Nutrition and Home Economics, or industrial support. For more than two-fifths of the studies, most of them made by students, no specific appropriations were listed.

The sources of funds may be summarized as follows:

Agricultural experiment stations .................. 47 percent
Bureau of Human Nutrition and Home Economics ... 6 percent
State funds ........................................ 4 percent
Commercial and other grants ..................... 1 percent
No special funds required ....................... 42 percent
Number of Publications

A total of 115 printed publications and articles report the research done in 106 of the housing studies.\(^1\) Reports on five others have appeared in mimeographed form but are not included in the summaries because they are not available in libraries. Thus 42 percent of the 255 studies have been published in some form, several of the studies in more than one place. The regional cooperative studies of housing needs and preferences, while representing extensive research by many institutions and individuals, are combined into five publications.

About four-fifths of the publications are in the form of bulletins, circulars, and professional and technical journals, as shown below:

- Experiment station bulletins and circulars: 51
- Professional and technical journals: 29
- Extension bulletins and circulars: 6
- Other bulletins and circulars: 2
- Popular magazines: 3
- Handbooks: 3
- Miscellaneous publications: 3
- USDA publications: 18

Total: 115

The details of distribution, number, and kinds of publications are given in Table 5.

Place of Home Economics in Housing Research

Increased activity in home-economics housing research in recent years parallels the greater national interest in housing. The Housing and Home Finance Agency is engaged in an extensive research program, and the Building Research Advisory Board of the National Research Council is stimulating effort by correlating findings in this field. Industrial groups, public institutions and agencies, and nonprofit foundations have given a great deal of attention to housing improvement. A few universities have made notable contributions to house heating, construction methods, and space planning. Agricultural engineers have taken an active part in farmhouse research, determining needs, defining rural housing problems, preparing plans, and providing a sound basis for their recommendations.

If, as has been said, the period of greatest advancement in any science or industry coincides with the period of its greatest activity in research, then it would seem that housing in the United States is on

\(^1\) It should be noted that Cornell, unlike other institutions, listed only those publications having a professional rating such as experiment station bulletins and a few articles in professional journals. Otherwise the number of publications would have been higher.
### Table 5: Publication of Housing Studies

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<th>Number and types of publications</th>
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<td>1 Station</td>
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<td>1 professional article, 1 popular</td>
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<td>1 Professional article</td>
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<tr>
<td><strong>California</strong></td>
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<td>2</td>
<td>1 Station (including 1 regional cooperative)</td>
<td>2</td>
</tr>
<tr>
<td><strong>Colorado</strong> A. and M.**</td>
<td>3</td>
<td>1</td>
<td>1 professional article</td>
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<td><strong>U. Colorado</strong></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Connecticut</strong></td>
<td>1</td>
<td>1</td>
<td>1 Station</td>
<td>1</td>
</tr>
<tr>
<td><strong>Delaware</strong></td>
<td>1</td>
<td>1</td>
<td>1 Station</td>
<td>1</td>
</tr>
<tr>
<td><strong>Georgia</strong></td>
<td>3</td>
<td>1</td>
<td>1 Station</td>
<td>1</td>
</tr>
<tr>
<td><strong>Chicago</strong></td>
<td>4</td>
<td>1</td>
<td>1 professional article</td>
<td>1</td>
</tr>
<tr>
<td><strong>Illinois</strong></td>
<td>10</td>
<td>9</td>
<td>4 Station, 2 S.H.C. circulars, 1 S.H.C. handbook, 8 professional articles</td>
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<tr>
<td><strong>Purdue (Ind.)</strong></td>
<td>11</td>
<td>2</td>
<td>1 professional article</td>
<td>1</td>
</tr>
<tr>
<td><strong>Iowa</strong></td>
<td>11</td>
<td>1</td>
<td>1 Station (regional cooperative)</td>
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</tr>
<tr>
<td><strong>Kansas</strong></td>
<td>10</td>
<td>3</td>
<td>2 professional articles</td>
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<td><strong>Kentucky</strong></td>
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<td><strong>Michigan</strong></td>
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<tr>
<td><strong>Minnesota</strong></td>
<td>2</td>
<td>1</td>
<td>1 Station, 1 professional article</td>
<td>2</td>
</tr>
<tr>
<td><strong>Mississippi</strong></td>
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<td></td>
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<td><strong>Missouri</strong></td>
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<td><strong>Nebraska</strong></td>
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<td>5</td>
<td>3 Station</td>
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<td>1 Station</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cornell (N.Y.)</strong></td>
<td>23</td>
<td>12</td>
<td>8 Station (including 1 regional cooperative), 6 Extension, 1 handbook, 1 professional article</td>
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<tr>
<td><strong>Syracuse (N.Y.)</strong></td>
<td>5</td>
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</tr>
<tr>
<td><strong>Ohio State U.</strong></td>
<td>10</td>
<td>3</td>
<td>2 professional articles</td>
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</tr>
<tr>
<td><strong>Ohio U.</strong></td>
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<td></td>
<td></td>
<td></td>
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<td><strong>Oklahoma</strong></td>
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<td></td>
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<tr>
<td><strong>Oregon</strong></td>
<td>32</td>
<td>10</td>
<td>10 Station, 2 USDA, 5 professional articles, 1 handbook</td>
<td>18</td>
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<tr>
<td><strong>Pennsylvania</strong></td>
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<td>3</td>
<td>3 Station</td>
<td>3</td>
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<tr>
<td><strong>Rhode Island</strong></td>
<td>8</td>
<td>8</td>
<td>4 Station, 3 miscellaneous</td>
<td>7</td>
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<td><strong>Clemson (S.C.)</strong></td>
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<td></td>
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<tr>
<td><strong>Tennessee</strong></td>
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<td></td>
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<tr>
<td><strong>N. Texas State Teach.</strong></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Prairie View (Tex.)</strong></td>
<td>1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Texas St, for Women</strong></td>
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<td></td>
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<tr>
<td><strong>Texas Tech.</strong></td>
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<tr>
<td><strong>U. Texas.</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Utah</strong></td>
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<td>1</td>
<td>4 Station</td>
<td>4</td>
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<td><strong>Vermont</strong></td>
<td>6</td>
<td>4</td>
<td>4 Station</td>
<td>4</td>
</tr>
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<td><strong>Virginia Poly</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Virginia St.</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Washington</strong></td>
<td>13</td>
<td>9</td>
<td>7 Station</td>
<td>7</td>
</tr>
<tr>
<td><strong>West Virginia</strong></td>
<td>2</td>
<td>2</td>
<td>1 Station</td>
<td>1</td>
</tr>
<tr>
<td><strong>Stout (Wis.)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wisconsin</strong></td>
<td>7</td>
<td>3</td>
<td>1 Station, 2 professional articles</td>
<td>3</td>
</tr>
<tr>
<td><strong>BHNHE</strong></td>
<td>15</td>
<td>9</td>
<td>16 USDA, 4 professional articles, 2 popular articles</td>
<td>22</td>
</tr>
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<td><strong>Total</strong></td>
<td>255</td>
<td>106</td>
<td>115</td>
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<td><strong>Percent of studies published</strong></td>
<td>42</td>
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</tr>
</tbody>
</table>

*For more complete names of institutions, see Table 4.

The three regional housing studies published by Georgia, Iowa, and Cornell are included only under those states. Trade magazines and house organs are classified here as professional magazines.

*Including a regional cooperative study published jointly with other institutions.

**One study was regional, the other cooperative with California, Rhode Island, and BHNHE.
the threshold of definite progress toward meeting the complex and diversified needs of family living.

In its broadest aspects, housing research requires the participation of trained personnel from architecture, engineering, economics, political science, geography, physiology, sociology, anthropology, and home economics. As members of this larger group, home economists can make their chief contribution in the family-living aspect of housing research. As this report reveals, their studies have been largely concerned with accumulating data on family needs and preferences in housing; determining requirements and establishing space standards for various areas of the house; and relating good management practices to house planning.

Home economists can further the good work started in housing research by intensifying their work in those areas in which they are qualified to make their best contribution, by developing sound research methodology, by attaining well-rounded and complete studies through interdisciplinary cooperation, and by publishing the results of their research in a form that will be available to all those who are interested in promoting better housing.

PART II: HOUSEHOLD EQUIPMENT RESEARCH

Information on household-equipment research was collected with that on housing. The same questionnaire was used and the same limitations and problems were encountered. The equipment studies covered the same period and were conducted by similar methods of research. Fewer in number (138 studies compared with 255 in housing), they were made in fewer institutions and, as could be expected, represented a narrower range of subject matter. For these reasons the report of household-equipment studies has been condensed to a greater degree than that of the housing studies.

The first equipment study was listed in 1925 under housing at Nebraska. A year later five studies were reported under household equipment. Two were made at the University of Chicago, two at Iowa State College, and one at the University of Nebraska. The number of studies per year up through 1950 was much more uniform than for housing, as is evident from the graph shown below. The largest number of studies started in any one year, 10 in 1947, was only two more than the high for previous years (see Fig. 2).

The number of studies started each year by various institutions for the period 1925 through 1950 is shown in Table 6.

Because of the development of new kinds of household equipment and the frequent changes in existing models, much equipment research is of temporary value, and the field will require continuing study.
Table 6. — Number of Equipment Projects Started Annually, 1925-1950

<table>
<thead>
<tr>
<th>Year</th>
<th>Total projects</th>
<th>Institution and number of projects at each</th>
</tr>
</thead>
<tbody>
<tr>
<td>1925</td>
<td>1</td>
<td>Nebraska 1</td>
</tr>
<tr>
<td>1926</td>
<td>5</td>
<td>Nebraska 1; Iowa, Chicago, 2 each</td>
</tr>
<tr>
<td>1927</td>
<td>3</td>
<td>BHNHE 1; Iowa 2</td>
</tr>
<tr>
<td>1928</td>
<td>4</td>
<td>Iowa, Nebraska, 1 each; Chicago 2</td>
</tr>
<tr>
<td>1929</td>
<td>1</td>
<td>Iowa 1</td>
</tr>
<tr>
<td>1930</td>
<td>6</td>
<td>Chicago, Nebraska, 1 each; Iowa 4</td>
</tr>
<tr>
<td>1931</td>
<td>7</td>
<td>Nebraska, Maine, 1 each; Iowa 5</td>
</tr>
<tr>
<td>1932</td>
<td>7</td>
<td>Georgia 1; Kansas 2; Iowa 4</td>
</tr>
<tr>
<td>1933</td>
<td>4</td>
<td>Maine, Nebraska, Ohio St. U., Rhode Island, 1 each</td>
</tr>
<tr>
<td>1934</td>
<td>4</td>
<td>Kansas 1; Iowa 3</td>
</tr>
<tr>
<td>1935</td>
<td>3</td>
<td>Maine, Nebraska, Cornell, 1 each</td>
</tr>
<tr>
<td>1936</td>
<td>4</td>
<td>BHNHE, Washington St., 1 each; Iowa 2</td>
</tr>
<tr>
<td>1937</td>
<td>6</td>
<td>Ohio St. U. 1; Nebraska 2; Iowa 3</td>
</tr>
<tr>
<td>1938</td>
<td>6</td>
<td>Maine, Rhode Island, 1 each; Iowa 4</td>
</tr>
<tr>
<td>1939</td>
<td>3</td>
<td>BHNHE 1; Iowa 2</td>
</tr>
<tr>
<td>1940</td>
<td>6</td>
<td>Purdue, Maine, Nebraska, BHNHE, 1 each; Iowa 2</td>
</tr>
<tr>
<td>1941</td>
<td>7</td>
<td>Iowa 6; BHNHE 1</td>
</tr>
<tr>
<td>1942</td>
<td>6</td>
<td>Ohio St. U., BHNHE, 1 each; Iowa, Oregon, 2 each</td>
</tr>
<tr>
<td>1943</td>
<td>2</td>
<td>Ohio St. U., U. Washington, 1 each</td>
</tr>
<tr>
<td>1944</td>
<td>6</td>
<td>Iowa, Nebraska, Cornell, BHNHE, 1 each; Pennsylvania 2</td>
</tr>
<tr>
<td>1945</td>
<td>7</td>
<td>California, Cornell, Syracuse, 1 each; BHNHE 4</td>
</tr>
<tr>
<td>1946</td>
<td>8</td>
<td>Georgia, Kansas, Maine, Minnesota, Ohio St. U., Nebraska, Rhode Island, BHNHE, 1 each</td>
</tr>
<tr>
<td>1947</td>
<td>10</td>
<td>Purdue, Kansas, Maine, Columbia, 1 each; Iowa, Nebraska, BHNHE, 2 each</td>
</tr>
<tr>
<td>1948</td>
<td>8</td>
<td>Montana, Ohio St. U., BHNHE, 1 each; Purdue 2; Iowa 3</td>
</tr>
<tr>
<td>1949</td>
<td>8</td>
<td>Syracuse 1; Iowa, BHNHE, 2 each; Ohio St. U. 3</td>
</tr>
<tr>
<td>1950</td>
<td>6</td>
<td>Nebraska, Syracuse, Oregon, Vermont, 1 each; Ohio St. U. 2</td>
</tr>
<tr>
<td>Total</td>
<td>138</td>
<td></td>
</tr>
</tbody>
</table>

* For more complete names of institutions, see Table 4, page 13. Here, for brevity, only the state is given when only one institution from that state is listed in Table 4.
Housing and Household Equipment Research

Unlike housing research, in which few of the areas studied by home economists in the colleges have been duplicated by other agencies, household equipment research is done constantly by the companies manufacturing such equipment and by other technical organizations under much more scientific conditions than exist in most departments of home economics.

HOUSEHOLD EQUIPMENT RESEARCH PROJECTS
BY HOME ECONOMISTS
IN EDUCATIONAL INSTITUTIONS

Equipment research was carried on much more uniformly than housing research through the years 1925 to 1950 (see page 6).

However, just as the family living aspect of housing has provided a relatively unexplored field of research for the home economist, so are there aspects of equipment research not duplicated by other groups. These fields include research on equipment as it is used in the home, its best use for specified activities, such as the use of automatic machines for the washing of wool blankets studied at Ohio State University, and comparison of specified characteristics of different models of the same type of equipment. Furthermore, graduate studies in equipment, regardless of their general or permanent value, have afforded and will continue to afford a valuable means of training for the student.

Types of Institutions Where Work Was Done

The types of institutions in which the household equipment research was done were the same as those for housing—land-grant colleges and universities, a few colleges and universities other than land-grant, and the U.S. Bureau of Human Nutrition and Home Economics.

Only 21 institutions, however, were represented in equipment research (Table 7) compared with 49 in housing research. Sixteen were land-grant, four were other than land-grant, and one was the Bureau of Human Nutrition and Home Economics.
Of the total 138 studies, 111, or 80 percent, were made in land-grant institutions, 10 in other colleges and institutions, and 17 in the Bureau of Human Nutrition and Home Economics.

**Aspects and Kinds of Equipment Studied**

Eighty-seven studies in household equipment, or 63 percent of the total number, were tests of performance. Studies in the development of specifications, 22 in number, rank second; and those of equipment from the angle of space requirements, 13 in number, are third. The rest consist of educational material, management (including care and maintenance), cost, and the historical development of specified kinds of equipment. For further details see Table 7.

**Table 7. — Aspects of Equipment Studied**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Performance</th>
<th>House Planning</th>
<th>Management</th>
<th>Other</th>
<th>Total studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>1</td>
<td></td>
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<td></td>
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<tr>
<td>Georgia</td>
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<td>Chicago</td>
<td>3</td>
<td>1</td>
<td>Historical</td>
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</tr>
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<td>Purdue</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iowa</td>
<td>32</td>
<td>1</td>
<td>3</td>
<td>Specifications 13, education 1, economics 1</td>
<td>51</td>
</tr>
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<td>Maine</td>
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<td>Vermont</td>
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<td>Washington</td>
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<td>Specifications 7</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

**Total** | 87 | 13 | 8 | 30 | 138 **Per cent** | 63 | 9 | 6 | 22 | 100

a For more complete names of institutions, see Table 4.
b Not land-grant.
### Table 8. — Number of Studies of Different Kinds of Equipment

<table>
<thead>
<tr>
<th>Institution *</th>
<th>Ranges and cookers</th>
<th>Refrigerators and freezers</th>
<th>Small kitchen equipment</th>
<th>Laundry equipment</th>
<th>Equipment in general</th>
<th>Other equipment</th>
<th>Total studies</th>
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<tbody>
<tr>
<td>California</td>
<td>1</td>
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<td></td>
<td></td>
<td>Food beaters 1</td>
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<tr>
<td>Georgia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dishwashers 3, vacuum cleaners 1</td>
<td></td>
<td>2</td>
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<tr>
<td>Chicago</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Food mixers 1</td>
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</tr>
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<td>10</td>
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<td>4</td>
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</tr>
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<td></td>
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<td>Cornell (N.Y.)</td>
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<tr>
<td>Ohio St. U.</td>
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</tr>
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</tr>
<tr>
<td>Pennsylvania</td>
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<tr>
<td>Rhode Island</td>
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<tr>
<td>Vermont</td>
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<td>Washington St.</td>
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<tr>
<td>U. Washington</td>
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<tr>
<td>BHNHE — House-</td>
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<td>ing and House-</td>
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<tr>
<td>hold Equipment</td>
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<td>5</td>
</tr>
<tr>
<td>Division</td>
<td>4</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>Canning equipment 1, electricity 1, dehydrator 1</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>37</strong></td>
<td><strong>25</strong></td>
<td><strong>19</strong></td>
<td><strong>15</strong></td>
<td><strong>9</strong></td>
<td><strong>33</strong></td>
<td><strong>138</strong></td>
</tr>
<tr>
<td><strong>Percent</strong></td>
<td><strong>27</strong></td>
<td><strong>18</strong></td>
<td><strong>13.5</strong></td>
<td><strong>11</strong></td>
<td><strong>6.5</strong></td>
<td><strong>24</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

* For more complete names of institutions, see Table 4.

Practically every kind of equipment used in the household has been covered in the research (Table 8). Ranges, refrigerators and freezers, small kitchen equipment, and laundry equipment, in order of rank, account for 96 studies, or 70 percent. Food mixers, lighting equipment, canning equipment, and water heaters range from 5 down to one studies, while 9 studies cover equipment in general.

### Types of Equipment Research

Of the 138 household equipment studies, 120, or 87 percent, were made in whole or in part by experimental methods. The majority of these experimental studies were performance tests with physics forming the background science. In one at the University of Chicago physiological techniques were used, and one at Kansas State College was a motion-time study.

The number of experimental studies made at the various institutions was as follows:
Iowa ....................................................... 49
BHNHE .................................................... 15
Nebraska ................................................... 14
Ohio State .............................................. 7
Maine ...................................................... 6
Kansas ...................................................... 5
Chicago, Purdue (4 each) ................................ 8
Georgia, Cornell, Pennsylvania, Rhode Island (2 each) .... 8
California, Minnesota, Montana, Columbia, Oregon, Vermont, Washington State, University of Washington (1 each) .... 8

Surveys accounted for 15 studies: three each at Syracuse and Ohio State University; two each at Iowa and Oregon State Colleges and at BHNHE; one each at Nebraska, Cornell, and Rhode Island.

Three studies, one each at the Universities of Chicago and Maine and one at Ohio State University, used library methods.

**Extent of Cooperative Research**

Relatively few equipment studies were conducted cooperatively by institutions. Twelve studies were listed by states as having been made with the Bureau of Human Nutrition and Home Economics; however, the Bureau indicated only six such studies made with states. The Bureau listed two studies as made with other government agencies. One equipment study was conducted jointly by three states: Purdue, Iowa, and Nebraska.

**Graduate Studies**

Graduate studies, 81 in number, make up 59 percent of all the household equipment studies by home economists. Seventy-eight of these were master's theses, and three were graduate problems.

Only 11 institutions have done graduate research in equipment. For more than half the studies, Iowa State College is alone responsible. The majority of these were done under the direction of Dr. Louise Peet. The studies were distributed among the 11 institutions as follows:

Chicago .................. 5
Georgia .................. 2
Purdue .................. 2
Iowa .................... 49
Kansas .................. 5
Cornell .................. 1
Syracuse ................ 3
Ohio State ............... 8
Oregon .................. 3
Pennsylvania ............. 2
Washington ............... 1
Total .................... 81

\*a Two were graduate problems. \*b Graduate problem.

Only three of the graduate studies were made in agricultural experiment stations—one at Cornell and two at Ohio State University.

Twelve of the studies have been published in 18 publications including one book, 5 experiment station bulletins, one extension bul-
letin, 11 professional magazines. Fourteen of these were from Iowa State College. Chicago, Cornell, Syracuse, and Ohio State University have each published one study.

**Number of Publications**

Fifty-eight of the household-equipment studies, or 42 percent, have been published in a total of 82 books, bulletins, circulars, leaflets, and professional and popular magazines. This percentage is the same as that for the housing studies.

Among the institutions having more than three publications, the Bureau of Human Nutrition and Home Economics ranks first with 27 publications based on 10 projects. Iowa State with 16 publications resulting from 15 projects is second. The University of Nebraska is

<table>
<thead>
<tr>
<th>Institutiona</th>
<th>Total studies</th>
<th>Number of studies published</th>
<th>Type of publication</th>
<th>Total publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>California...</td>
<td>1</td>
<td>1</td>
<td>1 professional article, 1 popular article</td>
<td>2</td>
</tr>
<tr>
<td>Georgia......</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago......</td>
<td>5</td>
<td>1</td>
<td>1 professional article</td>
<td>1</td>
</tr>
<tr>
<td>Purdue (Ind.)</td>
<td>4</td>
<td>1b</td>
<td>(1 cooperative)</td>
<td>(1)b</td>
</tr>
<tr>
<td>Iowa.........</td>
<td>51</td>
<td>15</td>
<td>5 Station, 9 professional articles, 1 popular article, 1 handbook</td>
<td>16</td>
</tr>
<tr>
<td>Kansas......</td>
<td>5</td>
<td>7</td>
<td>7 Station, 3 Extension, 2 professional articles</td>
<td>12</td>
</tr>
<tr>
<td>Maine.......</td>
<td>7</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minnesota....</td>
<td>1</td>
<td>1</td>
<td>1 professional article</td>
<td>1</td>
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<tr>
<td>Montana......</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nebraska.....</td>
<td>15</td>
<td>11b</td>
<td>10 Station, 3 Extension</td>
<td>13</td>
</tr>
<tr>
<td>Columbia (N.Y.)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cornell (N.Y.)</td>
<td>3</td>
<td>2</td>
<td>1 Station, 1 professional article</td>
<td>2</td>
</tr>
<tr>
<td>Syracuse (N.Y.)</td>
<td>3</td>
<td>1</td>
<td>1 professional article</td>
<td>1</td>
</tr>
<tr>
<td>Ohio St. U....</td>
<td>11</td>
<td>3</td>
<td>2 Station</td>
<td>2a</td>
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<tr>
<td>Oregon......</td>
<td>3</td>
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<tr>
<td>Pennsylvania</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhode Island</td>
<td>3</td>
<td>3</td>
<td>3 Station</td>
<td>3</td>
</tr>
<tr>
<td>Vermont......</td>
<td>1</td>
<td>1</td>
<td>1 Station</td>
<td>1</td>
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<tr>
<td>Washington St.</td>
<td>1</td>
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<tr>
<td>U. Washington</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BHNHE........</td>
<td>17</td>
<td>10</td>
<td>7 USDA publications, 18 professional articles, 2 popular articles</td>
<td>27</td>
</tr>
</tbody>
</table>

Total........ | 138           | 58                         |                     | 82                |

Percent of studies published........ | 42             |                     |                     |

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a For more complete names of institutions, see Table 4.
b Including one cooperative study published by Iowa.
c In one instance two projects were published in one bulletin.
next with 13 publications based on 11 studies. The University of Maine ranks fourth with 12 publications for 7 studies. Maine is the only institution in this group that has published the results of all its projects. For further details see Table 9.

Sources of Funds

Less than half of the household-equipment studies were financed by specified funds. Thirty-two percent were supported by agricultural experiment stations; 12 percent by the Bureau of Human Nutrition and Home Economics; and 4 percent by special grants. Seventy-two projects, or 52 percent, all of which were studies by graduate students, had no formally indicated financial support.

The breakdown of the sources of funds for research is as follows:

<table>
<thead>
<tr>
<th>Sources of Funds</th>
<th>Number of Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural experiment stations, including projects cooperative with the U. S. Department of Agriculture</td>
<td>44</td>
</tr>
<tr>
<td>BHNHE</td>
<td>17</td>
</tr>
<tr>
<td>Special grants</td>
<td>5</td>
</tr>
<tr>
<td>No formal financial support (graduate studies)</td>
<td>72</td>
</tr>
</tbody>
</table>

PART III: PROJECTS AND PUBLICATIONS

The housing and household-equipment projects and publications listed on the following pages are those submitted by the various institutions for this report.

All institutions are listed alphabetically by the names of the states in which they appear. Although the projects extend only through 1950, some of the publications are dated later.

The first names of project leaders and authors are given only once. When authors' names are not given with the publications, it is because they are the same as those listed with the project. Mimeographs were omitted because they are unavailable in libraries.

Where graduate studies are cited, the name of the major instructor, if given, is listed after with. Not all of the graduate studies can be obtained through library loan.

**Housing**

Alabama Polytechnic Institute

1947- Functional requirements and plans for Southern rural homes. Florence

1949- Davis. Agr. Exp. Sta. Regional cooperative. Publication (see Georgia)


University of Arizona


1949 Indoor play areas for the preschool child. Johnson. Agr. Exp. Sta. Regional cooperative. Publication:

1950 Dining area storage of linen, dishes, silver, glassware, and table appliances used in indoor meal service in rural homes in the Western Region. Johnson. Agr. Exp. Sta. Regional cooperative.

**University of Arkansas**

1949 Functional requirements and plans for Southern rural homes. Beulah V. Gillaspie. Agr. Exp. Sta. Regional cooperative. Publication (see Georgia)


**University of California**

Utensils every farm kitchen should have. Avis Woolrich. Farm Jour. 72(6). 1948.


**Colorado A & M**


1948 Improvement of rural housing in the Western region: A study to determine functional requirements. Combs. Agr. Exp. Sta. Regional cooperative. Publication (see BHNHE)


**University of Colorado**


**University of Connecticut**


* Also included under equipment in statistical summaries.

1 At Davis.
Housing
University of Delaware

University of Georgia
Housing

1948– Housing conditions related to hospitality activities of owner-operator farm families in Georgia. Ethel Davis with Hood. Master's thesis.


Equipment
1932 Effect of oven linings of different materials on thermal deficiency of pans of different material finishes. Geraldine Ellis with Bennie G. Danner. Master's thesis.


University of Chicago (Illinois)
Housing
1926 Recent housing developments in the United States from the point of view of the woman in the home. Wilkie L. Hines. Master's thesis.

1929 A time and motion comparison of four methods of dishwashing. Nellie Maud Vedder with Mary K. Heiner. Master's thesis. Publication:
- Studies in dishwashing methods: An attempt to apply methods of job analysis to a household process. Jour. Home Econ. 22 (5). 1930.


Equipment


1928 Human-energy cost of operating a vacuum cleaner at different speeds. Venona W. Swartz. Master's thesis. Publication:
- (Same title as project) Jour. Home Econ. 21(6). 1929.

Housing and Household Equipment Research


University of Illinois


   Homemaking plans of fifty farm homemakers. Rural Sociol. 10 (4). 1945.

1945  Survey of some fatigue problems of rural homemakers, with special emphasis on home laundering facilities and practices. Perkins, Wilma Beyer, Lita Bane. Agr. Exp. Sta. Publication:
   (Same title as project) Ill. Sta. Bul. 514. 1945.

   Cabinet space for the kitchen. McCullough. SHC Cir. C5.31. 1949.
   Handbook of kitchen design. SHC Cir. C5.32R. 1950.

1947- Studies to determine farmhouse requirements. D. G. Carter, R. C. Cohlmeyer, Marion Walker, Margaret A. Reed (Corbin). Agr. Exp. Sta. Regional cooperative. Publication (see Iowa)


1949- Space requirements for the home laundry. McCullough. Agr. Exp. Sta. Publication:

1950  Space requirements for the home laundry. McCullough. Agr. Exp. Sta. Publication:

1950- Determination of space standards for household storage on a modular basis. McCullough. Agr. Exp. Sta. Publication:

Purdue University (Indiana)

1943 Study of the 4-H room-improvement projects in 19 counties in Indiana, with suggestions for changing the project. Mary L. Bone with Mary L. Matthews. Master's thesis.


1947 Examination of possible criteria for minimum adequacy in kitchen-storage provision for families of four. Rose V. White with Cleo Fitzsimmons. Master's thesis.


1947- Study of room uses of 100 faculty members of Purdue University. Ruth Birk with Matthews. Master's thesis.

1948 Farm-family living patterns, activities, and preferences to be used as a basis for functional planning of farm homes. Gail Redfield, Fitzsimmons. Agr. Exp. Sta. Regional cooperative. Publication (see Iowa)


1948 Gains and goals in housing and equipment of selected families in Indiana and Michigan. Mary B. Settle with Fitzsimmons. Master's thesis.


Equipment

1940 Tests with nine electric food mixers. Redfield. Agr. Exp. Sta. Publication (see Iowa, 1940)


Iowa State College


* Also included under equipment in statistical summaries.


1945 Functional aspects of the farm home in Iowa: Certain housing needs and preferences expressed by 55 farm families in Howard county. Lorna J. Gasset with Peet. Master's thesis.


1950 Farm-family housing needs and preferences. Paulena Nickell, Marie Budolfson, Margaret Liston, Elizabeth C. Willis. Agr. Exp. Sta. Regional cooperative. Publication:


Equipment


1931 Time of washing as a factor in the cleaning efficiencies of electric washing machines of various types. Lela M. Vaughn. Master's thesis.
1931 Determination of the moisture content of gas and electric ovens under baking conditions, and effect of varied moisture content on a baked product. Bernice Strawn. Master's thesis.


1931 Comparative thermal efficiencies of casseroles of different materials when used in a gas and in an electric oven. May C. Frank. Master's thesis.


1932 Thickness of sheet aluminum as a factor influencing the thermal efficiency of a utensil used in surface cookery on an electric range. Enid Sater with Peet. Master's thesis. Publication:

Thickness of an aluminum utensil as a factor in its thermal efficiency when used in surface cookery on an electric range. Jour. Home Ecoq. 25(4). 1933.


1934 Household refrigeration of the common cuts of beef, pork, and lamb. Dorothy Burnett with Peet. Master's thesis. Commercial grant. Publication:


1936 Effect of light and black bottom aluminum pans on the efficiency of electric range units in long-process cookery. Betty Mackay with Peet. Master's thesis. Publication:


1937 Storage efficiency of certain ice and electric refrigerators, as measured by bacteriological and chemical changes in foods. Florence Schaeffer with Peet. Master's thesis.


1938 Operating efficiency of household appliances: II. Effect of varying the number of watts per unit area in typical electric surface units. Evelyn M. Johnson with Peet. Master's thesis.


1939 Some recommended methods for testing performance of electric roasters. Gertrude Berg with Peet. Master's thesis. Publication:


1940 Effect of shape and thickness of beater blades of small electric mixers upon certain food products. Lyle M. Mamer with Peet. Master's thesis. Publication:

1940 Effect of agitator and tub design on cleaning action of washers. Gladys Johnson with Peet. Master's thesis. Publication:

1941 Performance of certain combination range ovens. Arlean Pattison with Peet. Master's thesis. Publication:

1941 Adequate methods of lighting a home, using liquid fuels. Marion R. Pratt with Peet. Master's thesis. Publication:

1941 Abrasive effect of certain commercial cleaning powders and pastes on porcelain enamel surfaces. Evelyn Sparks with Peet. Master's thesis. Publication:
Household cleaning powders do scratch porcelain enamel. The Enamelist 19(3). 1941.


1942 Handbook of techniques for effective home-service demonstration. Mary B. Allgood with Peet. Master's thesis. Publication:


1948 Palatability of ground beef and ground pork stored in home freezers at varying temperatures. Virginia E. Hirschbeck with Ehrenkranz. Master's thesis. Cooperative with BHNHE. Publications:

1948 Effect of temperature fluctuations in home freezers upon stored strawberries, snap beans, ground beef, and ground pork. Margaret I. Marron with Ehrenkranz. Master's thesis. Cooperative with BHNHE. Publication (see project above)

1949 Operational characteristics and labor requirements of electrical service, equipment, and appliances for the farm home. Ehrenkranz. Agr. Exp. Sta. with BHNHE. Publications:
- Sixteen farm families watch electric use. Altman, Ehrenkranz. Iowa Farm Sci. 6(10). 1952.

1949 Effect of packaging and judging procedures on scores of ground pork and beef stored at fluctuating temperatures in a home freezer. Lydia Inman with Ehrenkranz. Master's thesis. Cooperative with BHNHE.

**Kansas State College**


1947 Certain storage requirements for families with preschool children. Rogenia Green with Agan. Master's thesis. (Mimeograph)
1948 Space and equipment required for a preschool child's room in a professional family home. Virginia Y. Trotter with Agan. Master's thesis. Publication:

1948 Economics of the farm home. Jane W. Barnes. Agr. Exp. Sta. Publication:

1948 Certain storage requirements for grooming activities of teen-age rural youth in Harvey county. Hazel Molzen with Agan. Graduate problem. (Mimeograph)

1948 Farm-family living patterns, activities, and preferences used as a basis for functional designing of farm homes. Agan. Agr. Exp. Sta. Regional cooperative. Publication (see Iowa)


Equipment


University of Kentucky

Housing


Louisiana State University

Housing


University of Maine

Housing


1948- Kinds of working and storage space needed in various rooms of the Maine farm home, and the preferred juxtaposition of the most frequently used rooms. Monroe. Agr. Exp. Sta.

Equipment


Thermal efficiency of cooking utensils as affected by variations in the area of their contact with the heating surfaces. Monroe, Smith. Jour. Home Econ. 26(1). 1934.


Effect of steam on the baking of foods. Jour. Home Econ. 36(2). 1944.


1938– Performance of wood ranges heated by distillate burners and an evaluation of factors which affect this performance. Monroe. Agr. Exp. Sta. Publication:


1940– Testing of 1939-1940 models of electric ranges sold in this territory. Monroe. Agr. Exp. Sta. Publication:


Ideas to consider when you buy a kitchen sink. Maine Sta. Bul. 494. 1951.

Housing


1947– Determination and interpretation of farmhouse requirements based upon patterns of farm-family living; and the development of plans, construction practices, and effective methods for attaining adequate economical housing for farm families. Agr. Exp. Sta. Regional cooperative. Marguerite Paulsen. Publication (see Iowa)
Equipment
(See title as project) Winter, Hulstrulid, Noble, Enid Sater Ross. Food Tech. 6(8). 1952.

Mississippi State College

Housing of farm owner-operator families in the Mississippi lower central area. Miss. Sta. Bul. 490. 1952. (See also Georgia)

University of Missouri

1940 Housing conditions of 750 rural rehabilitation families of the Farm Security Administration in Missouri. Bonnie L. Barrick. *Master's thesis*.

Montana State College


Equipment

1948 A study of small pressure saucepans to determine efficiency of gauges, fuel consumption, and cooking time necessary. Alma R. Ragar. Commercial grant.

University of Nebraska

1925- *Lighting of Nebraska rural homes by kerosene and gasoline lamps.*
(Same title as project) Neb. Sta. Bul. 225. 1928.
1925- Water carried for household purposes on Nebraska farms. Gray.

*Also included under equipment in statistical studies.*
1940– *Improvement of the lighting of farm homes without electricity. A. E. Bargar. Agr. Exp. Sta. (Mimeograph)


1947 Some characteristics of farm housing in Nebraska, 1940. Louise Windhusen with Margaret Liston. Master's thesis.

1947– Activities, possessions and verbal preferences of Nebraska farm families which may influence their housing needs. Virginia Trotter, Liston, Herrmann. Agr. Exp. Sta.

1947– Determination and interpretation of farm-house requirements based upon patterns of farm-family living and the development of plans, construction practices and effective methods for attaining adequate economical housing for farm families. Liston, Herrmann. Agr. Exp. Sta. Regional cooperative. Publication (see Iowa)

Equipment


* Also included under equipment in statistical summaries.
1948 Exp. Sta. Publication:
1947—Liquid loss from glass jars processed in the pressure cooker. Baragar.
1949 Agr. Exp. Sta. Publication:

Rutgers University (New Jersey)
1947—Farm-housing requirements in the Northeast region, H. E. Besley.
1949 Agr. Exp. Sta. Regional cooperative. Publication (see Cornell)

Columbia University* (New York)
1947—Cleaning methods and equipment used in 25 New Jersey homes.
1948 Elaine K. Weaver. Commercial grant.

Cornell University (New York)
1928 Organization of the sewing center in the home. Ella M. Cushman with Martha Van Rensselaer and Dexter S. Kimball. Master's thesis. Publication:
    (Same title as project) Cushman. N.Y. (Cornell) Sta. Bul. 492. 1929.
1935 Consideration of the needs of children in selecting household furnishings, as determined by a study of 55 families in Ithaca, New York. Delpha E. Wiesendanger with Helen Canon and Ethel Waring. Master's thesis.
1938 Kitchen storage spaces in relation to management. Clara E. Jonas with Canon and Cushman. Master's thesis. Publication:
1938 Efficiency in the arrangement of equipment and materials for the performance of a common task in food preparation. Louise E. Greer with Canon and Cushman. Master's thesis.
1940 Determination of the most satisfactory methods of maintaining felt-base floor coverings in home kitchens. Evelyn K. Bennett with Cushman, Canon, and Lucille J. Williamson. Agr. Exp. Sta. Master's thesis. Publication:

*Teachers' College.


(Same title as project) N.Y. (Cornell) Sta. Bul. 846. 1948.


1946 A study of farm housing in Courtland county, N. Y., to determine extent and type of new and remodeled housing to be undertaken in the immediate postwar period. Grace Morin, S. Holt, T. Baird.

1946 Analysis of farm housing and related economic and social factors, for New York State and the rural counties of the state. Morin.


1947- Farm housing requirements in the Northeast region. G. H. Beyer. 1949 Agr. Exp. Sta. Regional cooperative. Publication:


1948 Housing requirements and house improvement practices of rural families in five selected areas of New York State. G. H. Beyer. Agr. Exp. Sta. Publication:

*Also included under equipment in statistical summaries.


(Same title as project) N.Y. (Cornell) Sta. Bul. 879. 1952.


1950— Farmhouse planning in New York State. Morin. Publication:

(Same title as project) N.Y. (Cornell) Misc. Bul. 10. 1951.

**Equipment**


1944 Effect of fluctuating storage temperatures on the quality of stored frozen foods. Willis Gortner. Cooperative with BHNE. Publication:


**Syracuse University (New York)**


1944 Public housing as a vocational objective for home economics. Margaret A. Cain. Master's thesis.

1944 Survey of homemakers' preferences in postwar homes and equipment. Helen J. Miller. Graduate problem. Publication:

Postwar homes as women want them. Prudence S. Connor, Helen M. Seyse. What's New in Home Econ. 10(1). 1945.


**Equipment**

1945 A study concerning women's knowledge of their electric equipment based on 100 families in Syracuse in 1944. Seyse. Master's thesis. Publication:


University of North Carolina Woman's College

Housing
1939 Housing and equipment provided for young children in the homes of members of parent education study groups. Lorena E. Rogers. *Master's thesis*.


1949 Factors influencing the purchase of upholstered furniture and the resulting satisfactions as expressed by fifty homemakers. Mary C. Miller. *Master's thesis*.


Ohio State University

1926 The information of a group of 100 homemakers concerning certain principles of house construction and furnishings as shown by replies to a questionnaire. Isabelle M. Hitchcock. *Master's thesis*.

1937 Specifications of small equipment for the foods laboratory of the home economics department of a high school of 125 pupils. Dorothy Bowers. *Master's thesis*.

1942 Home lighting conditions in a selected group of farm homes. Mary E. Barnes. *Master's thesis*.

1947 Farm-family needs and preferences for housing. Elaine K. Weaver, Tynii Niemi. Agr. Exp. Sta. Regional cooperative. *Publication (see Iowa)*


1950 Determination of suitable work-surface materials and finishes used in rural homes from the standpoint of maintenance, durability, and cost. Weaver. Agr. Exp. Sta. Regional cooperative.

*Also included under equipment in statistical summaries.*
Equipment
1933 Some characteristics of homemade ice cream made from cream of varying butterfat content and frozen in the automatic refrigerator. Ruth Beard. Master's thesis.
1948- Use of various new types of washing machines for laundering in rural homes. Weaver. Agr. Exp. Sta. Publication:

Ohio University

Housing
1950 Storage of sewing equipment to form a home sewing center. Margaret Combs. Master's thesis.

Oklahoma A & M

Oregon State College
1930- The farm home (an analysis of housing requirements). Maud Wilson.
1932 Agr. Exp. Sta. Publication:
1933- Standardization of dimensions of space units in the dwelling. Wilson and Helen E. McCullough. Agr. Exp. Sta. Publications:
Closet and storage space. USDA Farmer's Bull. 1855. 1940. (Subject matter by Wilson and J. Robert Dodge; arranged and written by Elma Edwards)

1938 Heights for high-school clothing-laboratory tables based on measurements of 100 girls. Mary E. Stayton with Vera Brandon. Master's thesis.
1939 Recommendations for planning a home-management house for Oregon State College, based on a study of needs. Elizabeth Cameron. Master's thesis.
A set of utensils for the farm kitchen. Wilson, McCullough. Ore. Sta. Cir. 134. 1940.

* Also included under equipment in statistical summaries.


1943 Laboratories, equipment, and practices used in teaching foods in Oregon high schools, 1940. Alta Hirst with Blazier. *Master's thesis.*

Publication:


*Also included under equipment in statistical summaries.
Pennsylvania State College

Housing

1947  Housing requirements of Pennsylvania farm families. Francena Nolan, Ruth Honey, Christine Salmon, Delpha E. Wiesendanger, M. E. John, Gladys Wasmuth. Agr. Exp. Sta. Publication:


(See also Cornell)


1949-- Some ways children's activities and attitudes affect housing requirements of families on 188 owner-operated farms in Pennsylvania. L. Jeanne Riebel. Master's thesis.


Equipment


University of Rhode Island

Housing


Wood finishes. R. I. Misc. Pub. 3. 1939. (Rev. as Home floor finishes, 1947)

1940  Care and maintenance of wood floor finishes in the home. Kuschke. Agr. Exp. Sta. Publication:

(Same title as project) R. I. Sta. Bul. 276. 1940.

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University of Tennessee


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Texas State College for Women
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University of Washington

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