ENERGY AND TIME MANAGEMENT

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Bulletin 244

Look at Your Posture!

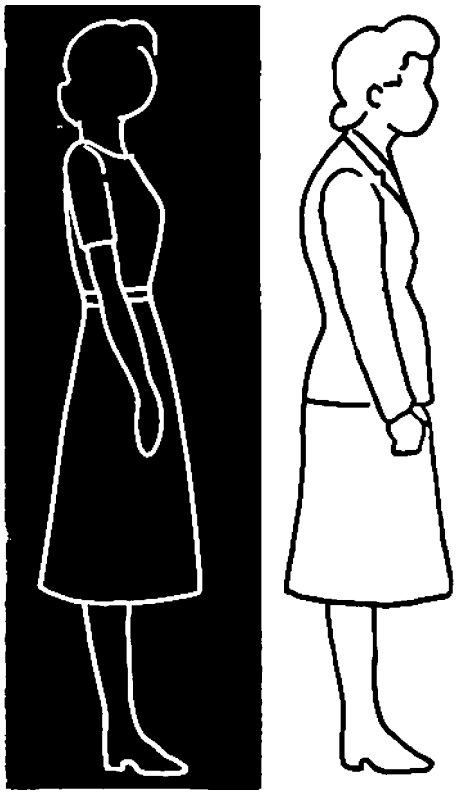
Agricultural Extension Service
Ohio State University

Look at Your Posture!

by Thelma Beall, home management specialist

How do you stand? How do you lift? How do you reach? How do you carry?

The way you use your muscles may make the difference between tha "all in" feeling and the ability to finish off a big day's work with a flourish The amount of work you do, your food, clothing and working condition also may contribute to that tired feeling.



When You Stand

Stand tall, so you feel like a growing plant shooting up—not like an umbrella spreading out! Lift up in front, pull down in back i a good rule.

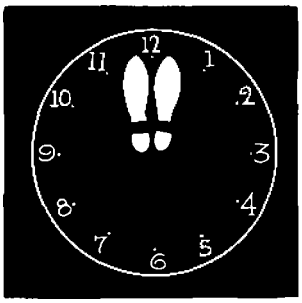
Bring your "front" up by pulling in you chin and standing tall.

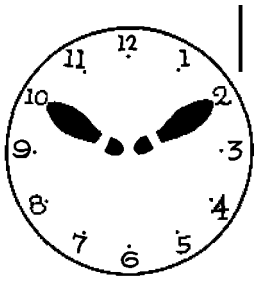
Move your "dining room" upstairs by tight ening the muscles in the wall of the lower ab domen.

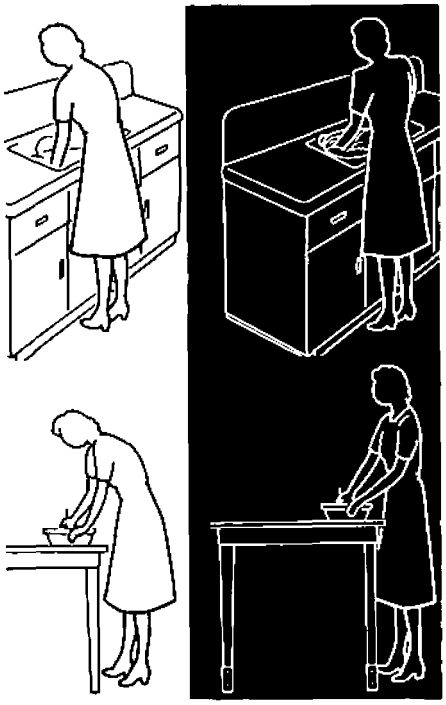
Move your "sitting room" downstairs b rocking the pelvic bones forward and pullin your "tail" in.

Stand with your feet placed at 1 minute t 12, instead of turned out at 10 'til 2. The weigh should be on the outer border of the foot s the inner ankle bones do not bulge.

You stand to do many jobs at the sink kitchen mixing counter, range, ironing boar cutting table, sorting table, and washing ma chine. Be sure they are at the correct height for you.







Stand tall. When you work while standing, be sure your work surface—sink, table, mixing counter, ironing board, etc.—are of the correct height for you. Point your toes at a minute to 12—not at 10 'til 2.

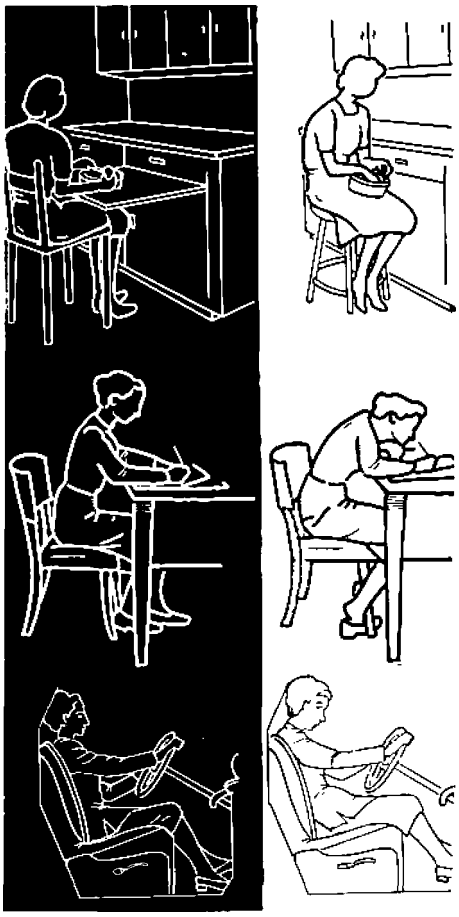
When You Walk

Walk so your heel hits the ground first. Carry the weight of the body forward on the outside of the foot from heel to toes. If you walk with your weight on the inside of your foot, it tires easily. Swing your leg from the hip, bend your knee as it comes forward, and straighten it as you put your weight on it.

When you walk upstairs, hold your body erect. Use the thigh muscles to lift the body. When you come down, reach forward with the toe and bend the knee. Your head should follow a straight line.

When You Sit

Sit for those jobs which you can do sitting down, or alternate sitting with standing. Use a comfortable chair or stool. It should have a seat large enough to support your body comfortably and of such height that you do not have to reach up to or stoop over your work. If your feet do not touch the floor, use a foot rest.



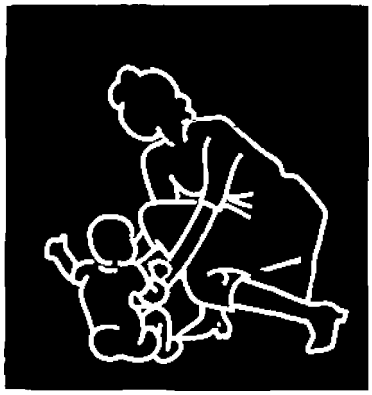
Sit at a pull-out board to do kitchen jobs. As you sit in your work chair with your feet on the floor, the board should just clear your lap. This lets you work with your shoulders in a comfortable, relaxed position.

Hold your trunk erect with muscles of abdomen tight, and hips against back of the chair. Crossing your ankles avoids the cramped feeling of crossing your legs at the knees. When you get up from a chair, tuck your feet under your chair and use the lower legs as levers for pushing. You won't need to push with your arms.

If you drive a car or tractor sit with back straight and abdominal muscles tightened. Get a seat that fits and adjust it so you don't have to stretch to reach the pedals.

When you sit on the floor or ground, lower your thighs by bending your knees. Put one one foot forward and cross the other behind your body and to the side. Let your weight rest most on the foot at the back as you bend the knees and sink down. When you get up roll your weight onto your knees and step to your feet.

When You Lift

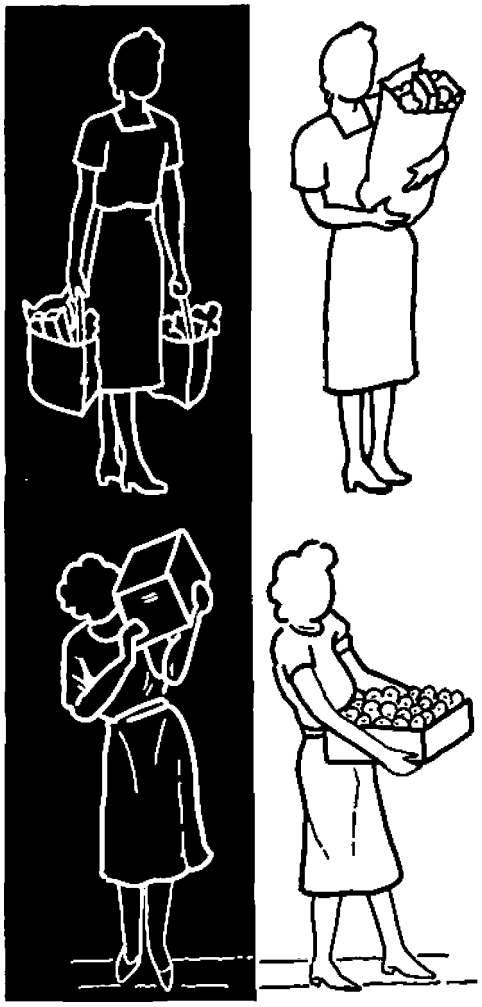


When you lift things from low levels, stand close to the object to be lifted and bend at the knees. Keep your back straight. This is really "sitting at the floor." Take hold, keep your back straight, and gradually straighten your knees so you lift with leg muscles instead of your back. Don't lift by bending at the hip. It causes strain on the back. The bent knee position is the right one too, for such jobs as weeding, looking into a low oven and dusting baseboards. Get this habit by bending your knees when you pick anything from the floor. Don't stoop.

To avoid abdominal strain, hold your abdominal muscles tense when you lift.

Don't lift too much. In Ohio industry, law prohibits women from frequent or repeated lifting of more than 25 pounds. Before you lift, consider your physical characteristics and the levels to which and from which you are lifting. If possible, store at waist level heavy articles that will be used at that height.

When You Carry



When you carry, try to keep your shoulders level and your back straight. Carry something in each hand to help keep body balance and permit free movement. If you do this long, however, it tires hands and arms and interferes with breathing.

If you must carry a heavy load on your arm, place it as near the elbow joint as possible.

"Tray" carrying, or carrying a load at the front of the body, tires arms and wrists and may cause pressure on abdomen and thighs. If you do this often, you may develop round shoulders.

Use a cart for your heavy carrying jobs.

Shoulder carrying is a good way to move a load more than a few steps. It leaves the legs free and does not cramp the chest to a great degree. If possible get help to put the load on your shoulder, or get it high enough to get your shoulder under it by bending your knees.

Hip carrying permits you to take up a load from a table with ease and leaves one arm free. It interferes with normal walking and breathing.

When You Reach

When you reach up, hold abdominal muscles tight to avoid strain. Don't stretch to reach from a ladder. Move it. Keep frequently used articles within easy reach.

Everyday jobs such as making beds and dusting offer opportunities to practice tensing the abdominal muscles. This will help prevent "abdominal sag."

When You Pull

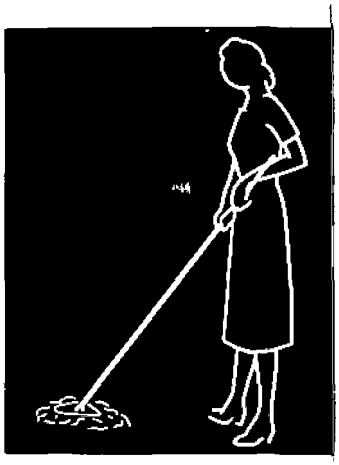
When you pull, make your whole body work. Tense the abdominal muscles to avoid strain. If you are pulling something from above the head, like an overhead garage door, bend your knees.

When You Push

Push with your whole body instead of only your arms. Tense the abdominal muscles. Push the vacuum cleaner or lawn mower with your body.

To open or close heayy or "bulky" doors or gates, you may have to combine these movements with those of lifting—bending the knees and keeping the back straight.

A job like hoeing is a combination of pulling and pushing. Use the whole body instead of part of it. Bend at your hips instead of sagging your shoulders. Tense the abdominal muscles. Hoes, brooms, mops and other such tools are easier to use of handles are long enough.



Weight Lifters

Home economics publications of the Agricultural Extension Service are the greatest little "weight lifters" a homemaker can bring into her home. They lighten her load by applying the strength of good information to everyday jobs.

Extension provides most publications free. There are home extension bulletins in these fields: child development and family life; foods and nutrition; home furnishings; home management; and textiles and clothing.

See your home economics extension agent for new bulletins and other homemaking information. She is in most county offices of the Agricultural Extension Service, and the telephone number is in the book.

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Time Management

FOR HOMEMAKERS

EDITED BY DEPARTMENT OF RESEARCH

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HOUSEHOLD FINANCE Corporation
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Simplified Housekeeping Will

Save time and energy for war activities

Provide more womanpower

Speed up production

Safeguard essential home life

You are anxious to do all you can toward winning this war. Many women are now doing important work in munitions and airplane factories. Some are taking the places of men in civilian industry and on the farm. Others are acting as Nurses' Aides and are giving their time regularly to volunteer activities such as the Red Cross, Civilian Defense and War Bond sales.

You may be one who wants to do more than you are now doing, but you think you cannot add anything to your already filled days. That is probably right, but your housekeeping may be taking more time than is really necessary. Until you have made your housekeeping as simple as possible, consistent with maintaining the health and efficiency of your family, you are not doing all you might do. There should be no compromise in this because in an all-out war every person should feel the responsibility of devoting some time directly to war work.

These are difficult days for the homemaker in the management of her time budget. The limiting of delivery services of stores, the cutting down of the services of laundries, and the introduction of rationing have all increased the homemaker's work. It is necessary for her to spend more time in marketing and she uses more time in transportation and just waiting in line. Neither will her problems be solved at the war's end, because services will continue to be scarce and rationing may be in effect for some time. The adjustments which she can make to help in her work today will also have post-war importance for her.

The war working mother who spends 48 hours a week in the war plant and six hours in transportation will have 42 left, besides Sunday, if she allows eight hours a day for sleep. In those 42 hours she must then care for her children, her house, do her marketing and sewing, prepare and eat her meals, and allow what time she can for personal care, rest, recreation, and family companionship. If she is to succeed either as a mother or a war worker, she must be a good manager.

Homemaking is more individual than any other occupation because each person develops her own habits of work. The differences in size of family, size of house, amount and kind of equipment and many other things make it difficult to suggest standard methods which will apply in all homes. But there are guides which will help all homemakers in planning and working out effective ways of managing time and saving energy.

Time Patterns

Many homemakers divide the working day into but two parts, morning and afternoon, rather than breaking it down into smaller units. These persons will take an important step toward better time management when they start to develop a new kind of time consciousness. This could be done by working out time patterns for various household tasks, particularly the repetitive ones. These time patterns, or in other words, these units of time which a person finds she must allow for doing certain jobs, can then be fitted into the daily and weekly routine. Since the time necessary for doing anything depends largely upon the number of steps taken and the motions used in doing it, the homemaker will begin to watch these for short cuts and will become *motion-minded.*

Motion-mindedness is the key to success in Time Management.

It may be necessary to set aside your customary standards of housekeeping for the duration. Start your wartime program with a statement of what your basic aims are during these times.

What Are Your Wartime Standards?

Desirable standards of housekeeping would include:

Cleanliness; for health and family satisfaction and for the preservation of materials.

Comfort; to allow privacy and relaxation for all members of the family when off duty.

Convenience; particularly for those who carry on the work in the house.

Orderliness; to provide restful atmosphere and freedom from irritation.

Time for What?

The amount of time required to do the work under the standards set up should be weighed against the value of time which you could give for other more important work. Dusting every day may be a good standard for peacetime, but while we are at war you may feel that once or twice a week is sufficient and that the time and energy saved might better be spent at the Red Cross.

Take a new attitude toward your work. Stop doing unnecessary things and simplify the rest. Decide on the smallest amount of cleaning and dusting which will meet the need and build your program of work around these. In other words, practice "intelligent neglect."

Simplify the home itself by putting away for the duration those articles which require too much time for their care, such as decorative objects which make dusting more difficult. Glass curtains may be taken down and only draperies used; or when glass curtains are necessary, use them without draperies. Plastic or paper place mats may replace table linens.

Discuss with the members of your family the changes you are making and the reasons for them. It will make them more willing to help and will strengthen your determination to *put your housekeeping on an emergency basis.*

First Things First

A plan of work is the most helpful tool you can have for saving time. It will help you to put the most important things first and to direct others who help you. Your plan must be based on your own habits and experience.

A Calendar of Work

Making a plan need not be a difficult job even though you have never tried it. While you work, as you think of things which should be included, jot them down on a memo pad for reference later. Then when you are fresh and neither weary nor hurried, sit down

quietly and take time to develop your *work calendar.* This time will pay for itself many times over in saving both time and energy in the future. But remember, the planning time itself must be used effectively.

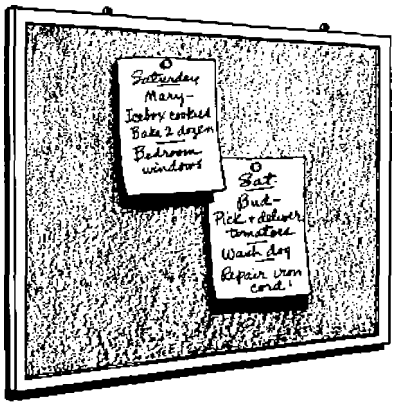
The chart in the back of the book will help you to build the framework for a calendar of work. On this chart you will find listed those jobs which are usually necessary in most homes. Care of children is not included so if that is one of the responsibilities in your home, you will add it along with others which apply in your case.

Start to develop your work calendar on the chart by recording the definite time which you are now giving, or plan to give, to war work outside the home and any other regular tasks which shape your program, such as laundry or preparation of meals.

To know how much time to allow, clock yourself on various jobs before recording the time required for them. Probably as you work with the plan, you will shorten the time you are now using to do some things and you may do them less often. Also, other members of the family may take over some things which you are now doing. All jobs should be included as a part of the housekeeping plan regardless of who does them.

Use a pencil so you can make changes easily.

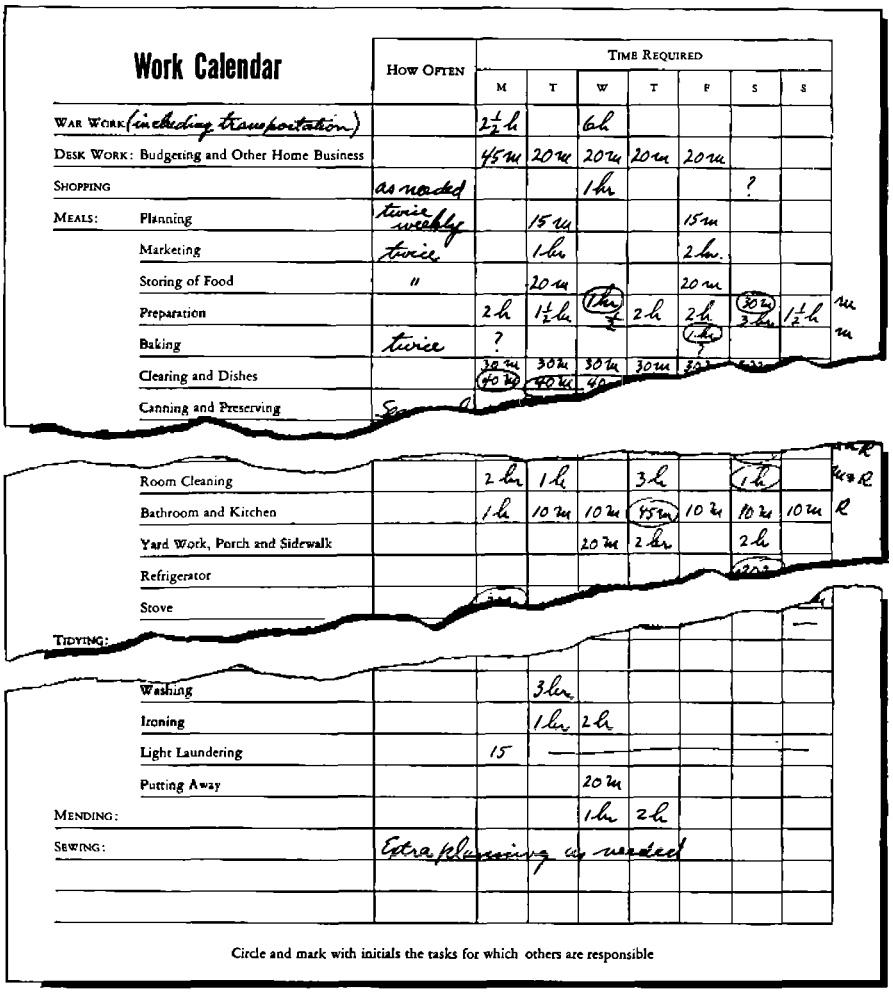
Mark the duties of other members of the family with the initials of the person responsible for them.



Unless the tasks are done daily, make a note in the column marked, "How Often."

When a work calendar is used, the program is always scheduled in advance so that each person knows what are his or her regular responsibilities. When special emergencies arise, the added duties may be assigned to members of the family. Then, to supplement the work calendar, make out memo lists for each helper and post these on a bulletin board.

A Sample Housekeeping Plan



Work Calendar

	How Often	Time Required						
		M	T	W	T	F	S	S
War Work (including transportation)		2½ h		6 h				
Desk Work: Budgeting and Other Home Business		45 m	20 m	20 m	20 m	20 m		
Shopping	as needed			1 hr			?	
Meals: Planning	twice weekly		15 m			15 m		
Marketing	twice		1 hr			2 hr.		
Storing of Food	"		20 m			20 m		
Preparation		2 h	1½ h	(Thurs) ½	2 h	2 h	(30 m) 3 hr	1½ h
Baking	twice	?				?		
Clearing and Dishes		30 m (40 m)	30 m 40 m	30 m 40	30 m	30		
Canning and Preserving								
Room Cleaning		2 hr	1 h		3 h		1 h	
Bathroom and Kitchen		1 h	10 m	10 m	(45 m)	10 m	10 m	10 m
Yard Work, Porch and Sidewalk				20 m	2 hr		2 h	
Refrigerator								
Stove								
Tidying:								
Washing			3 hr					
Ironing			1 hr	2 h				
Light Laundering		15						
Putting Away				20 m				
Mending:				1 hr	2 h			
Sewing:	Extra planning as needed							

Circle and mark with initials the tasks for which others are responsible

This plan was made for a family of four. The children, Mary, 10, and Roy, 14, have regular responsibilities. Each cleans his or her bedroom on Saturday. Working together, they do the dinner dishes every day. Those jobs which they do are circled and initialed in the margin.

When you are planning your daily program, you will want to consider the order of your work for time-saving and convenience. Plan your time around those periods in each day which must be given to specific things such as meals and appointments.

Adjustments to Changes

Today it is necessary to have an open mind and to make easy adjustments to changes in routine. If there are persons in the family who are working at night, then you will need to plan to do the quiet jobs while they sleep, or work in other parts of the house. It may seem to be turning things topsy-turvy to use the vacuum cleaner after nine o'clock at night, but if the house must be quiet, the mending can be done at nine in the morning.

Rigid hourly schedules with definite time assigned to each task are discouraging to most people because they must be adjusted so often to allow for interruptions and emergencies. Such plans seldom fit any one day exactly, nor can they be used when lives are irregular as they are today in many homes.

As you use your calendar of work you will see at a glance which days carry peak loads and will distribute your work more evenly. You will also begin to measure the importance of the things you are doing against the time they require.

If the calendar is posted for the other members of the family to see, there will be a new respect for the business of homemaking. They will see the need for help and will give it more regularly.

Making Your Plan Work for You

A Feeling of Order

Health and strength must be conserved, so use this work calendar to help you fit jobs together and proceed smoothly from one to the next. You must not let your plan push you so that you will feel rushed and nervous, but rather make it assist you by giving a feeling of order to the day.

When too much has been planned for a day, or when emergencies arise (and you can be sure they will) a quick checking of the calendar will help to show first what *must* be done, then those things which *may* be done if there is time for them. The may-be-dones can be postponed to the next day or week or omitted entirely.

A person often feels hurried and frustrated because she recognizes her own weakness in not finding and following the best way to do each task. A careful study of how you do each job in housekeeping will bring to your attention unnecessary motions and steps. You can then improve your methods and choose the ones best for you with the equipment you have to use. Each job should be simplified so that the least possible time and effort are used to complete it.

How Do You Work?

A tremendous amount of time has been saved in industry by suggestions from specialists on time and motion study. The homemaker could do some of this for herself.

"It has been estimated that 25% to 50% of the manual work done in our shops, offices, factories, and homes is unnecessary—that the work might be done in a much better way, producing the same output with less expenditure of energy on the part of the workers."*

Following techniques of analysis used in industry, a group of home economists studied the job of peeling potatoes as done once by one person. An improved method was developed which increased the output 78.6%**.

Every job has three parts: *preparation*, *performance* and *clearing away* afterward. Consider each part separately, then study each one in relation to the others. Will better preparation for the job make it easier to do? How may the method of doing the job simplify the clearing process? By grouping certain jobs, could one clearing do for all of them at once? Kitchen jobs often lend themselves to grouping: for instance, a cake or cookies can be baked while getting dinner.

Examine Each Job

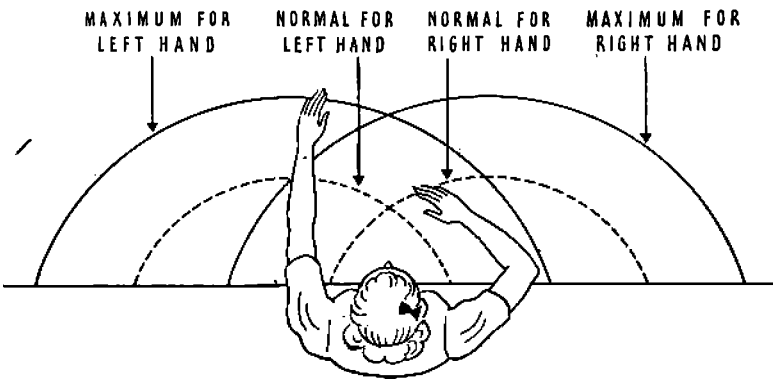
The Preparation for the Job

Preparation includes the assembling of supplies and equipment. It will save time and steps if the things to be used are all brought to the center where the work is done. In some homes this is

*See Reference on page 30
**See Reference on page 30

made simpler because the storage space in the house is well planned. Everything should be placed so it may be reached easily, and, if possible, in the order of use. Group the articles with which you work in a circular position before you within your normal working area.

To find this area, hold your arms comfortably at your sides, bend your elbows and draw an imaginary circle on the table with each hand. This will mark the most comfortable work space for



each hand. The section where these circles overlap is the area where work may be done most comfortably when both hands are working together. Circles drawn with the arms extended from the shoulder will give you the maximum working area.*

"Pre-position"

"Pre-position" is a term used in motion and time study of workers in industry. It describes the practice of placing tools or equipment ready to grasp and use in any operation to avoid rehandling or turning. Homemakers may profitably adopt this idea and add the word to their working vocabulary. Train yourself and your children to preposition clothes at night ready for putting on quickly in the morning. Stack dishes in the order of washing with glasses nearest the worker, then silver and cups. When ironing, fold sheets so they may be unfolded and spread with fewest motions. Place articles where quick selection can be made easily. If knives are kept in drawers, place them in cleats with slots to hold the blades, so the desired knife may be grasped quickly and without danger of a cut.

*See References on page 30

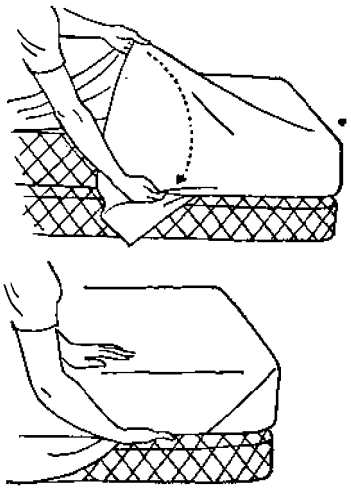
Watch your movements in handling everything and in doing the work, then rearrange your supplies and equipment and try out various plans until you think you have found the arrangement that is easiest for you.

Performing the Job

The ease with which you work is partly dependent on the preparation you make for doing a job, but attention to your habits and methods will reveal many places for improvement. You will find yourself making lost motions, tiring and backtracking movements which could be eliminated. Notice whether you handle one thing several times, picking it up and putting it down, when it might have been handled once for several operations. For example, if you are right-handed it is usually easier to work from right to left. This would apply in dishwashing. You would work with the dishcloth in your right hand. You would pick up a dish and hold it in your left hand while washing it, then place it in the drainer. If the rack were on the right side of the dishpan you would have to drop the cloth and transfer the dish to the right hand to put it in the rack.

Learn to Be Motion-Minded

Working in a circular direction, as in doing the washing with a washer and roller type of wringer, saves steps and motions. For example, keeping the washing machine in front of the right hand tub and proceeding from the washing to the first rinse, to the second rinse, to the wringing, to the basket for the hanging of the wash.



If a basket is equipped with dust cloths, brushes, furniture polish and other cleaning equipment, it may be carried from room to room and then set aside in the storage closet until needed again. Such planning shortens the time of doing the work, also of clearing afterward.

How do you make a bed? If a bed is made up securely when fresh sheets are put on, the covers will seldom need more than spreading up on other days. Learn to make the diagonal fold for mitred

corners so sheets and blankets will be securely tucked in. Do all of the spreading on one side of the bed, then work at the foot if the bedding has been pulled loose at the bottom. You can then spread the other side. One trip around the bed is all that is necessary and the whole job should not require over 2½ minutes.

Your Line of March

Many housekeeping tasks are done moving about and not in one place. In these cases it will usually save time to proceed with one operation until it is finished; for instance, to do all of the vacuum cleaning or all of the dusting at one time. Notice your "line of march." Do you work consistently from front to back or from top to bottom? If possible, end one job where you will begin the next one.

Both hands are used for some tasks, but often not to the extent that they might be. It is fun to educate your left hand to be more help to you. One woman keeps the dust cloth in her left hand or left apron pocket as she uses the dust mop around the edge of the rug. When she comes to windows, she wipes the sills and sashes, also the mop boards and doors with her left hand. She does not need to drop the dust mop nor retrace her steps. The use of the left hand may be important in saving time when doing the smaller tasks at a table or counter, such as preparing fruits and vegetables. When attention is given to the motions made by each hand, a different arrangement of equipment may prove to be all that is necessary to make it possible to work effectively with the left as well as the right hand.

Work rhythmically. The seven dwarfs who whistle while they work and those who sing make their work easier through rhythm. The use of rhythm as an aid to efficiency in certain types of work has been successful in some factories where music is broadcast during working hours.

In the daily routine of the homemaker, continuous and circular motions rather than abrupt jerky ones save both time and energy. Try to develop rhythmical motions in your manner of working at such tasks as handling clothes for a wringer, sweeping and mopping. You will discover many other places where this idea will apply if you are on the alert to watch for them.

As Others See You

Encourage the members of your family to watch you as you work and to suggest easier ways. They may find you making

many needless motions which have come to be habits with you and which you do not recognize as being unnecessary.

Clearing Away After the Job

When the preparation has been well done, the clearing is made easier. It is well to consider the need for each utensil used in preparation. Some kitchen gadgets add work rather than reduce it, because they are difficult to keep in working order or to clean after use.

Time may be greatly reduced if clearing is combined with another task. An illustration of this would be to wash baking dishes with those after a meal, or to combine the doing of dishes for two or three meals. This is a good practice today also, because of the need for saving soap.

Meals at Odd Hours

Changed Routine

Your home today may be one of those where meals come at irregular hours. This requires special thought and skillful planning. Your other work must be arranged to have time free for the preparation when meals must be served. You may have to plan to have meals hot and attractive over a period of time, or perhaps others must serve themselves before you get home.

One-dish meals supply one answer to this problem. These may be prepared at a convenient time and placed in the refrigerator in a dish which will withstand sudden temperature changes. They may be put in the oven and baked later by the one who arrives home first. There are also one-dish dinners that may be kept hot for a long time or reheated and will be equally good for the first person or the last to be served. Begin collecting a file of these so the family does not have to eat chili too often.

Fresh vegetables ready cleaned for "finger" salads and prepared spreads for sandwich fillings can be kept in the refrigerator for those who must pack lunches.

Simple directions may be posted on the bulletin board for the children to follow. The making of creamed soups and vegetables is especially easy if the blended fat and flour are mixed in quantity and stored for use as needed.

How to Improve Your Methods

Study one job at a time.
Break it down into parts.
Question every step.

Use the following check list:

PREPARATION; Setting the Stage

Work Place

Is there enough clear space for working?
Is it well lighted?
Are working heights comfortable?

The Equipment

Am I using the right tools for the job?
Would another tool simplify the job?
Are tools and equipment in good condition for efficiency?

The Layout

Do I have all supplies and tools assembled?
Are they conveniently arranged?

PERFORMANCE; Doing the Job

Watch every step and motion.

Is it necessary?
Do I reach too far?
May I combine several parts of a job?
Could I use both hands?
Do I retrace steps?
Am I comfortable as I work?

CLEARING AWAY

Can I store all equipment for the job in one place?
Have I kept things in place while working?
Can I eliminate or simplify after-clearing by doing the work in a different way?

After making all of the improvements which you see indicated, check your time in doing the job, then use the same method until it becomes a habit. But you must have patience in learning to do things the new way. It is not easy to break old habits. You will not succeed until you make up your mind to stick to the new methods and practice them until they seem to you to be the natural way to work. You will then get out supplies, arrange them and do the work easily without needing to give it much thought.

Training Others to Help

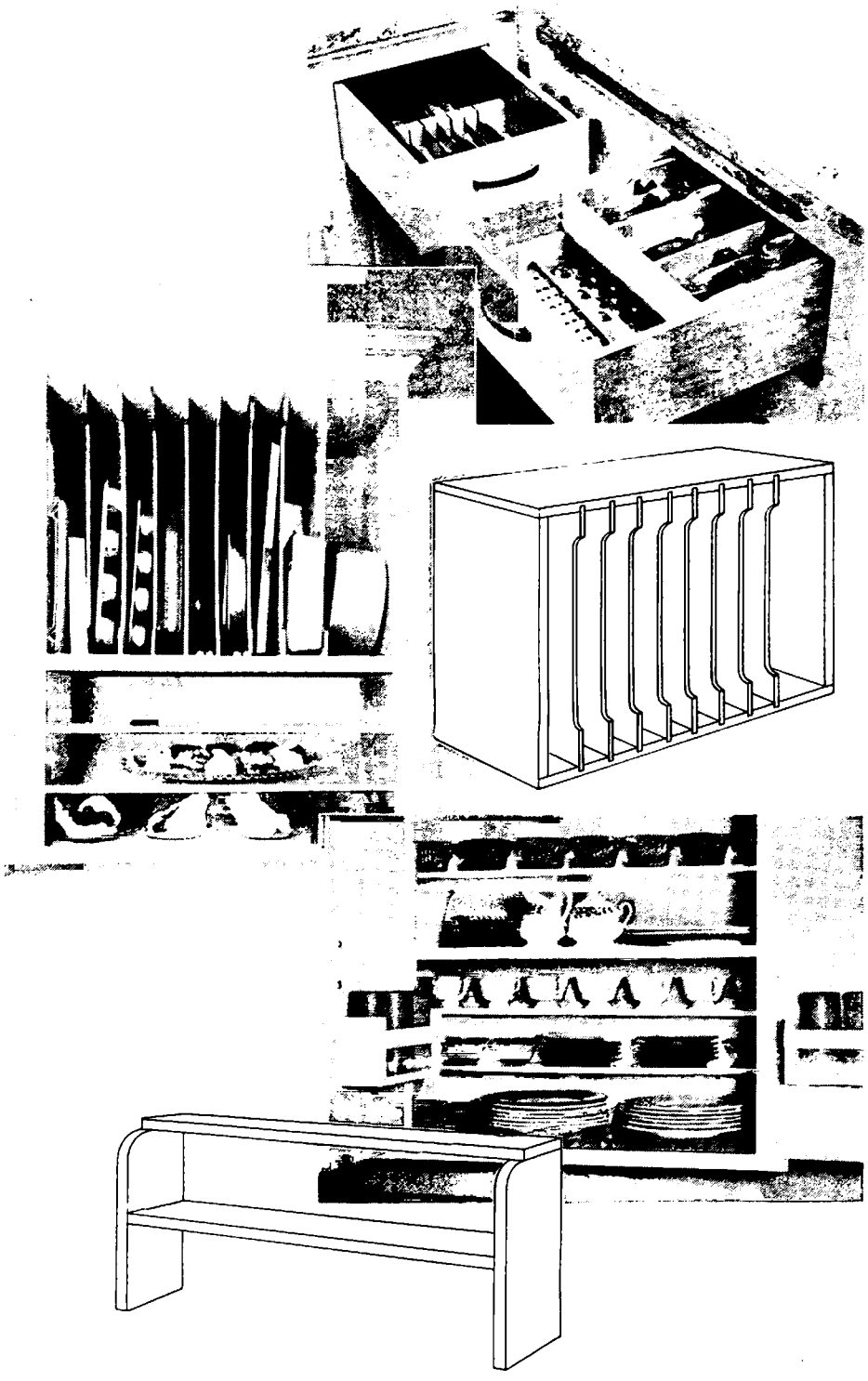
A program which includes regular duties for other members of the family usually means that they will require training if they are to do the work satisfactorily. Sometimes very little attention is given to this training. The helper is often expected to learn how to do a piece of work by watching someone else. As a result, she may do it poorly and become discouraged.

It will pay to give attention to training those who are to help. Children need to know also why things should be done or why certain ways of doing things are better than others.

Each person should know exactly what is expected of her. If attention is given to working out the steps in doing a job, as has been suggested, it will be easier to teach someone else to do it.

The following pattern may be used to train children and others:

1. Tell the helper exactly what she is to do.
2. Explain how it is to be done, step by step.
3. Work *with* her, helping, giving directions and correcting mistakes.
4. Watch her do it alone, making suggestions as she works.
5. Leave her while she does it.
6. Encourage her and praise her for good work.



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More Storage Space
o

The arrangement and amount of storage space in a house has much to do with the ease of keeping it in order. Although this is not the time to be making extensive changes in houses, it may be possible to build new cupboards or closets and to supplement available storage space by adding shelves and dividing drawers.

Many cupboards and pantries are filled with waste space because shelves are too far apart and drawers too deep.

Sliding inside trays may be added to deep drawers, thus doubling their usefulness.

Smaller shelves of graduated width can be introduced to hold cups, saucers and smaller plates.

Vertical partitions may be inserted between the deep shelves. These are convenient for storing muffin tins and other baking tins as well as covers, trays and platters.

The use of graduated shelves and vertical partitions will avoid stacking, making it easy to choose at a glance and to remove one article without disturbing the others.

The shelves and partitions may be constructed separately and of different widths to be inserted where needed. They could then be moved from one house to another.

Use paper patterns cut the size of plates and utensils to help you to plan for effective use of shelf space. Arrange these as you would like to have the articles placed. Plenty of room should be allowed for space between the articles so that all of them may be handled easily. Whenever possible, plan to have everything in sight and only like articles and those of the same size stacked together.

Check your equipment critically at least once a year and make sure you are not using valuable space to store articles which you do not use. Service should be the price paid for space occupied.

It will save steps if each utensil is placed near the center where it is most used or at the place first used.

Working Centers

The following will serve as a guide for the kitchen storage space:

DISHWASHING CENTER (*at the sink*)

All utensils and supplies needed for dishwashing.

Dish pans	Soap
Dish drainer	Scouring powder and utensils
Plate scraper	Silver polish
Paper towels	Sink strainer
Garbage container	Sieve
Kitchen towels	Container for salvage tin cans
Waste paper basket	

Other utensils used first at the sink.

Strainers
Knives and brushes used for preparation of food at the sink
Sauce pans, if water is first put in for vegetable cooking
Coffee maker

COOKING AND SERVING CENTER (*at the range*)

Frying pans
Sauce pans
Covers
Supply of salt, pepper, flour, seasonings used at the stove
Double boiler
Fork, turners and stirring spoons
Platters and vegetable dishes
Cooking thermometers
Tea pot
Tea and coffee

PREPARATION CENTER (*refrigerator and storage cupboard*)

Measuring spoons and cups	Mixing spoons
Molding board	Egg beater
Rolling pin	Food chopper
Flour sifter	Grater
Pastry blender	Cutters
Bowls	Baking pans
Knives, spatula	Casseroles
Supplies: Flour, spices,	Can opener
sugar, cereals,	Recipes
soda, baking powder	Container for salvage fats

Store away for the duration all gadgets which are not necessary in simple living, such as, fancy vegetable slicers, spring molds and other utensils for fancy baking, extra dishes, duplicate utensils not often used.

Adequate storage space in other areas of the house is equally important. Clutter is avoided and children develop a sense of respect for the family possessions when there are well planned places to put things. Hooks and shelves for the children's things should be low enough for them to reach easily. You may think your house does not have enough closets. Possibly it doesn't, but often additional storage space may be provided by making better use of the space you already have.

Avoid Clutter

The practice of labeling every bottle or carton is worth cultivating. Boxes marked with labels which may be read easily will avoid much searching. The absence of a label may also mean waste as well as hazard.

When you are feeling well and enjoying your work, it may not seem hard, but if you are ill, mentally or physically, any job seems more difficult, sometimes impossible.

What Makes You Tired?

The tired worker is slower and inaccurate, so when trying to reduce time, it is important to lessen fatigue. We are told that there is a direct relationship between fatigue and the dislike for a task. We also know that most folks enjoy doing those things which they do well. So by improving her methods through time and motion study, a homemaker would do a job better, she would enjoy doing it, and would get less tired.

What you think about while doing your routine tasks is important. You will tire more quickly if you think of unpleasant things, or you can lessen fatigue by maintaining a cheerful attitude. Do some of your "head work" while dusting and sweeping; plan the family recreation, the garden, or use that time to ponder about a book which

A Penny for Your Thoughts

you are reading. Learn to get satisfaction out of your work. When it is interesting and absorbing to you, its doing becomes easy. You, in turn, find the drudgery of the job gone.

Rest Periods Are Necessary

Nearly 400 homemakers were questioned regarding their work habits and methods.* They reported that the high fatigue periods were noon to three o'clock, late afternoon and early evening. Notice your fatigue periods and use that information in planning. When it is possible, the sitting-down tasks should be planned for these hours, with a short relaxing period about an hour or two before if possible. Frequent short periods of rest through the day are better than one long one. If it is possible, get into the habit of short periods of relaxation. If you have three or five minutes, you can lie down on the floor on your back, put your hands above your head, close your eyes and let go. Don't try to hold up the floor under you. If you have just a minute, sit down with your feet up on a chair, close your eyes, and relax all of your muscles.

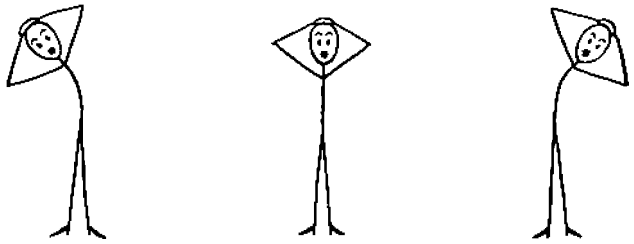
Posture Makes A Difference

Good working postures will reduce fatigue, so one should give attention to posture habits in standing, sitting, stooping, and bending while at work.

To improve your posture:

Stand with your heels 4 inches from the wall, then touch head, shoulders and buttocks to the wall. Try to flatten the back against the wall by pulling in the abdominal muscles, then relax.

Practice this several times a day.



Clasp your hands over your head and then pull up with left elbow, relax, and repeat the stretching on the right side. Relax. Stretch both sides by pulling up on the shoulders.

*A study made by Dr. Irma Gross and Miss Evelyn Zwenner at Michigan State College.

Working Heights

The way you stand and sit as you work is important. The heights of working surfaces should be adjusted to the comfort of the worker to maintain good posture. Kitchen tables which are too low to use without stooping may be raised on blocks to the correct height.

It is impossible to give accurate heights of surfaces to suit different individuals and it is better for each to work these out for herself. The need will vary depending upon the height of the individual and proportions of her body. It may be as low as 30 inches for beating or stirring and as high as 38 inches for other activities. A good way to test the height is to stand with arms slightly flexed and palms of the hands extended. They should rest easily on a surface when the back is straight.

An ironing board should be about an inch lower than this, and surfaces where the electric mixer and other equipment is used may be higher.

Miss Elaine Knowles, in her study of equipment at Cornell University, found that in ironing boards the comfortable heights for most persons varied from 32 to 35 inches.

Sit When You Can

It requires eight percent more energy to stand than to sit, so get into the habit of using a chair or kitchen stool when possible. A lapboard which can be pulled out like a breadboard furnishes a working surface for preparation of vegetables and other things which may be done sitting down. A comfortable height for this board is approximately 25 inches from the floor.

Bending requires 55% more energy than lying down and 43% more than standing. The handle on the dustmop and the dustpan should be long enough to use without stooping, thus allowing one to work with much less fatigue. Make it a practice to keep articles off the floor, out from under foot.

Suitable clothes for work should definitely be considered a part of the homemaker's necessary equipment.

Shoes should be comfortable, with even heels of suitable height, three-fourths to one and a half inches. An uneven heel soon twists a shoe out of shape. Such shoes neither protect the feet nor properly support the body. It is restful to change shoes when the feet begin to tire.

Ill-fitting Clothes May Cause Fatigue

House dresses should be fitted comfortably for bending and reaching. A dress which pulls or binds as one works will tire the worker unnecessarily. The golf dress with action back is a good type for the house dress. Particular attention should be given also to the freedom of fit in the neck, shoulders and armhole seams. The length of sleeves is important for comfort. Aprons should fit so they do not slide off the shoulders. Sew short tapes to the inside of shoulder seams on house dresses. These can be snapped around shoulder straps to keep them from slipping.

Are You Fit for Two Jobs?

If you have added a war job to your regular homemaking one, or if you are planning to, the first thing to do is to get competent advice regarding the kind and amount of physical work you can do.

Knowing how to keep physically fit for every day and throughout the day is as important as knowing how to do the work.

Just as the men in military training are given exercises to strengthen muscles and to prepare them for the work they will have to do, women who are trying to do two jobs will work more easily if they build up resistance to fatigue. Exercises need not be strenuous and tiring, but they should be the right ones to strengthen the muscles that will have to take extra strain. There are foot exercises which are helpful to keep the feet in condition if the work requires standing most of the day. Relaxing exercises as well as muscle-building ones should be included in the conditioning program.

"Basic Training" for homemakers should include the right food as well as exercise. Attention must be given to regular meals which hold to the standards for good nutrition. A good breakfast and mid-day lunch are as important for the homemaker as for the school child and factory worker. You will find helpful suggestions in the booklet, "Money Management, The Food Dollar," listed on page 31 of this booklet.

Personal Rewards

When a homemaker gives her attention to her work requirements, she will find many opportunities for improvement in making her day's work more effective. At first her changes may be big ones accomplishing surprising results. But if she retains her enthusiasm for improvement, she will continue to find places where she can cut minutes from her schedule and can conserve her energy.

The personal satisfaction in achievement is an inspiration in itself. One homemaker expressed it this way. "I like to have a plan to check my accomplishment, because then I can think of the things behind me rather than always worrying about those piled up ahead."

15 Short Cuts to Time Saving

Take time to plan a good work program.

Cancel all tasks that cannot be justified.

Group the routine tasks for saving time and energy.

Arrange equipment to save steps and motions.

Adjust the heights of working surfaces to permit good posture while working.

Keep equipment in good working condition.

Put away furnishings and "things" which require extra care.

Work out simple methods and stick to them until they become habits.

Find your speed which is efficient but not hurried.

Include rest periods in your schedule.

Encourage the cooperation of the whole family.

Serve simple, nutritious, easy-to-prepare meals.

Take care of your health.

Keep up your enthusiasm for improvement.

Take all safety precautions. Sometimes "haste makes waste."

Check in the list below the time savers which you have adopted. Why not try the others?

Management

Have a business center which will invite you to plan ____

Have convenient files for sales slips, bills, ration coupons, ceiling price lists, cleaning hints, garden records, labels with cleaning and care instructions ____

Keep a pad and pencil handy at the phone, in the kitchen and living room ____

Keep in a handy spot a box of supplies such as gummed labels, string, gummed paper tape, tags ____

Use a bulletin board for notes to yourself and others ____

Have jobs planned and posted for children or others when they come in ____

Post lists of "must" and "may" jobs on the bulletin board ____

Establish "business hours" for telephone calls. Notify friends and organization officers of these ____

Do not putter ____

Shopping and Marketing

Make as few trips to market as possible ____

Shop when markets are least crowded. (*Those who can should shop when employed women are at work and should leave the markets free to serve war workers and others whose time for shopping is limited to the peak hours.*) ____

Serve yourself as much as possible at the market ____

Make out shopping list before going to market ____

Keep memo on bulletin board to add items as they come to mind or as stocks are running low ____

Keep in your purse a list of clothing sizes for different members of the family ____

Meals

PLANNING

Keep file of quickly prepared menus, tested recipes ____

Check supplies in refrigerator and cupboard before planning menus and market orders ____

Check the items on your list for prices and ration values before going to market ____

Plan meals and the use of ration coupons over a period of a week or a ration period ____

PREPARATION

Study and improve the placing of small equipment in your kitchen to save steps and motions ____

Keep knives sharpened ____

Assemble in one place the equipment and supplies for box lunches ____

Select the best utensils to use for each purpose ____

Use vegetable slicer for shredding whenever possible ____

Prepare more one dish meals ____

Bake loaf cakes instead of layers ____

Use basic cake and cookie recipes and vary as desired ____

Make ice box and drop cookies instead of rolled ones ____

Plan to bake while preparing dinner ____

Take advantage of new, quick methods suggested by magazine, newspaper and radio food editors ____

Use alarm clock to check baking time ____

Plan simple desserts, use fruits as available ____

Prepare large quantity muffin and biscuit mix and store in refrigerator (all ingredients blended except liquid and eggs) ____

Combine equal quantities of shortening and flour and store for use as needed in thickening cream sauces and soups ____

Keep ice box cookies in refrigerator, slice and bake a few at a time as you have the oven on ____

Sift dry ingredients onto waxed paper ____

Work on newspapers when preparing orange juice and cleaning vegetables, then whisk into garbage can. Simplifies cleaning-up process ____

To flour chicken, shake the pieces in a paper bag with the flour ____

For thickening gravies and creaming vegetables, shake the flour and liquid in a glass jar ____

SERVING

For busy days serve buffet meals and on trays ____

When family has early after-dinner appointments, serve picnic style using paper plates and cups ____

Eat meals in the kitchen ____

Use paper, plastic or other place mats which do not require laundering ____

Use paper napkins ____

Cook and serve in the same utensils ✓ ____

Serve directly from the stove to the plates ____

Use a tray for setting and clearing the dining table ✓ ____

CLEARING AWAY

Ask each person to carry his own dishes to the kitchen, scrape, rinse, and stack them ✓ ____

Rinse all cooking utensils after use and put to soak if necessary ____

Arrange the most convenient plan for doing dishes in your kitchen ____

Do dishes only once a day when possible ____

Scald dishes and leave to dry without wiping. When possible leave dishes in drainer until next meal. Caution: Boiling hot water should not be used on fine china and glass ____

After pouring off drippings, wipe greasy pans with paper before washing ____

Place paper towel holder at sink ____

Use paper baking containers for muffins ____

Cleaning

GENERAL

See that all equipment is kept in good operating order for immediate use ____

See that handles of equipment are the right length for good posture while using them ✓ ____

Use oil cloth on unpainted or unfinished shelves ____

Wax wood surfaces such as window sills and around door handles making them easier to care for ____

Schedule window washing to be done a few at a time ____

Keep windows dusted to reduce need for washing ____

Use a basket or paper shopping bag for cleaning supplies, brushes, and cloths, to take from room to room. Store away in basket for next use ____

Proceed with one operation until finished ____

Pack away silver which requires extra time for polishing ____

Put silver away in chemically treated cloth or box to reduce amount of polishing necessary ____

CUPBOARDS

Avoid stacking utensils except those of like sizes ____

Arrange shelves of graduated widths to simplify cleaning, to utilize all the space between deep shelves and to avoid breakage ____

Store those utensils used less frequently in the places which are harder to reach ____

Have a safe stepladder convenient for reaching high shelves ____

Have no unlabeled containers in use ____

VACUUM CLEANING

Use a damp newspaper on which to empty the bag of the vacuum cleaner and the carpet sweeper ____

Do all the vacuum cleaning at one time ____

Spread out the furniture to make the rug easier to clean ____

Use vacuum cleaner to remove dust from dry mop. . . ✓ . . . . . ___

TIDYING

Put away for the duration the extra knick-knacks which require too much care. . . . . ___

Gain cooperation of family members in putting things where they belong immediately after using. . . . . ___

Put living room in order at night before retiring, all hands helping. ___

Keep a "tote basket" for things to be taken down from upstairs or to the basement. . . . . ___

Keep a waste basket in as many rooms as possible. . ✓ . . . . . ___

Have materials convenient for children to use in learning to do things for themselves such as towel, washcloth, comb. . . . . ___

Provide low hooks for small children and make it easier for them to keep their things in order. . . . . ___

Laundry

WASHING

Use textiles which are easy to launder but do not require frequent laundering. . . . . ___

Store one set of curtains, using only draperies or glass curtains for the duration. . . . . ___

Place laundry bag or hamper in every bedroom, in bathroom and kitchen. . . . . ___

Ask each person to set out laundry on washday. . . . . ___

Sort laundry on a table to avoid bending. . . . . ___

Use cotton sheet over blanket to protect it against dust. . . . . ___

Avoid letting articles get heavily soiled. . . . . ___

IRONING

When practical, iron directly from line, bringing clothes in as they become dry enough for easy ironing. . . . . ___

Fold at the line those articles which may be put away without ironing. . . . . ___

Do not spend time on clothes which do not require ironing like tea towels, sheets, underwear, overalls, pajamas. . . . . ___

Select clothing easy to iron or requiring no ironing, such as seersucker house dresses, children's clothes and pajamas; garments simply designed, knit wear.....___

Use warm water for sprinkling and sprinkle lightly.....___

Mending and Sewing

Keep sewing basket with mending in convenient place, to be picked up at odd moments.....___

Mend small rips, tears and worn places immediately.....___

Simplify methods of mending and repairing.....___

Use simple quick construction methods for home sewing.....___

When making a garment, plan to do similar work at one time:

Machine sewing; get all pieces ready for stitching.

Pressing; prepare and hold pieces for pressing to do as much as possible at one time.

Fittings; plan not more than three for each garment.

1. Basted for design, placement and line of seams, darts and details.
2. After seams have been sewed and pressed, sleeves basted, skirt basted to blouse.
3. For hanging skirt and adjusting trim.....___

Storage

CLOSETS AND BUREAU DRAWERS (*seasonal*)

Sort the contents.....___

Put like things in open boxes in bureau drawers.....___

Determine: What is to be stored for another season.

What is to be discarded.

What is to be cleaned or repaired.

What to return to closet or drawer.....___

Label containers and boxes when storing.....___

List contents on inside of locker doors.....___

ACKNOWLEDGMENT

In order that a well-balanced point of view might be presented in this bulletin, a number of persons were consulted and many publications were reviewed. This bulletin represents a synthesis of information rather than the viewpoints of individuals. For assistance in helping us to obtain a clearer understanding of the subject, we give grateful acknowledgment to:

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LUCY STUDLEY, *Assistant Professor, Home Management, University of Minnesota, University Farm, St. Paul, Minnesota.*

TESTING BOARD MEMBERS, *Milwaukee, Wisconsin.*

MRS. W. E. WEST, *Director, Women's Voluntary Services Division, Department of National War Services, New Supreme Court Building, Ottawa, Canada.*

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Home Living. Margaret M. Justin and Lucile Osborn Rust. J. B. Lippincott Company, Chicago, 1935.

Kitchen Storage Space. Bulletin 398. Clara E. Jones, Cornell University, Ithaca, New York, November, 1938.

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Management In Family Living. Paulena Nickell and Jean Muir Dorsey. John Wiley & Sons, 1942.

**Motion and Time Study.* Ralph M. Barnes. John Wiley & Sons, New York, January, 1940.

The Step Saving Kitchen. Iowa Extension Service, 1943.

Use Of Time In Its Relation To Home Management. Jean Warren, Cornell University Agricultural Experimental Station, Ithaca, New York, June, 1940.

**Motion and Time Study as applied to homemaking has taken on new importance. In August, 1943, a group of 32 Home Economists from 24 different states were in conference for two weeks at Lafayette, Indiana. They worked under the instruction of Dr. Marvin Mundel of the Motion and Time Laboratory of the Department of General Engineering, Purdue University. Unquestionably results of this conference will be far reaching.

The Household Library

THE consumer library may be divided into four main groups of booklets, each group made up of a Money Management booklet giving the general points on economical money management in its field, and several supplementary Better Buymanship, Use and Care bulletins each giving specific information on how to buy a particular commodity. Films, too, have been developed in each field, for use by schools and clubs.

When ordering, please send stamps to the amount of 2½ cents per booklet to cover mailing costs, *except* that one sample copy of *Money Management, The Budget Calendar,* will be sent free, postpaid.

For special free offer to a teacher or a club, see order blank.

Single free sample copies of the Money Management and Stretching the Dollar Series may be secured by calling at any Household Finance office.

Bulletins starred (*) are edited to be applicable both in Canada and the United States. Residents of Canada may obtain them by writing to Household Finance Corporation of Canada, 80 Richmond St. West, Toronto. Only single copies of booklets not starred are available in Canada. These will be mailed from Chicago.

The films starred (*) are also available in Canada, but for *information* about *films,* please write to Household Finance Corporation, 919 North Michigan Avenue, Chicago.

Money Management

**Money Management Principles,* how to organize the business side of homemaking around the interests of the entire family.

**Money Management, The Budget Calendar,* a new, simplified way to manage the family income.

Other Money Management booklets include:

**George Clark's Cartoons on Money Management for the Family,* a sense of humor applied to the principles and methods of money management.

**Money Management for Newlyweds,* suggestions for the bride and groom.

How to Buy Life Insurance. (Public Affairs Committee.)

**Credit for Consumers.* about instalment buying and loans. (Public Affairs Committee.)

**Consumer Credit Cost Calculator,* a simple method for figuring true interest rates.

Films: *"Managing the Family Income"
*"Happily Ever After"

Clothing and Accessories

**Money Management, The Clothing Dollar,* on how to plan the small but perfect family wardrobe.

Better Buymanship, Use and Care booklets on the following subjects:

*Fabrics
Shoes
*Hosiery
*Furs
*Soap and Other Cleansing Agents
*Cosmetics
Electric Shavers

Film: *"What Shall I Wear?"

The Home

**Time Management for Homemakers,* how to put modern motion and time study methods into practice in homemaking.

**Money Management, The Rental Dollar,* points to be checked in selecting a new home, moving-day economies, how to read your lease.

**Money Management, Home Furnishings,* with new ideas and smart economies for cheerful, cozy rooms.

Better Buymanship, Use and Care booklets on the following subjects:

*Household Equipment
*Furniture
*Floor Coverings
*Household Textiles
*Home Heating
Radios
Gasoline and Oil
Automobile Tires
*Playthings

Foods and Equipment

**Money Management, The Food Dollar,* for everyone who plans meals and buys food.

Better Buymanship, Use and Care booklets on the following subjects:

*Poultry and Eggs
*Fresh Fruits and Vegetables
*Meat
*Fish
*Dairy Products
*Food Fats and Oils
*Kitchen Utensils
*Dinnerware

Film: *"Love in the Kitchen"

Home, Inc., a little envelope-size, popular monthly magazine, chock-full of helpful ideas and inspiration for the homemaker: 25 cents a year. This magazine is not designed for educational use in schools and clubs and cannot be supplied in quantities.

(Continued on next page)

Visual Material

The movies and sound slidefilms listed below are available to study groups in cities in the United States and Canada where Household Finance Corporation has offices (listed on inside of back cover).

1. ***"Happily Ever After"***

Especially for brides and older girls directly interested in homemaking. This film shows a bride contemplating her "new job" of homemaking.

2. ***"Managing the Family Income"***

This picture shows *how* to make a wartime budget. New edition available.

3. ***"What Shall I Wear?"***

Not a fashion picture nor a story, but rather a practical discussion of how to build a satisfactory wardrobe for the entire family.

4. ***"Love in the Kitchen"***

The story of how one daughter found a happy solution of the problem of three meals a day, for her family and her own future home.

5. ***"Men and Money"***

Appropriate for classes and clubs studying finance and economics. It is the story of borrowing through the ages. Education and credit control are indicated as the solution of the problem of debt.

Numbers 1, 3, 4 and 5 are available as *sound slidefilms*. If you can provide sound slidefilm equipment, we will lend you the record and 35mm film. This equipment consists of a phonograph turntable revolving at 33⅓ R.P.M., that will accommodate a 16-inch diameter record, and with a 35mm still film projector. As a suggestion, many local merchants, especially automobile and electrical appliance retailers, do possess sound slidefilm equipment used for salesmen's or service men's training. Many Household Finance Corporation offices have this equipment and will be glad to reserve it for you providing you ask the local manager sufficiently in advance. It can be operated by any high school student or adult.

Numbers 1, 2 and 3 are available as sound movies. If you have a 16mm sound-on-film movies projector (and operator) we will be glad to send you the reel of film. We do not furnish the projector or operator. Please note this movie film cannot be run on a "silent" projector.

The only expense to you for the use of films is the cost of transportation one way.

A "key" booklet from our consumer education library and a study guide are furnished free for each film showing. The booklet contains the subject matter of the film, and the study guide offers suggestions for group discussion.

For complete and most recent information about films, both in Canada and the United States, please write to the *Chicago* address below.

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Address

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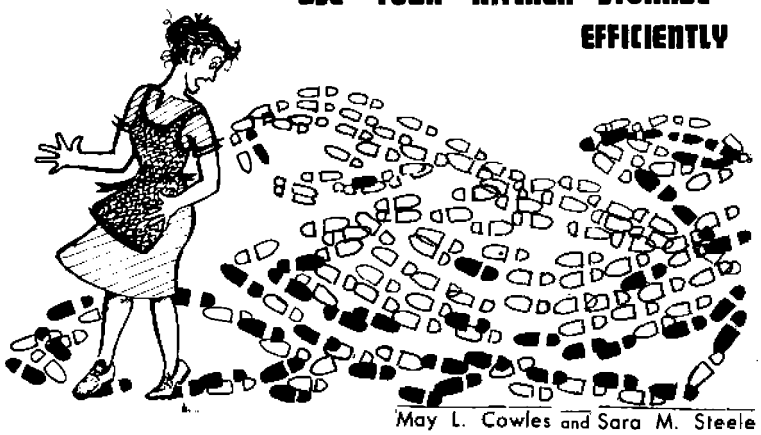
SAVE STEPS

USE YOUR KITCHEN STORAGE EFFICIENTLY



May L. Cowles and Sara M. Steele

HOW well are you using your kitchen storage? A recent study conducted by the School of Home Economics of the University of Wisconsin indicates that some homemakers walk unnecessary miles each year as they prepare family meals because they are not making the best use of the cabinet, counter or other storage areas within their kitchens. Are you losing time and tiring yourself with too many steps?

If you are a young homemaker with small children, a busy farm wife, a homemaker who works away from home or who is active in community affairs, needless steps are lost minutes to you. If you have a condition requiring doctor's care or if you are older, needless steps are a drain on your vitality.

Let's take a look at the recent research report and see if you may not find some ways of eliminating steps in your kitchen.

56 Wisconsin Homemakers Help

Fifty-six homemakers* in southern Wisconsin cooperated by allowing home economists to visit them and make complete scale drawings of their kitchens. The drawings showed the location of each piece of equipment and each article of food as the homemaker had placed it within her kitchen storage areas.

*Thanks are due these homemakers, without whose cooperation the work would not have been possible.

University of Wisconsin—EXTENSION SERVICE
COLLEGE OF AGRICULTURE, MADISON

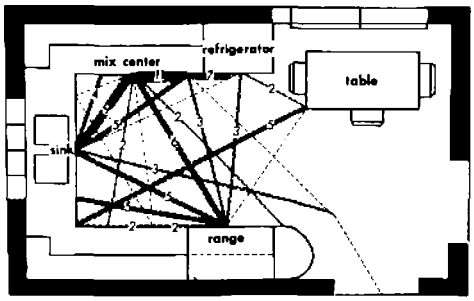
The 56 kitchens varied widely as to arrangement. Some were well arranged -- others were not. Some were newly remodeled -- others dated back to earlier years, some with storage in an adjoining pantry. Some had plenty of counter and cabinet space -- others were limited to very small amounts of storage space.

The results of the research study showed that although good general arrangement of the kitchen (the amount and location of cupboard and counter space and the placement of the range, refrigerator and sink) was important, this was only the first step toward working efficiency. Real efficiency also depended on the homemaker's ability to organize and use the available space.

Scale Drawings Show Steps

Walked While Making A Meal

before



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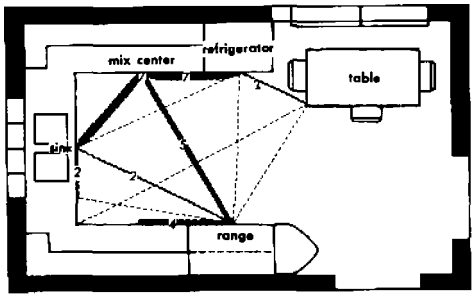


At the University, the research workers, using the scale drawings which showed the location of food and equipment, made a drawing for each kitchen of the steps taken in making, serving, and clearing away a specific meal. A meal of Swiss steak, cabbage salad, mashed potatoes, canned peas and cherry pie was used. The lines on the drawings were measured and translated into feet and inches. These measurements showed distances of from 151 to 597 feet -- an average of 329 feet -- walked to prepare the meal.

Then three simple rules of work efficiency were applied and, without changing the basic kitchen arrangment in any way, the foods and pieces of equipment were relocated on the drawing. The steps in preparing the same meal as before were drawn out and measured. In every one of the 56 kitchens, steps could be saved. The amount of walking that could be eliminated varied a great deal, but the average homemaker could have eliminated about 25% of the total walking distance, an average of 82 feet saved on one meal.

To test whether the changing of location of the foods and equipment would work for other meals, drawings were made showing steps used before and after relocation in preparing a second, more difficult meal. Not only did the relocations prove successful for this meal, too, but the average saving was about 30% of the original distance. To check these results, the same procedure was followed in a test kitchen with slow motion pictures, and again steps were saved.

How Were Steps Saved ?

By now you are probably wondering how the savings were made. Here's the answer. Three basic rules and an old adage were used to eliminate the wasteful steps. The adage? "Use Your Head, Save Your Heels." the rules were:

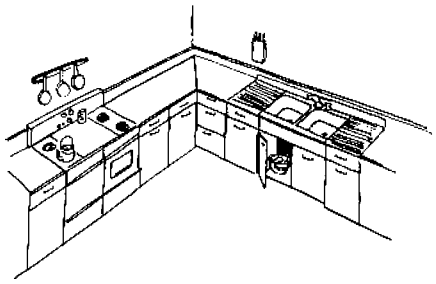
1. Keep food and equipment at the place of first use.
2. Keep food and equipment used in the same food process together.
3. Keep duplicates of equipment and foods if used at two or more centers.

Here is how these three rules could be applied to save steps for these homemakers without any costly construction changes in their kitchens.

Keep Food andEquipment At The Place Of First Use

If you were to walk into your kitchen and begin preparing one food for supper, could you reach everything you need for that preparation without taking more than five or six steps? That's the test of having your kitchen organized according to the place of first use.

Let's take preparing potatoes. Can you walk over to the sink and from there take the potatoes over to the range and start them cooking without having to go anywhere else in the kitchen? You can if the potatoes, saucepan and knife for peeling are at the sink and if the salt and lid are at the range. Some of the 56 homemakers had to move all over the kitchen before they had the potatoes ready for the range.

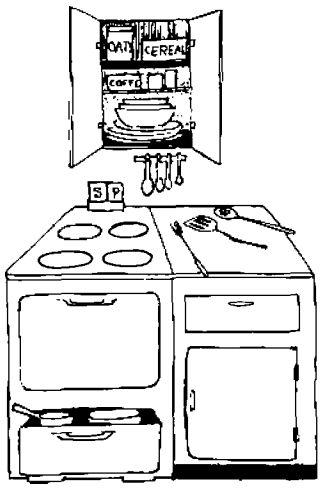


Instead of being stored at the place of first use, some pieces of equipment were stored together because of similar size or shape and without regard to use. For example, homemakers often kept their skillets and their sauce pans at the same place. But the skillet almost always is used at the range and the sauce pan often is first used at the sink. Some saucepans are used only at the range-those used to heat canned vegetables, for example. A pan for this use, canned vegetables and a can opener could well be kept at the range. As another example, knives are used at many different places in the kitchen but are typically stored at one spot.

In the 56 kitchens, over half of the separate items of food and pieces of equipment, 51.6% of the food items and 58.3% of the equipment, needed some change in location to make their use more convenient. Measuring cups or spoons, saucepans, knives, stirring spoons, serving bowls, platters, and can openers most often needed relocation. Foods which were most often relocated for handy first use were potatoes, flour, seasonings and canned goods.

Keep Food and Equipment Used

In The Same Food Process Together

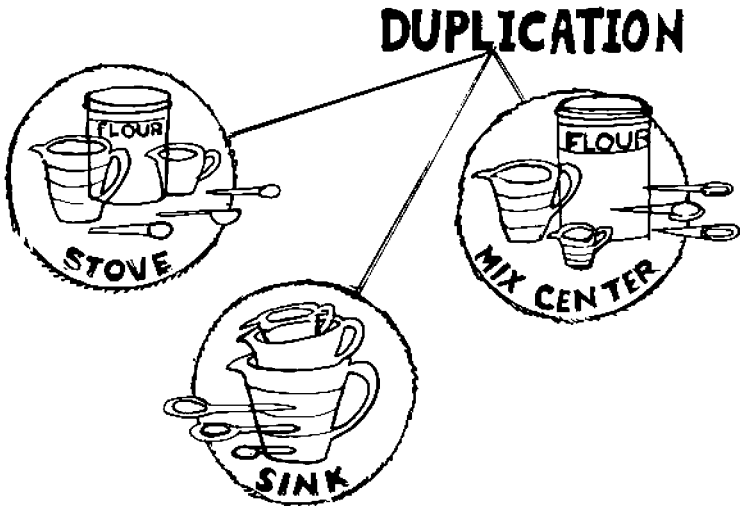


Some things just naturally go together, so keep them together. You use a fork or a turner with a skillet, a stirring or tasting spoon with a saucepan, and a can opener with canned goods. Keep them together and keep them at the range where you will be using them.

A kitchen generally has four work areas called "centers." You are probably familiar with the importance of keeping all of your baking supplies together at the "mix center." The other three centers are the "cook center," the "sink center" and the "serving and dish center." Good organization of supplies and equipment kept at these centers is just as important as a well organized mix center.

The cook centers in the 56 kitchens needed the most reorganization. Nearly three-fourths of the equipment and about two-thirds of the food items used at the range were stored in other parts of the kitchens. Over half of the items used first at the sink were not kept there. The mix center was usually the best organized in these 56 kitchens, but not even all food and equipment items used in baking were stored there.

Keep Duplicates Of Equipment and Food If Used In Two Or More Centers



If you are thinking about your own kitchen, you may be thinking "but I use flour at the range and at the mix center. I measure coffee and cereal at the range, and yet I need measuring tools at the mix center, too." The step saving answer is to have duplicates of those items which are fairly inexpensive.

Keep most of the flour at the mix center, but keep a small canister at the range. Keep measuring spoons and cups at the range, at the sink, and at the mix center. If your work centers are so close together that you can reach these without taking a step, duplication isn't necessary. But if you are going to have to walk to get them, then buy duplicate inexpensive items.

What If You Don't

Have Enough Storage Space?

As you try applying these three rules in your kitchen you may find that there doesn't seem to be enough storage room at one of the centers. What can you do?

Take stock of the amount of space. Look at what you already have stored there. Are any of the items things that you use only in other parts of the house? Or, if they're used in the kitchen, do you use them each day or only on special occasions (Christmas cooky cutters, for example)?

Homemakers sometimes find they are using important space for things that could be stored across the room or in another part of the house. It may be convenient to have some of the children's toys in the kitchen, but they can be put in a low drawer that isn't needed to hold food preparation supplies.

Relocating items belonging in other parts of the house and those used only occasionally in food preparation helps give more room for the work you carry on every day. Then make use of all of the space you have with racks and drawer dividers. See the Wisconsin Extension Bulletin, "The Well Planned Kitchen" for drawings of simple space savers that you can put into your present cupboards.

Now What Can You Do In Your Kitchen?

If you really are short of cupboard space and there's no chance of building more, temporary racks and shelves are available that can be attached to the wall or to a cupboard door. Pegboard provides handy storage in an area where there isn't a cupboard.

In each one of the 56 kitchens some steps could have been saved. Now how about yours? Don't let habit or copying others rule your use of the space you have.

Perhaps you will want to sketch your kitchen and mark where you keep food and equipment. Then draw colored lines as though you were walking through all the little movements in preparing a meal. Look at the lines. Could you move something to eliminate a trip?

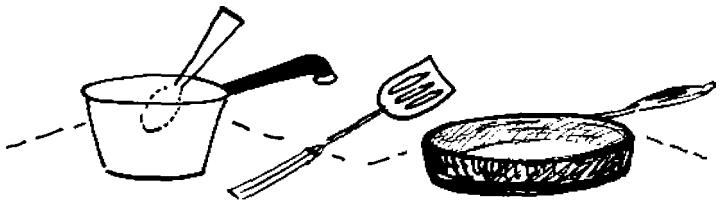
Here's another suggestion. Make a list of the foods that you prepare at the range and at the sink. Then list the supplies that you need there for the preparations. Next move the food and equipment to the center and place it where you can reach it easily.

REMEMBER

- PUT IT WHERE IT IS FIRST USED
- KEEP THINGS USED TOGETHER STORED TOGETHER
- DUPLICATE ITEMS IF NECESSARY

Use Your Head, Save Your Heels

Make Your Kitchen Storage Work For You



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RESEARCH BULLETIN 946 AUGUST 1963

Energy Expenditures of Homemakers Performing Floor-Care Activities and an Evaluation of Floor Appearance

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OHIO
AGRICULTURAL
EXPERIMENT
STATION

WOOSTER, OHIO

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The twenty-five homemakers who participated as subjects in the study.

8-63-3M

Energy Expenditures of Homemakers Performing Floor-Care Activities and an Evaluation of Floor Appearance

JOHNNIE RAY HOOPES AND MARY BROWN PATTON*

INTRODUCTION

The increased use of smooth-surface floor materials throughout the house makes information concerning their care of importance to many homemakers. This study was carried out to help meet the need for an increased understanding of the use of selected methods, materials, and equipment for effective floor care.

The interaction of methods and tools in the care of floors prompts their consideration as a unit. The limited availability of small tools for a given task which complement the physical characteristics of the worker may be indicative of the little concern held for these floor-care tasks. Modifications of either the tools or their use are frequently necessary for performance of these activities with ease.

It is generally recognized that a protective wax layer enhances floor appearance and that waxed floors withstand wear and require less care than unwaxed ones. By shortening time devoted to household tasks, homemakers release time for other interests.

Women have accepted liberation by machines from a number of household tasks; similarly, the acceptance of machines for household floor maintenance may be expected to follow the same pattern. Determining energy costs of persons when performing floor-care activities is one approach to appraising the efficiency of methods and tools. Energy and time costs of performing tasks by various methods can be used in developing more efficient procedures.

Objectives of the present study were (1) to determine energy expenditures, blood pressures, and heart rates of women when performing floor-care activities on waxed and unwaxed floors; (2) to obtain an energy expenditure basis for selecting tools and methods for performing floor-care tasks; (3) to evaluate the appearance of floors and to obtain reactions of participants to prescribed floor-care practices during an experimental period.

*This study was reported in detail in a Ph.D. dissertation (Ray, Johnnie Nell. 1962. Energy expenditures of women performing household floor-care activities, The Ohio State University).

PROCEDURE

Twenty-five homemakers living in north Columbus, Ohio, followed prescribed practices and recorded time spent in kitchen floor-care activities for a 6-month period. For six of the 25 women, energy costs, blood pressures, and heart rates when performing floor-care activities were obtained under controlled conditions in the laboratory. By using energy costs from the laboratory and time reported by homemakers, calculations of energy expenditures were made as estimates for performing the same tasks in homes.

In the laboratory the six homemakers performed the same task with several different tools in order to obtain information on energy expenditures as a basis for selection of tools commonly used in floor care activities.

Limitations of time and number of subjects made it impossible to have the homemakers use all these tools in the home. Criteria for selection of those to be used in the home were developed and will be discussed.

PRELIMINARY PLANNING

Subjects. Homemakers were selected on the basis of age, presence of children under 18 years at home, and characteristics of kitchen floor. Women were to be between 25 and 50 years old. Consideration was given to height and weight of women under 40 years of age as six laboratory participants were to be chosen from this group. Flooring material was to be permanently installed, less than 20 years old with surface in good condition, and either inlaid linoleum, vinyl asbestos, or vinyl.

The six homemakers selected for laboratory participation ranged in age from 26 through 37 years, in height from 63 through 67 inches, and in weight from 127 through 144 pounds. Basal methabolism determinations were made in advance and at the end of the laboratory period. The lower or lowest basal metabolism values for each subject are given along with height and weight in Table 1.

Laboratory kitchen area. To carry out floor-care activities in the laboratory it was necessary to have an area which would simulate a home kitchen (Fig. 1). The plan which was used provided 9.74 square yards of available floor space (Fig. 2). Four sets of movable floors were constructed of ¾ inch plywood covered with vinyl sheet material. For ease of handling, each set consisted of four panels.

The factory finish on the floors was removed to simulate wear by using a scrubbing pad on a professional-size floor machine with a mild abrasive and wax remover and cleaner.

TABLE 1.—Age, Height, Weight, and Basal Metabolism of Laboratory Subjects.

Subject	Age[a]	Height[b]	Weight[c]		Basal heat production		Deviation from standard[d]	
			Initial	Final	Initial	Final	Initial	Final
	yr	in	lb	lb	Cal/m^2/hr	Cal/m^2/hr	per cent	per cent
A	26	66	127	136	29.59	27.12	-17.11	-24.03
B	33	64	134	132	32.73	32.59	- 8.32	- 8.71
C	26	67	126	133	30.25	29.72	-15.27	-16.75
D	33	64	144	141	33.94	31.99	- 4.93	-10.39
E	37	65	141	141	31.90	31.61	-10.64	-11.46
F	37	63	135	140	29.77	28.39	-16.61	-20.48
Mean	32	65	134	137				

[a]To nearest birthday at beginning of study.

[b]In bare feet.

[c]Corrected for weight of smock worn.

[d]According to the Mayo Foundation Standard (Boothby, Berkson, and Dunn, 1936, Table 4).

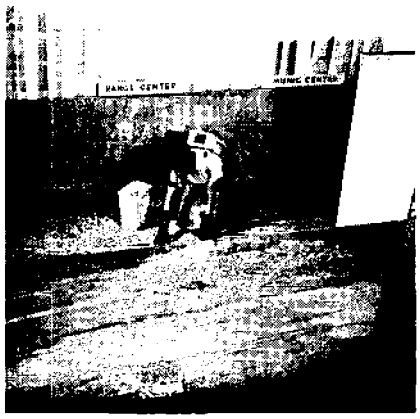


Fig. 1.—Subject washing floor in laboratory kitchen area.

Dust, sand, soot, and grease were obtained from a garage area and a liquid soil (pH 8.75) was made with detergent and water. To prepare a floor for laboratory activities, 10 ml of soil were distributed with the floor machine, 1 tsp orange juice, 1 tsp milk, ¼ tsp catsup, and ¼ tsp bacon drippings were smeared by hand, and four shoe marks, each approximately 1 foot in length, were made at irregular intervals.

Selection of floor-care tools. Several criteria, including popularity with homemakers, were used for selecting tools for floor-care activities.

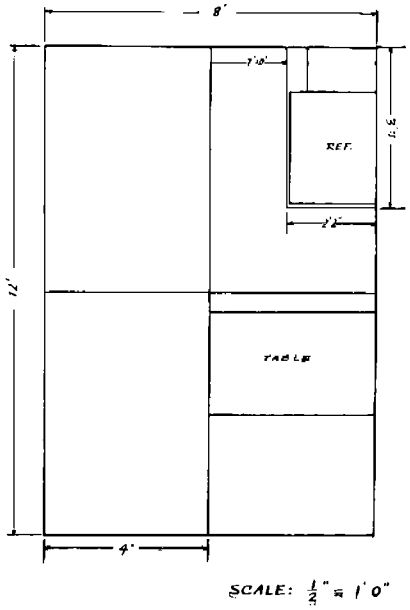


Fig. 2.—Space available for floor-care activities.

The sponge mop was the top seller in the fall of 1960 according to the household cleaning department supervisor in a local department store.[1] Indianhead cloths for waxing and terry cloths for washing and rinsing were chosen for activities on hands and knees. A single-brush design floor machine was made available by the sponsor so similar models were not considered for the study. Guides found in the literature and limitations placed by items available determined selections of other tools. Activities performed in the laboratory and tools used are given in Table 2.

Initial interviews. Information about homemakers' usual methods of kitchen floor-care was obtained through interviews using a questionnaire. From the responses of homemakers, the most frequently reported

[1]F. and R. Laparus Co., Town and High Streets, Columbus, Ohio.

TABLE 2. Mean Energy Expenditures of Six Subjects when Performing Floor-Care Activities.

Activity	Tool	Cal/min
	All treatments	
Sweeping	Broom	2.93
Dust mopping	Dust mop	2.66
Washing		
	Terry cloth, on hands and knees	3.72
	Sponge mop	3.07
	Household floor machine and sponge mop	2.62
Rinsing		
	Terry cloth, on hands and knees	3.79
	Sponge mop	3.00
Buffing	Household floor machine	2.03
	Wax treatments only	
Waxing--(self-polishing wax)		
	Indianhead cloth, on hands and knees	3.30
	Cotton chenille applier	2.61
Waxing--(paste wax)		
	Indianhead cloth, on hands and knees	3.81
	Lamb's wool applier	2.87

interval for washing the floor (2 weeks) and the most commonly used detergent were adopted as practices for the study. Measurements for calculation of available kitchen floor areas were taken at the time of interviews.

PLAN FOR STUDY

Home study. The 6-month interval of home observations, January 2 through June 30, 1961, was divided into three periods—initial, experimental, and final.

During the initial period of approximately 1 month, homemakers continued to care for their kitchen floors by their usual methods.

In the experimental period, homemakers cared for kitchen floors according to assigned sequences of treatments—no-wax, self-polishing wax, and paste wax. Characteristics of kitchen floors and reactions of homemakers to prescribed floor-care practices were obtained by use of a rating scale and a check list. The 5-level rating scale was adapted from "Score Card for Condition of Smooth Floors" (Beveridge and Pond, 1960). A copy of the rating scale is in Appendix B. The appearance of floors was rated independently by homemakers and a research worker at six observation times during each period—at the beginning, preceding and following washings at 2-week intervals, and at the end of the 6-week period. Scores for each floor were obtained within 48 hours before washing or removing treatment and within 24 hours after treatment period began or floors had been washed and buffed. Self-polishing waxed floors were scored after washings as well as after buffings. At the end of each 6-week period, homemakers responded to a 10-item check list consisting of statements describing their reactions toward the prescribed floor-care practices.

Homemakers received directions concerning the following practices:

1. Soil and/or wax removal at the beginning of each 6-week period.

2. Use and care of tools for application of waxes and for buffing. Tools and supplies were provided for prescribed floor-care tasks—a sponge mop for washing, household floor machine for buffing, cotton chenille applier for applying self-polishing wax, Indianhead cloth for applying paste wax on hands and knees, and a hand sponge for wiping spots and spills.

3. Daily recording of time spent performing freely chosen and prescribed floor-care activities.

Fig. 3.—Measurements of blood pressure and heart rate during preactivity period; meter reading is also being recorded.

4. Preparation of a solution[2] which was to contain 46 gm (¼ cup) of a trisodium phosphate detergent dissolved in 1½ gal of water (0.16 percent concentration of trisodium phosphate) at 37-40° C.

During the final period of approximately 2½ weeks, each homemaker selected the floor treatment which she preferred and followed the same floor-care practices as prescribed during the experimental period.

Laboratory measurements. Activities were performed by each subject after eating a standardized lunch and resting in a sitting position for 20 minutes. Energy expenditure measurements of standing for 5 minutes were obtained in triplicate following the initial rest period.

Actual activity time was set at 5 minutes to provide an adequate size sample of expired air for analysis and to prevent fatigue which might occur with longer work periods. To determine recovery rates, measurements while standing relaxed after working were obtained for three consecutive 5-minute periods. The energy costs reported in this bulletin are those calculated for the duration of the activity itself and reduced to Calories per minute. Blood pressures and heart rates were measured at the beginning and end of the activity performance time and at the end of the three 5-minute recovery periods (Fig. 3). Following each 20-minute energy-determination interval, the subject sat relaxed for 5 minutes with gas meter removed.

[2]Since it was thought that waxes might be adversely affected by solutions used for washings as directed by the manufacturer, temperature recommended on the detergent box was reduced from hot to luke warm and the concentration was reduced by one-half.

Floor-care activities were performed first on floors without wax, then on floors prepared with self-polishing wax, and in turn with paste wax. The order for activities was rotated for each subject with each treatment to remove possible effects of fatigue, specific dynamic action of food, and/or oxygen debt. Measurements were made without duplication. Activities are pictured in Figures 1, 4-8 inc.

When a task was completed in less than the 5-minute period, performance time was recorded and the subject continued the task to complete the 5-minute interval. For an activity requiring over 5 minutes to complete, the activitity was discontinued at the end of 5 minutes and the time cost of the total job was obtained subsequently.

Procedures for collection and analysis of expired air and calculation to Calories expended are given in detail in Ohio Agricultural Experiment Station Research Circular 121, August, 1963. Copies of detailed procedures and statistical analyses of data for the home and laboratory phases of the study are on file in the Home Economics Department, Ohio Agricultural Experiment Station, Columbus 10, Ohio.

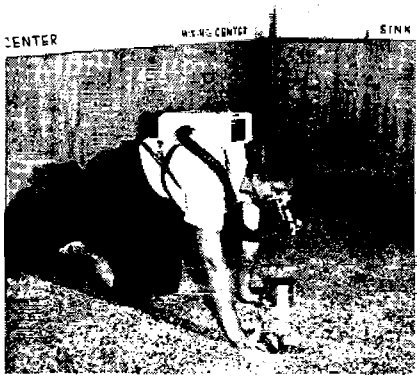
Fig. 4.—Subject, left, washes or rinses with a sponge mop.

Fig. 5.—Floor at right is being washed with floor machine.

Fig. 6.—At right, floor is being buffed with floor machine.

Fig. 7.—Subject, left, is applying self-polishing wax.

Fig. 8.—Subject, right, uses circular motions in applying paste wax.



RESULTS AND DISCUSSION

ENERGY EXPENDITURES

Floor treatments. One objective of the study was to determine energy expenditures, blood pressures, and heart rates of women when performing floor-care activities on waxed, self-polishing and paste, and unwaxed floors in the laboratory. The data were analyzed using analysis of variance to test the significance of the differences in energy expended due to floor treatments. Differences were nonsignificant when energy expenditures were expressed either as gross Calories, Calories over preactivity standing, or Calories per square meter. Consequently, a mean of the three treatments for each of the activities studied was calculated and expressed as Calories per minute. The activities with corresponding mean Calorie expenditures per minute are given in Table 2. Energy costs in Calories per hour for each subject for activities on the three floor treatments are given in Appendix A, Table 6. All values were calculated from the 5-minute performance time following sitting at rest for 5 minutes and represent the energy expenditure per minute during activity only.

Figure 9 shows the energy cost of an activity in relation to preactivity and recovery levels. It can be noted that the energy cost during recovery—bars 3, 4, and 5—decreased to a level comparable to initial standing cost, bar 1.

Comparing results with those reported in the literature is difficult because authors have presented energy costs in various ways and have not described tools used and methods of performance of activity in many cases.

The energy expenditure for sweeping found in the current study, 2.93 Cal/min, approaches the value given by Sherman (1952) of 2.81 Cal/min. Droese *et al.* (1949) and Garry *et al.* (1955) in determining the energy expenditure for the same activity found higher mean values —3.6 over basal value (approximately 1.0 Cal/min) and 3.9 Cal/min, respectively—than observed in the present study. Spector (1956) and Langworthy and Barott (1920) reported lower values—1.85 and 1.68 Cal/min, respectively. In the present study, although motions were similar for dust mopping and sweeping as performed in the laboratory, energy expended for dust mopping, 2.66 Cal/min, was lower than for sweeping. Of the eight activities the least energy was expended for buffing with a household floor machine, 2.03 Cal/min. Energy cost of polishing a floor as given by Garry *et al.* (1955), 5.1 Cal/min, was not identified as to method or tool used; the task may have been performed by hand.

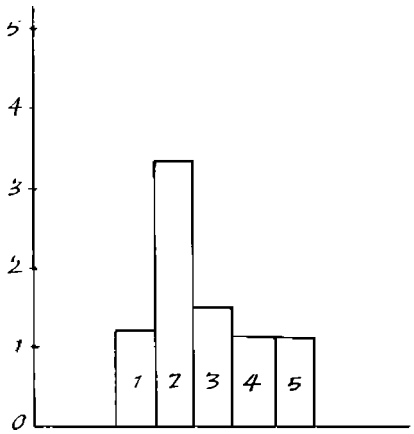


Fig. 9.—Energy expenditure during initial standing, activity, and recovery periods.

1 INITIAL STANDING
2. ACTIVITY
3-5. RECOVERY

Tools and methods. Another objective of the study was to obtain an energy expenditure basis for selecting tools and methods for performing floor-care tasks. Energy expended in washing floors appeared to be related to method of performing the task. Energy expenditure of the homemakers was significantly greater when they washed the floor on hands and knees than when they washed the floor in a standing position using either a sponge mop or household floor machine. Of the three methods the least energy was expended when using the household floor machine. The energy cost of washing the floor on hands and knees, 3.72 Cal/min, is comparable to a value for scrubbing, 3.6 Cal/min, given by Gordon (1957). Durnin *et al.* (1961) determined energy cost of the same activity and reported a value of 3.4 Cal/min. Droese *et al.* (1949) reported 4.9 Cal/min over basal value for this activity. These investigators did not describe the methods used in performing the tasks. In the present study, washing with a sponge mop required 3.07 Cal/min and with the household floor machine, 2.62 Cal/min.

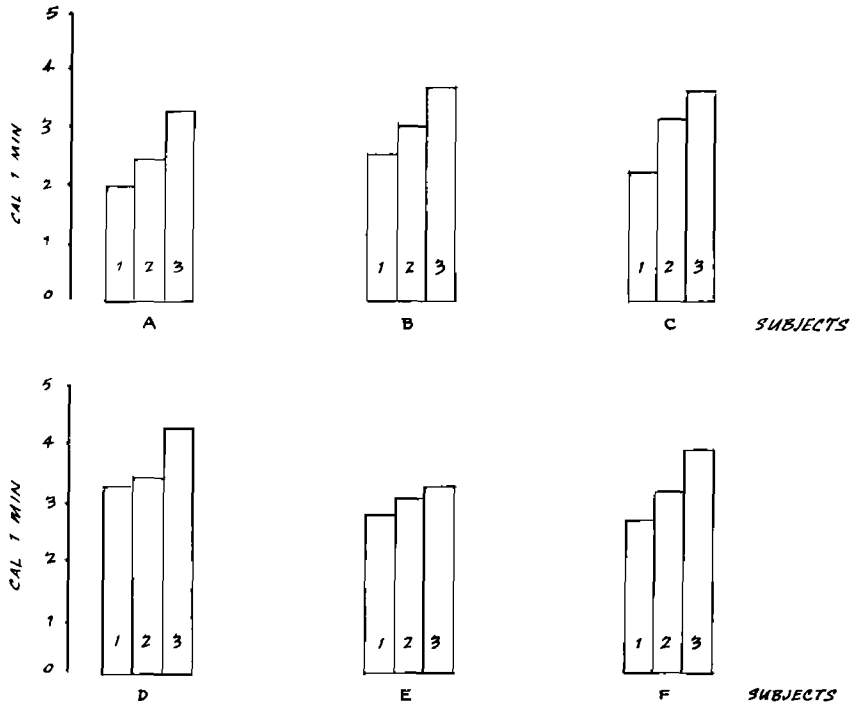
Energy expended for floor-care activities varied among subjects. When the floor was washed on hands and knees, Subject D consistently expended the greatest amount of energy expressed as Cal/min and Subject A, the least amount (Fig. 10). Subjects were instructed to

work at their usual rates. It appeared that Subjects C, D, and E worked with moderately rapid motions while Subject B worked slowly and thoroughly.

In the present study, energy costs were similar in washing and in rinsing the floor using the same tool—for example, 3.07 and 3.00 Cal/min, respectively, for the sponge mop. Although there were significant differences among the energy costs of activities, the difference between washing and rinsing was not significant.

Among activities performed on floors in wax treatments only, differences may be noted. Wax was applied from a hands and knees position and while standing. The energy expenditure for hands and knees was 3.30 Cal/min for applying self-polishing and 3.81 Cal/min for applying paste wax. Droese *et al.* (1949) reported 4.7 Cal/min over the basal value when applying paste wax on hands and knees.

Fig. 10.—Energy expenditure of six laboratory subjects during washing of floors by three methods.



In the present study, energy costs of applying wax using a standing position were less than when using a hands and knees position, 2.61 and 2.87 Cal/min for applying self-polishing wax with a cotton chenille applier and paste wax with a lamb's wool applier, respectively. The lamb's wool applier method was considered unsatisfactory because of difficulty in getting an even wax layer.

While the energy cost of each activity was determined for a 5-minute period, each subject also performed all tasks to completion and the time required for each task was recorded. Means for the time required were calculated and are given in minutes per square yard of floor area (Table 3). More time was required for washing floors with the household floor machine and less time was used in sweeping and dust mopping than with any of the remaining activities.

Mean Calories per square yard were obtained by dividing mean Calories required for performing an activity to completion (total time cost multiplied by energy cost per minute for each subject) by 9.74 square yards in kitchen area. As can be noted, the energy cost per square yard for washing using the household floor machine and sponge mop approached that of washing on hands and knees, 3.993 and 4.326 Cal/sq yd, respectively, on floors protected with paste wax.

Of the wax application activities, the highest energy expenditure rate was obtained when applying paste wax with a cloth on hands and knees, 3.935 Cal/sq yd, and the lowest value for applying self-polishing wax with the cotton chenille applier, 1.603 Cal/sq yd.

The rates at which Calories per hour and Calories per square meter per hour varied with blood pressures and heart rates were determined for the eight activities performed on the three floor treatments. In general, there was no relation between energy expenditure and blood pressures or heart rate.

TIME

Time records for the experimental part of the 6-month period were complete for 23 families. No attempt was made to identify persons within households who performed the floor-care activities. In most cases the homemaker performed these tasks. Time per day for each task was determined by dividing total time spent performing the activity by number of days in the treatment period. Mean time costs were calculated for each activity on each treatment and reduced to the square yard basis (Table 4).

Homemakers spent more time per day per square yard in washing with the sponge mop than in any other activity. Time cost for applying

paste wax was almost twice that for applying self-polishing wax. Costs for dust mopping and vacuuming were quite low; one reason was that the time spent by approximately half the homemakers (Table 4) who performed each of these tasks was divided by the total number.

Homemakers spent similar amounts of time in washing with a sponge mop, dust mopping, sweeping, and vacuuming on the three types of floors and in applying the two waxes. The time spent buffing paste waxed floors was significantly greater than time spent buffing no-wax and self-polishing waxed floors.

The 23 homemakers spent on the average less than 0.5 minute per day per square yard in floor-care activities during each of the 6-week periods. These activities included those tasks given in Table 4 and in addition the wiping of spots and spills. The most time per day per square yard was spent on floors with paste wax (0.470 min) and the least on self-polishing waxed floors (0.320 min). Time per day per square yard for no wax was 0.361 min. The differences were significant at the 0.01 level.

Time ranged from 0.143 to 0.847 min/day/sq yd when the three treatments were considered as a whole. Time spent washing with a sponge mop, dust mopping, sweeping, and vacuuming expressed as

TABLE 3.—Mean Time Costs and Mean Energy Costs Per Square Yard for Floor-Care Activities Performed in the Laboratory.

Activity	Treatment					
	No-wax		Self-polishing wax		Paste wax	
All treatments						
	min	Cal/ sq yd	min	Cal/ sq yd	min	Cal/ sq yd
Sweeping	0.227	0.689	0.227	0.653	0.226	0.648
Dust mopping	0.253	0.689	0.180	0.449	0.168	0.460
Washing						
Terry cloth, on hands and knees	1.217	4.457	1.305	4.917	1.189	4.326
Sponge mop	1.308	3.935	0.911	2.704	0.885	2.766
Household floor machine	2.051	5.240	1.675	4.134	1.495	3.993
Rinsing						
Terry cloth, on hands and knees	0.868	3.128	0.830	3.089	0.730	2.782
Sponge mop	0.701	2.045	0.808	2.458	0.674	1.991
Buffing	0.484	0.991	0.510	0.999	0.484	0.914
Wax treatments only						
Waxing--(self-polishing wax)						
Indianhead cloth, on hands and knees			0.752	2.387		
Cotton chenille applier			0.614	1.603		
Waxing--(paste wax)						
Indianhead cloth, on hands and knees					1.051	3.935
Lamb's wool applier					0.918	2.692

TABLE 4.—Calculated Energy Expenditure of Women in Caring for Floors in the Home Based on Average Time Spent for Each Task and Energy Cost Determined in the Laboratory.

Activity (1)	Cal/ min (2)	Min/ day/ sq yd (3)	Cal/ day/ sq yd (4)	Frequency of homemakers performing task in 6-week period (5)
No-wax treatment				
Buffing, floor machine	2.11	0.042	0.089	23
Dust mopping	2.71	0.005	0.014	12
Sweeping	3.02	0.055	0.166	20
Vacuuming	. . .	0.003	. . .	16
Washing, sponge mop	3.01	0.130	0.391	23
Self-polishing wax				
Applying wax, cotton chenille applier	2.61	0.040	0.104	23
Buffing, floor machine	2.05	0.044	0.090	23
Dust mopping	2.51	0.005	0.013	11
Sweeping	2.88	0.052	0.150	21
Vacuuming	. . .	0.003	. . .	17
Washing, sponge mop	3.03	0.136	0.412	23
Paste wax				
Applying wax, hands and knees	3.81	0.073	0.278	23
Buffing, floor machine	1.94	0.116[a]	0.225	23
Dust mopping	2.75	0.005	0.014	12
Sweeping	2.89	0.057	0.165	20
Vacuuming	. . .	0.001	. . .	16
Washing, sponge mop	3.17	0.130	0.412	23

[a]After applying wax and after washings.

minutes per day per square yard varied significantly among subjects. In general, more time was spent on floor-care activities by homemakers with larger families than by those with smaller ones (Table 5).

Families were identified as to stage in family life cycle (Duvall, 1957, p. 8) which is based on age of the oldest child. Of the three stages identified for this study, families in each succeeding stage, re-

TABLE 5.—Mean Time Per Day Per Square Yard Spent in Floor-Care Activities According to Size of Family.

Number in family	Frequency of family size	Mean min/ day/sq yd
7	2	0.575
6	3	0.345
5	12	0.378
4	6	0.348

gardless of size, spent less time with floor care. In other words, families with younger children spent more time in caring for their floors than did those with older children.

PRESCRIBED PRACTICES DURING EXPERIMENTAL PERIOD

A third objective of the study was to evaluate the appearance of floors and to obtain reactions of participants to prescribed floor-care practices during an experimental period. A rating scale was used independently by homemakers and two research persons to evaluate the appearance of floors at specified times during each 6-week treatment period. Reactions of homemakers toward floor-care practices were obtained by using a check list at the end of each 6-week period.

Appearance of floors. Characteristics described in the rating scale were: A, general appearance; B, marks and dents; C, dust; D, food particles and spots; E, wax layer; F, discoloration; G, stickiness. Each characteristic was given a rating in whole numbers ranging from a high score of 5 to a low of 1. A copy of the rating scale is found in Appendix B.

Scores of homemakers for each treatment were significantly lower than those of the research persons for marks and dents, food particles and spots, discoloration, and stickiness and higher for wax layer. Scores of the two groups for general appearance and dust did not differ.

Scores for each characteristic for each of the three treatments were compared and were highly significant for general appearance, marks and dents, dust, and wax layer. Ratings of general appearance were highest for self-polishing waxed floors and lowest for floors without wax. The ratings for condition of wax layer were higher for self-polishing than for paste wax. Ratings of marks and dents and dust

were highest for paste wax and lowest for floors without wax. The scores for these four characteristics—A, B, C, and E—approach a normal distribution.

Values for four characteristics of unwaxed floors and seven of waxed floors were determined at six observation times. Scores of homemakers and research persons were combined and means were calculated for each characteristic with each of the three floor treatments. The means are given according to observation times in Appendix A, Table 7. In general, ratings were higher at the beginning of the period and following washings and buffings than preceding washings and at the end of the 6-week period when floors were soiled (Fig. 11).

The coefficient of correlation for ratings of general appearance with wax layer was significant at less than the 0.01 level. For the two wax treatments, scores for these two characteristics were similar at the beginning of the period. After 2 weeks, scores for the two treatments remained similar for each of these characteristics but ratings for wax layer were higher than those for general appearance. Ratings for both characteristics increased after washing and buffing. Ratings for self-polishing wax for both characteristics reached approximately the level of the beginning of the period whereas those for paste wax were considerably lower than those at the beginning. This same pattern of change in these characteristics continued for these two treatments during the remainder of the 6-week period. Based on these observations it would appear that the self-polishing wax gave the homemaker a protective coating which remained on the floor and responded to washings and buffings during the 6-week period.

Scores at two additional observation times (nos. 3 and 5 in Appendix A, Table 7) after each of the two washings and before buffing, were obtained on self-polishing waxed floors only. Ratings at these times for general appearance were similar to scores of floors without wax which had been washed and buffed. After buffing, scores for both general appearance and wax layer increased considerably (Fig. 11).

The r value for ratings of general appearance with marks and dents was significant at the 0.06 level. The extent to which permanent marks and dents and/or removable marks influenced the scoring of general appearance cannot be determined. Scores for marks and dents for each of the three treatments varied less throughout the 6-week period than did scores for general appearance.

One difference in scores for general appearance and for marks and dents is related to wax treatments. There was little difference

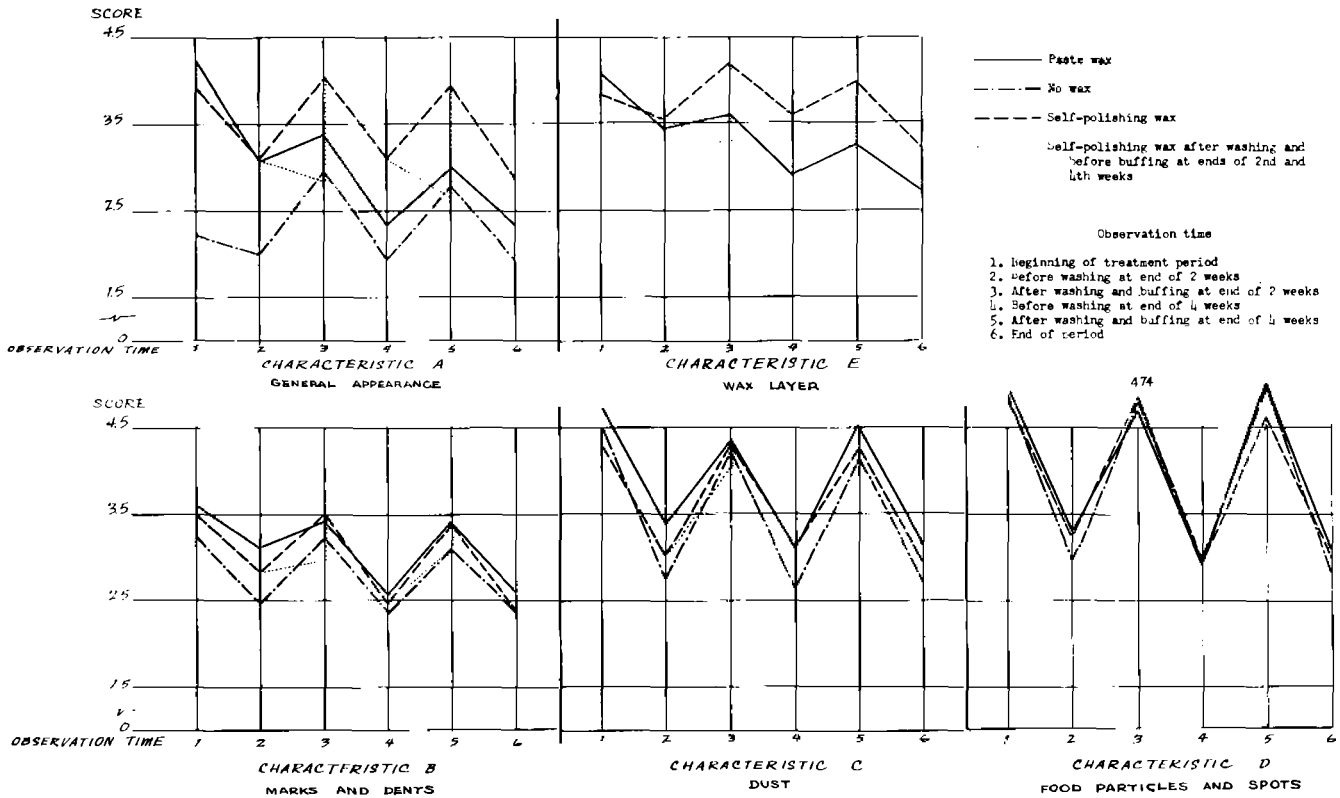


Fig. 11.—Comparison of scores of characteristics at different observation times during 6-week period.

in ratings of marks and dents due to kind of wax used whereas the ratings of general appearance showed considerable difference after the first 2 weeks. The no-wax treatment scores for marks and dents followed those of the wax treatments more closely than did general appearance scores.

Scores for dust and for food particles and spots followed similar patterns and the ranges of scores for both characteristics were greater than those for other characteristics throughout the 6-week period. Ratings for these two characteristics were not associated with general appearance scores as indicated by low and nonsignificant r values.

Since wax, if present, was removed at the beginning of each 6-week period, discoloration and stickness due to previous waxings were not encountered. The r value of general appearance ratings with discoloration scores was significant at less than the 0.025 level; the r of general appearance with stickness was nonsignificant. Mean values of both characteristics were quite high and distributions were skewed to the left.

Differences in ratings preceding washings and those after washings and buffings were highly significant for characteristics A through E and significant for F for each of the three treatments.

Mean scores of each characteristic were determined for floors which were identified by years in use. Scores usually decreased as the age of flooring material increased. Scores of general appearance for self-polishing wax were not significantly different for the three age groups; while for no-wax and paste, scores for the newest and oldest floor were significantly different. Scores for marks and dents for the three treatments were significantly different between "0 through 2" years and "11 or more" years. All other ratings except for food particles and spots were similar for the three age groups.

Reactions of homemakers. A frequency of responses of homemakers to items in the check list are given in Appendix A, Table 8. Some items with high and low frequencies need further consideration.

Of the 17 homemakers who preferred their own method to that prescribed for the no-wax treatment (item 1), 16 had used wax prior to the study, 13 of whom had used self-polishing wax. Ten of the 11 homemakers who preferred their own method to the prescribed paste treatment used self-polishing wax at the beginning of the study.

Prior to the study the predominating pattern of the homemakers who thought that the floor needed washing more frequently than every 2 weeks (item 2) had been that of washing the floor every 2 to 4 weeks and damp mopping at weekly intervals between washings. Damp mopping was described in various ways, use of several tools and water

ranging in temperature from hot to cold with varying amounts of detergen were mentioned.

Initially, 11 homemakers had been washing their floors on hands and knees. Six of the homemakers who found the sponge mop easy to use (item 4) had used it at the beginning of the study and five others had used string mops. One participant used a floor washer.

The satisfaction expressed by 17 homemakers with the appearance of self-polishing waxed floors at the beginning of the 6-week period (item 8) and after washings and buffinges (item 9) was supported by high scores for general appearance of floors at these observation times. The decrease in number of homemakers liking the appearance of paste wax floors after washings and buffings was associated with a decrease in scores for general appearance.

Twelve homemakers indicated that they thought that paste wax should have been applied more frequently than every 6 weeks, and only six indicated that more frequent applications of self-polishing wax were needed (item 10). From one to three coats of wax were used on each floor at the beginning of each wax treatment period.

During interviews following the study, homemakers were asked their preferences for the three floor treatments. Sixteen participants indicated strong preference for the self-polishing wax treatment.

SUMMARY

Objectives of the study were (1) to determine energy expenditures, blood pressures, and heart rates of women when performing floor-care activities on waxed and unwaxed floors; (2) to obtain an energy expenditure basis for selecting tools and methods for performing floor-care tasks; (3) to evaluate the appearance of floors and to obtain reactions of participants to prescribed floor-care practices during an experimental period.

Initially, information about floor care practices of 25 homemakers was obtained and used in determining some practices to be followed during the study and in comparing reactions of participants to the prescribed activities.

In the laboratory, samples of expired air were collected and analyzed for oxygen content for six subjects working under controlled conditions. Subjects performed floor-care activities for 5 minutes and then stood for a recovery period of three consecutive 5-minute intervals. The oxygen data were converted to energy costs for the duration of the activity exclusive of recovery. Mean energy expenditures in Calories per minute for each activity (dust mopping, sweeping, washing—

with a cloth on hands and knees, with a sponge mop, and with a floor machine—rinsing with a cloth on hands and knees and with a sponge mop, and buffing) were calculated since differences due to floor treatments were not significant. Measurements of blood pressures and heart rates were recorded also.

In the home study, 25 homemakers (the six laboratory participants and 19 others) followed prescribed practices and recorded time spent in kitchen floor-care activities (sweeping, dust mopping, vacuuming, washing with a sponge mop, applying self-polishing wax with a cotton chenille applier and paste wax with a cloth, buffing with a floor machine, and wiping spots and spills) for three 6-week intervals according to assigned sequences of treatments—no-wax, self-polishing wax, and paste wax. During each treatment period, appearance of floors was determined and reactions of participants to prescribed floor-care activities were obtained.

Data from the laboratory measurements may be summarized as follows:

For activities performed with only one tool—sweeping, dust mopping, and buffing—energy expenditures were 2.93, 2.66, and 2.03 Cal/min, respectively.

Energy costs varied with the use of different methods and tools for the same activity. Washing with a cloth on hands and knees required 3.72 Cal/min; with a sponge mop 3.07 Cal/min; and with a floor machine, 2.62 Cal/min. Energy cost when washing or rinsing on hands and knees was significantly greater than when washing or rinsing with a tool used in a standing position. Of activities performed on waxed floors only, costs of applying self-polishing and paste waxes on hands and knees were 3.30 and 3.81 Cal/min, respectively. Lower values were obtained with long-handle appliers—2.61 and 2.87 Cal/min when applying self-polishing and paste waxes, respectively.

Time, expressed as mean minutes per square yard, spent by the laboratory subjects in performing floor-care activities to completion varied for the activities. Washing floors with the household floor machine required more time and sweeping and dust mopping consumed less time than did any of the other activities.

When the mean energy cost for each task was calculated using time spent per square yard and the determined energy rate of each subject, energy expenditures were similar for washing with the floor machine and with a cloth on hands and knees. For example, washing floors protected with paste wax by these two methods required 3.993 and 4.326 Cal/sq yd, respectively.

Of the wax application activities, applying self-polishing wax with the cotton chenille applier, required the lowest energy expenditure rate.

In general, no relationship was found between changes in energy expenditure and changes in blood pressures and heart rates.

In the home study, records indicated that homemakers spent the most time caring for floors prepared with paste wax, 0.470 min/day/sq yd, compared with 0.320 on self-polishing waxed floors and 0.361 on floors without wax. The time for individual activities ranged from 0.001 min/day/sq yd in vacuuming a paste waxed floor to 0.136 min/day/sq yd for washing a self-polishing waxed floor with a sponge mop. For applying self-polishing and paste waxes, 0.040 and 0.073 min/day/sq yd, respectively, were spent.

Time spent in buffing was highest on paste waxed floors and lowest for floors with no wax, and the difference was significant. No differences were found in time spent in other floor-care activities when performed on either waxed or unwaxed floors.

For tasks performed by homemakers on floors in each of the three treatments, energy expenditures were calculated by multiplying mean time spent per day per square yard by the homemakers and mean energy rates of the laboratory participants.

The appearance of each kitchen floor was determined at regular intervals within each 6-week period. Characteristics evaluated were general appearance, marks and dents, food particles and spots, wax layer ,discoloration, and stickiness. Scores for general appearance were associated with scores for marks and dents, condition of wax layer, and extent of discoloration.

Favorable reactions of homemakers at the end of each 6-week period to statements describing the appearance of floors were supported by high scores of floor characteristics at beginning of treatments and after washings and buffings.

IMPLICATIONS

Results of this study indicated that body position of the worker while performing floor-care tasks was related to energy expenditure rate. The higher cost of working on hands and knees compared with standing may have been partially dependent on weight lifted and size of muscles involved. Laboratory subjects in this study were selected within limits for weight, height, and age. Data obtained on these subjects cannot be considered directly applicable for women who vary in body build from the limits used. Additional research is needed to determine the suitability of these results for women of other age groups and body builds.

Laboratory subjects performed floor-care activities at their own rates of work in this study. For a person who works at a fast rate, these results may not be applicable since these women worked at slow to moderate rates.

In this study, energy costs of floor-care activities performed for 5 minutes may be considered within the range of very light and light work. Further research is needed to determine the energy rates for varying lengths of time spent in activity performance and the relation of these rates to recovery.

A continuous recording device for determining heart rates during an activity would show changes in rates which were not possible in this study, and might give a basis for using heart rate as the criterion for limits within which persons would work over a period of time. The correlation of energy cost and heart rate might be used as an indication of intensity of activity.

In comparing tools for given tasks, the rate of energy expended and energy cost per job may be used as criteria. With a given tool, efficiency in terms of energy cost may be determined for different ways of using the tool. This approach may also be of interest to manufactures in designing tools which complement the physical characteristics of the worker.

The appearance of floors may vary with methods and tools used in floor-care activities. For optimum satisfaction, homemakers may find the use of complementary floor-care practices more desirable than the routine performance of tasks. Use of a glossmeter or reflectometer for determining appearance of floors would give more objective measurements than was possible with the rating scale.

The acceptance of responsibility for the performance of floor-care activities and the motivation needed for the execution of various floor-care tasks are important factors in understanding reactions of homemakers in caring for floors. Additional work is needed to further understand reactions of homemakers toward floor-care activities as well as other household tasks.

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APPENDIX A

TABLE 6.—Calories Per Hour of 6 Subjects When Performing Floor-Care Activities.

Activity	Subject A	B	C	D	E	F	Mean
No wax							
Sweeping	165	177	189	194	199	164	181
Dust mopping	149	140	150	177	196	162	162
Washing							
Cloth, on hands and knees	214	220	221	236	220	206	219
Sponge mop	174	170	187	200	179	174	181
Floor machine	130	136	138	203	169	157	156
Rinsing							
Cloth, on hands and knees	183	197	206	243	236	229	216
Sponge mop	163	154	198	212	169	163	177
Buffing	118	123	116	145	154	102	126
Self-polishing wax							
Sweeping	161	198	159	157	179	181	173
Dust mopping	117	163	150	161	154	160	151
Washing							
Cloth, on hands and knees	201	230	232	270	201	253	231
Sponge mop	125	189	196	209	185	188	182
Floor machine	116	168	136	177	157	149	151
Rinsing							
Cloth, on hands and knees	173	229	204	316	227	253	234
Sponge mop	176	182	179	233	153	188	185
Buffing	120	133	86	161	132	106	123

TABLE 6. (Continued)—Calories Per Hour of 6 Subjects When Performing Floor-Care Activities.

Activity	Subject A	B	C	D	E	F	Mean
Paste wax							
Sweeping	168	181	165	181	160	185	173
Dust mopping	129	155	159	194	176	178	165
Washing							
Cloth, on hands and knees	184	213	212	265	188	251	219
Sponge mop	143	202	187	207	186	214	190
Floor machine	124	166	140	208	174	179	165
Rinsing							
Cloth, on hands and knees	192	212	213	325	221	234	233
Sponge mop	148	176	186	231	149	198	178
Buffing	104	133	94	150	111	106	116
Wax treatment only							
Waxing--(self-polishing wax)							
Cloth, on hands and knees	155	194	181	247	198	214	198
Cotton chenille applier	152	161	144	190	122	170	156
Waxing--(paste wax)							
Cloth, on hands and knees	186	209	231	260	246	241	229
Lamb's wool applier	129	165	168	220	180	172	172

TABLE 7.—Mean Scores of Characteristics at Each Observation Time During Experimental Period.

Observation time	Characteristic						
	A	B	C	D	E	F	G
1. Beginning of treatment period							
No-wax	2.20	3.25	4.51	4.82			
Self-polishing wax	3.92	3.50	4.36	4.80	3.83	4.74	4.93
Paste wax	4.22	3.59	4.75	4.88	4.11	4.71	4.88
2. Before washing at end of 2 weeks							
No-wax	2.00	2.44	2.80	2.93			
Self-polishing wax	3.10	2.80	3.04	3.15	3.56	4.57	4.88
Paste wax	3.08	2.86	3.42	3.23	3.47	4.48	4.90
3. After washing at end of 2 weeks							
Self-polishing wax	2.86	2.96	4.09	4.74	3.23	4.62	4.90
After washing and buffing at end of 2 weeks							
No-wax	2.97	3.21	4.31	4.74			
Self-polishing wax	4.06	3.47	4.36	4.81	4.21	4.72	4.94
Paste wax	3.38	3.40	4.40	4.69	3.59	4.54	4.94
4. Before washing at end of 4 weeks							
No-wax	1.92	2.34	2.60	2.84			
Self-polishing wax	3.07	2.46	3.16	2.92	3.59	4.54	4.78
Paste wax	2.34	2.54	3.15	2.94	2.94	4.58	4.75
5. After washing at end of 4 weeks							
Self-polishing wax	2.65	3.12	4.15	4.53	3.22	4.72	4.90
After washing and buffing at end of 4 weeks							
No-wax	2.79	3.10	4.15	4.68			
Self-polishing wax	3.96	3.34	4.27	4.56	3.99	4.73	4.98
Paste wax	3.00	3.38	4.54	4.73	3.27	4.55	4.87
6. End of period							
No-wax	1.91	2.40	2.66	2.82			
Self-polishing wax	2.86	2.38	2.90	2.94	3.25	4.55	4.81
Paste wax	2.32	2.62	3.13	3.00	2.72	4.47	4.75

TABLE 8.—Frequency of 24 Homemakers' Responses to Check List Items on Kitchen Floor-Care.

Item	Floor treatment			Total homemakers checking item
	No-wax	Self-polishing	Paste	
1. Prefer own method of kitchen floor care to prescribed method	17	4	11	18
2. Feel floor needed to be washed more frequently than once every 2 weeks	19	10	9	21
3. Believe floor needed to be rinsed after it was washed	4	2	4	6
4. Found sponge mop easy to use	17	21	21	23
5. Like results obtained when washing floor with sponge mop	14	17	16	18
6. Would like to have been able to remove shoe marks from floor	13	12	14	17
7. Would like to have been permitted to buff floor more frequently than once every 2 weeks	8	11	9	16
8. Was pleased with appearance of floor immediately after treatment was given at beginning of this 6-week period	9	17	18	23
9. Like appearance of floor after it was washed and buffed at the end of the second week and at the end of the fourth week of this period	11	19	9	22
10. Believe floor needed waxing more frequently than once every 6 weeks	. .	6	12	13

APPENDIX B

Date_____ Hour_____ Family number_____ Method of floor care_____ Rater_____

RATING SCALE FOR KITCHEN FLOORS

We want you to score your kitchen floor as it seems to you, not to anyone else. Look at your kitchen floor closely and test with your hand for the feel of the floor surface; encircle the number that best describes the condition of the floor.

For example, to score item A below when the floor surface is slightly glossy and smooth you would give a rating of 3. On the other hand, if the floor condition is better than the rating of 1 and not high enough to receive a rating of 3, then a score of 2 would be given. Likewise, a rating of 4 would be given when the condition of the floor would be above a rating of 3 and below the rating of 5 which indicates that the floor has a high or satiny even gloss.

A. General appearance	Dull, streaked porous surface	1	2	Slightly glossy, and/or streaked, smooth surface	3	4	High or satiny even gloss	5	Comments
B. Marks and dents	Conspicuous and permanent marks, scratches, and/or dents	1	2	A few small dents and/or scratches; removable marks	3	4	Free of marks, scratches, and/or dents from shoes, furniture or other objects	5	
C. Dust	Very dusty under kitchen table, in corners, in toe spaces; a noticeable amount of mud and/or grit tracked on or ground in	1	2	Somewhat dusty or gritty all over or under kitchen table, in corners, in toe spaces; a small amount of mud or grit tracked on or ground in	3	4	Free of dust and/or mud; smooth to touch	5	

RATING SCALE FOR KITCHEN FLOORS (Continued)

									Comments
D. Food particles and spots	A noticeable amount of food particles or spots due to liquids near work centers and eating area	1	2	A small amount of food partciles or spots due to liquids near work centers and/or in eating area	3	4	Free of food particles and spots	5	

If there is any wax on the floor, continue scoring on these 3 characteristics.
If there is **no** wax, disregard this part of the score card.

E. Wax layer	Decidedly streaked with wax and/or appears to have a very heavy coat of wax	1	2	Somewhat streaked due to too much or too small an amount of wax	3	4	Completely free of wax streaks; appears to have a thin uniform layer of wax	5	
F. Discoloration	Very discolored due to coats of old wax over the entire floor, near base-boards and appliances, in corners, in toe space areas	1	2	Somewhat discolored over free floor space or near base-boards and appliances, in corners, in toe space areas	3	4	Absence of discoloration due to coats of old wax	5	
G. Stickiness	Quite sticky over entire floor area *or in particular areas*	1	2	Somewhat sticky where there is *no traffic*	3	4	No trace of *stickiness*	5	

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RESEARCH METHODS FOR STUDY OF HUMAN COSTS OF HOUSEHOLD WORK:

DEVELOPMENT AND USE AT CORNELL UNIVERSITY

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Research Methods for Study of Human Costs of Household Work: Development and Use at Cornell University

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In the continuing search for ways to moderate the work of homemakers, descriptions and measures of the time and effort required to accomplish their work provide a basis for appraising a worker's input. Requirements and activities differ, however. Some homemakers, preferring to use their time and effort in other ways, want to limit their input for domestic tasks, while others, because of physical limitations, must restrict their input. Knowledge of the effect of different procedures and working conditions on worker input makes possible intelligent choices in efforts to reduce necessary work to a minimum.

Changes in social conditions and patterns of living also emphasize the need to know how to minimize the human costs of household work. More and more, women are joining the labor force with the result that they have less time to allocate to household work, and other family members contribute more help. Not only homemakers, then, but also husbands and children can benefit directly by applying knowledge about human costs of work to homemaking activities.

The study of household work can be justified on its own merits. However, when the focus is on work, the implications need not be limited to workers in a given situation. In addition, the methods of study have universal use. In industry, both management and labor are concerned with the problem of human input as are the medical profession, the armed forces, and the physically handicapped — to identify a few besides those in home management. In each area different dimensions may complicate the problem of study of input; in industry, for example, piece rates, pacing, human relations, and job concept may have wide ramifications; in the home, lack of quality controls may intervene. Since the problem of minimizing the costs of work to the individual is common to many areas, a mutual exchange of knowledge and methods in the study of human resources is essential.

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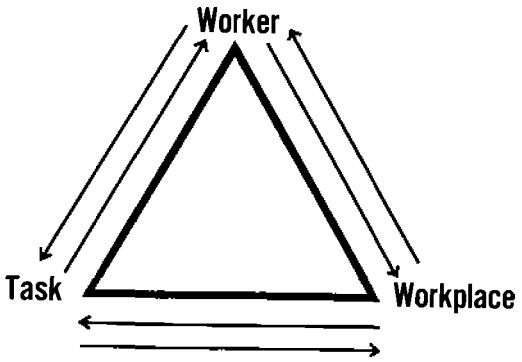
Measurement of worker input requires study of the components of work: the worker, the activity or task, and the workplace. In a specific study, one component may be given major attention, and at the same time knowledge is gained about the other components. Being interrelated they cannot be completely isolated. Each affects the other to some extent:



The workplace is studied to determine the conditions that expedite the activity, exert the minimum of strain on the worker, and require minimum effort. Thus, such aspects as the location in vertical and horizontal space, the spatial arrangement of parts, amount of space for work and storage, and specific features are examined. When focusing on the worker, knowledge is sought concerning the demands placed on the individual by the particular activity and by controlling the interplay with other activities. The number, variety, and duration of positions, feelings about the activity and the conditions for doing it, amount of judgment, skill, organization, attention, effort, and similar elements are studied here.

The task itself is studied to determine the amount and use of time and space; the spacing of the parts of the activity; the interplay with other activities; the materials, processes, and tools involved; the type of activity; the place of work; the person doing the activity; and the facilities used.

Study of the components of work involves measurement of physical, physiological, and psychological factors. The interrelationships among these factors are not clear. Measurement of a single dimension of a factor is generally inadequate since more than one dimension of a given factor as well as more than one factor probably enter into the cost. Identification of all factors involved and the dimensions of each continues to be a difficult problem.

The significance of each amount of change occurring with each indicator or measure is another problem of work measurement. Units of measurement vary with the factor — seconds for time, inches for distance, and cc of oxygen for energy expenditure, for example. A small change may be meaningful with one indicator of input but not with another. The importance of the changes may also vary with the individual because of the interplay among factors involved.

The purpose of this bulletin is to scrutinize a number of research methods presently used for studying the human costs of household work. Technical aspects of obtaining and analyzing data for some methods are included. De-

tails of most methods are necessarily omitted. The reader needing more information should find the Cornell University Agricultural Experiment Station bulletins and memoirs in the libraries of land-grant colleges and universities and in many other libraries. Cornell University theses may be borrowed on interlibrary loan. Many libraries have facilities for duplicating these source materials in whole or in part.

Only the methods developed or used at the Cornell University Agricultural Experiment Station and in the Department of Household Economics and Management are included. They were used most often in the study of the functional design of kitchens. The author assumes the responsibility for the interpretations given here and trusts that the reader will recognize the contribution of many other researchers in the development and use of these methods.

Basic processes of research that are common to this and other areas are not included, since references with such information are already available.

Descriptions and Measures of Work

Measures vary in the information they yield. They provide the means for analyzing different aspects of a problem. The choice of an appropriate measure requires knowledge of what elements of input each measure is estimating or assumed to be indicating. A further consideration is the component of work receiving primary attention. Many measures provide information about more than one component of work. The manner in which some measures and descriptions of work function in the identification of the costs of work are discussed in this section.

The descriptions and measures are organized into 3 major groups: movement, task, and evaluations. The measures within each group have in common the same general point of departure for attacking the problem of worker input:

Movement — amount, pattern, and quality of movement.
Task — duration, description, and analysis of activity.
Evaluations — worker's feelings about input and related conditions.

Measures within each of these groups contribute information about the 3 components of work: worker, task, and workplace.

Movement

Trips. The amount of movement from place to place provides a general measure of physical work. The amount of movement is grossly described by the number of trips or times a person walks between places of work and the number of reaches between work surfaces, storage areas, and appliances. The amount of movement is further quantified by measuring the distance walked or reached.

Trips may also indicate psychological demands placed on the worker, since each trip represents a start and a stop in work. Attention must be shifted from the work being done when a trip is made. Action is interrupted.

The total number of trips provides a gross comparison of different conditions and methods of work but does not identify high cost factors. Excessive movement may be associated with a poor situation related to one or more of the following: (a) the workplace — its placement in relation to other workplaces and its frequency of use; adequacy of work surface for the activity carried on; adequacy of storage space for the items used first at the workplace; appropriateness of supplies, tools, and utensils for the activities carried on at the workplace; the organization of the items used there; (b) the worker — work plan, body mechanics, skill, procedures; and (c) the activity — the materials, supplies, or equipment used; and the quantity of work done.

The significance of the differences in number of trips may be influenced by the total number involved, repetitiveness of the task, importance of the task in homemaking, and importance of minimum input.

Pattern of movement. Many tasks require the repeated use of a number of functional areas or "centers" — areas provided with storage space, work surface, equipment, and supplies for particular processes. The pattern of movement between and among these centers provides a meaningful basis for decisions about their arrangement. Adjoining functional areas that are used repeatedly facilitate carrying on the processes, or facilitate the "flow of work". Lower worker input can be achieved by arranging the centers so that the most frequent trips require the shortest distances.

Choice of center to locate first can be guided by the frequency of use since this is one indicator of relative importance for carrying out the tasks. Choice of centers to connect and group together can be based on the frequency of trips between centers, the sequence of use of centers, the consecutive use of pairs of centers, and the part of the center used first. Further details of these methods of studying trips may be found elsewhere (10, 16, 21, 23, 29).

The presence of "functional areas" or "centers" has been assumed in the preceding discussion of analyzing pattern of movement. For meal preparation and cleanup, trips between parts of centers — storage, work surface, and appliance — can be almost as frequent as trips between centers (28:14; 29:34). The interrelatedness of the parts of a center emphasizes the practical importance of organizing workplaces before determining how to place them together. Trips and distances traveled can be kept lower when the parts of a center are together, and interruptions in work, delays, and wasted time can be avoided. Ridder (18, 19) established the continuing need for helping homemakers become aware of the possibility of such savings. Her method of sketching the floor plan to scale during an interview and use of a letter-number code to locate work surfaces, storage spaces, and items was ingenious.

Energy expenditure. Energy expenditure measures total muscular activity, not fatigue. Some research workers have used energy expenditure to compare methods of work and design of workplaces in terms of severity of cost to the body. Nutritionists have measured energy cost or caloric expenditure to determine the caloric requirement for the activities of various occupations. Physiologists have the added interest in metabolic studies in determining human working capacity. Some physiologists believe that:

> . . . in order to prevent evidence of fatigue the intensity of the working rate and the length of the compensating rest pauses must be so adjusted as to give gross over-all rates of energy expenditure of not more than 5 Cal/min. This they call an 'endurance limit.' It represents approximately the upper limit of work that can be performed without an increasing accumulation of lactic acid and without a rise in body temperature. It corresponds approximately to walking on the level at about 3.8 mph. A man . . . should be able to maintain an over-all working rate of this order for 6 days a week, week after week, and year after year. It is equivalent to a daily walk of about 30 miles. (p. 833)[1]

Both rate of energy expenditure and duration of activity, then, must be taken into consideration with respect to physical fatigue. Bratton (3:102) reported: "Four calories [sic] per minute has also been given as the critical rate. Most homemakers, using only the most common mechanical appliances, probably do not often reach the four calories [sic]- per-minute level, and then not for any extended period." She concluded that (for studies of work in American homes) energy metabolism or energy-cost measurements, which represent only a *rate* of oxidation, do not provide a suitable objective evaluation of work method and equipment design. When the rate is 1 or 2 or 3 Calories per minute, the small differences in energy cost appear unimportant for the well person. A positive relationship between small increments in energy cost and strain might possibly be established by research. At the present we are not justified in assuming a direct relationship.

Energy index. To estimate oxygen consumed, or energy expended, by a worker when reaching and bending, Mize (16, 17) developed an energy index. Data from the early study by Crew (8) or Bratton (1) provided the basic information for the equations. The energy index was planned to reflect extent and frequency of reaches and bends for comparing designs of storage areas and organization of stored items.

Alignment of body parts. A more nearly normal posture can be maintained when objects are lifted, carried, or used close to the body, thus minimizing muscular work and strain as well as risk of injury to intervertebral discs and back muscles. In normal posture, the 3 major body weights — the head, chest, and pelvic or hip sections — are balanced over the base of support; the proper alignment of the weights requires a minimum of muscular effort to hold the body upright. Objects that are carried or lifted become a part of the body weight. Bending the body, extending the arms, and lifting objects change the body's center of gravity, increasing the effort

[1] Passmore, R., and Durnin, J. V. G. A. Human energy expenditure. Physiol. Rev. 35:4:801-840. 1955.

Figure 1. **Worker with anatomical points marked for measurement of positions.**

For angle of bend, points lettered A, B, and C were used. For angle of upper arm lift, points lettered X, Y, and Z were used. The vertex of each angle was at the second letter in the series.

In the study from which this figure came (22), anatomical marks were made for exploratory work in addition to those for angle of bend and angle of upper arm lift. The floor and background were marked to determine space use.

to maintain balance or position, and causing muscular fatigue (5, 6). Knowledge of the extent and duration of uncomfortable deviations from normal posture are obtained by measuring the angle of bend and angle of arm lift (2, 4, 7, 11, 12, 16, 17, 22). These measures indicate muscular effort, a factor in fatigue, and help evaluate the working conditions.

Little work has been done to measure the strain of working from a twisted position. It deserves attention since there is danger of damage to intervertebral discs.

Angle of bend and angle of arm lift are determined by connecting certain anatomical points (figure 1). The marks from which these angles are measured should be placed at anatomical points so that they are standard from person to person and from time to time. Otherwise, data may not be comparable. Markings are placed on the worker, a motion picture made, and a transparent protractor is used on the projected image to determine the angle. Black masking tape has been satisfactory for marking the person.

The anatomical marks used to determine angle of bend are the temple, the furthest projection of the hips, and the center of the ankle bone (A, B, and C, respectively, in figure 1). Mize (16) reported her method of measuring the angle of bend from memomotion films at a projection table — an improvement of the method used by Knowles (11, 12) and Crew (7).

Bratton (4:17, 18) gave a detailed description of her method of determining the angle of arm lift. She used the following marks for measuring the angle of upper arm lift:

1. At the outermost point of the acromion.
2. On a line running from just beneath the armpit to the waistline, placed perpendicular to the floor with the use of a plumb line.
3. At the protrusion of the elbow joint on the outside of the arm, made by the intersection of a line running down the outer arm from shoulder to elbow and a line running down the outer forearm to the wrist. (4:18)

(In figure 1, letter Y corresponds to number 1 in Bratton's list, X to 2, and Z to 3.)

The range of normal, comfortable positions must be obtained from each subject during the test periods, as well as the evaluation of deviations from normal positions. This information is basic to the interpretation of results.

Task

Time. Knowledge of when and where the greatest time costs occur helps to evaluate the use of time. Knowledge of time periods may be useful in studying the shifts in attention and the maintenance of attention — both fatigue factors. The importance of time differences may be related to the total involved, the size of units comprising the total, repetitiveness of the task, proportion of time for homemaking tasks, and the importance the homemaker attaches to the job and minimum time input.

Total time is a comparatively gross measure of input in that it may not help identify time costs related to work methods, work conditions, supplies,

materials, or equipment used. Time for parts of tasks may be needed for this.

The duration of activity at a workplace provides one general measure of the continuity of work — the amount of starting and stopping — and the organization for work (9, 16, 17, 23, 24). Total time for each use of a workplace, however, does not indicate the shifting from one task to another or from one type of activity to another; subunits of the total time at the workplace give this (23:120–151). Increased continuity of work may reduce time for work and make it easier to do because less shifting of attention is required. Extremely long periods of time, however, could be a disadvantage either because attention is not shifted, or continued standing is physiologically undesirable. (Bratton discusses the latter in 4:11, 12.)

Time for trips reduces time for productive work. Each trip represents a stop and a start in work. Attention must be shifted, and this may contribute to fatigue. With trips, the rhythm of work is broken: one tends to slow down to approach and stop at a center, and to turn to leave the center; slower motions tend to be made to start the first work at a center and to complete the last work there (9, 23, 24, 25).

Time for parts of tasks and types of activity describes the makeup of a task and may suggest where attention is needed to reduce the time input (16, 21, 23, 25, 28). For example, the proportion of time may be excessive for storage work, the preparation for doing the task, the performance of the task, or the cleaning up.

Knowledge of the time for maintenance of comfortable and uncomfortable positions during work helps assess the ease of using workplaces or doing a task. The duration of uncomfortable positions provides a measure of strain imposed on the worker by the workplace or the task.

Type of activity. In work study, the purposes of classifying activities can be to determine and evaluate the proportion of each type, the duration of each, and the pattern and place of occurrence; to relate to the preferences of the worker, work methods, and working conditions; and to compare tasks.

The frame of reference used in examining activity determines the description of type of activity. One of the more general characterizations of activity is preparation *versus* cleanup. A related but not identical frame of reference was used with "phase of activity" (23, 25) to obtain detailed information for meal preparation and cleanup about the getting ready, the doing, and the putting away — the 3 main steps of many operations. Activity was classified into 6 categories: get out, prepare and serve, cleanup get ready, clean up, put away, and care of hands. Decreases in the amount of getting ready to do a job, or cleaning up after a job, or putting away were considered advantageous because a smaller proportion of effort and attention would be used on the less creative aspects of the work.

The continuity of action on a "job" provided another point of view for work analysis in the same study (see "results of trips" in 23, 25). It was thought that each job would probably be easier to do if it were pos-

sible to continue working on it at fewer centers and without unplanned stops, or if it had to be given attention fewer times. The number of jobs worked on during the use of a center was another aspect of continuity. Less walking around the kitchen and smoother flow of work might result if more than one job could be worked on during each use of a center.

Reports of procedures used in cleaning the living room were analyzed for continuity by Roberts (20:140–141). Her categories were: completed cleaning operations, interrupted cleaning operations, and continued cleaning operations. The focus was on each cleaning operation, such as dusting or using the vacuum cleaner, and whether or not the homemaker completed it before doing another in the living room or another room.

Continuity of action for the day's activities has also been examined (30, 31). Homemakers' reports of yesterday's activities and time, as recorded by Wiegand (36, 37), provided the basis for analyzing the number of blocks of activity and time, number of activities, duration of blocks of time, repetition of household activities, and patterns of activities and blocks of time. Such information describes the homemaker's job and suggests psychological demands.

Other classifications of activity have been based on:

- Representative processes involved in work done at a mix cabinet when stored articles were removed from and replaced to assigned storage locations (getting and measuring 1 cup of flour; getting and measuring 1 cup of sugar; assembling and replacing food supplies used for cake making; assembling and replacing utensils used for cake making) (16:103).
- The purpose of using kitchen and china storage areas (to get or replace items) and the quality of work (extra handling involved or not) (26, 28).
- The type of activity for preparing foods for and from the freezer (assembly, manipulation, cooling, panning, packaging, thawing, and baking) and cleaning up activities (21:19, 20).
- The location of ironing activity and related activity (on the surface of the board, above the surface, off the board) (5:17).
- The components of action for household tasks (reaching, bending, pivoting, stepping up) (1, 8).
- Kind of cleaning operations — mechanized (done by hand or through use of vacuum cleaner); the nature (preparation or performance); and place or item cleaned (floors, furniture, walls) (20:134).
- Frequency of cleaning ("day-to-day" — all tasks done more frequently or as frequently as each homemaker's general cleaning) and item or place cleaned and process (making beds, putting house in order, cleaning bathroom, dusting furniture, dusting floors, cleaning rugs and carpets, sweeping floors, and wet-mopping floors) (15:11, 65).

Rate of work. An optimal rate of performance is a rate of work at which the cost of work to the individual per unit of output is at a minimum.[2] The optimum pace for a homemaker may represent a balance between minimum personal input and necessary output.

The relationship between time and quantity of work permits an objective comparison of work methods, working conditions, materials, equipment, and

[2] See *Principles of Industrial Psychology*, p. 422, by Thomas A. Ryan and Patricia C. Smith. Ronald Press, N Y 1954.

other factors that might be associated with rate of work. The relationship between output and positions for working were compared by Bratton in a laboratory study (2, 4).

"Work units" and "index of accomplishment" have been computed from homemakers' reports of use of time to provide a basis for comparing time costs in the household (32, 33, 34, 35). Since a work unit in homemaking was defined as the amount of household work done in 1 hour under average conditions by an average worker, the work units permit a homemaker to compare her rate of work with an average. Quality of work is not considered. The index of accomplishment or labor efficiency converts the time used to a common scale for comparison against the average. Neither the work unit nor the index of accomplishment identify the factors causing high input by a given homemaker.

Evaluations

The worker's evaluations provide information that cannot be obtained by observation or by objective measures such as trips or time. Knowledge of how an individual feels about a particular situation, procedure, or item supplements information obtained from objective measures and may help to interpret differences in the latter.

A worker's evaluations can be obtained by asking open-end questions and by encouraging her to make evaluative comments while the activity is being done. Mize (16:112–120) used the latter technique to apply management principles in the use of storage space and to obtain information about design limitations and imperfections and acceptance of specific features. Snow (21:36, 120–126, 197) used open-end questions to obtain the worker's reactions to work procedures and situations.

Ratings and rankings quantify the evaluations, making it possible at least to order or rank the evaluations and determine the relative position of the worker concerning the working situation, method, or materials. Steidl (23:31–36; 25) used graphic rating scales, rankings, and percentage scales to obtain the cooperator's comparative judgments; open-end questions were also used to obtain information that was not covered by the scales and to provide an opportunity to explain the evaluations. Maloch (13, 14)[3] used graphic rating scales and open-end questions in studying characteristics of household tasks. Roberts (20) determined intensity of homemakers' feelings toward certain statements by using a 5-fold intensity response system.

One difficulty with subjective data is the consistency of influence on ratings from transient personal factors such as health, mental set, and tiredness. Establishing a base line for each test period may be desirable to estimate influence of transient personal factors on differences in ratings.

Evaluations by persons other than the worker are also useful. The ad-

[3] After this manuscript was prepared, an additional reference became available that might be more accessible than reference 13 or 14: Maloch, Francille. 1963. Characteristics of most and least liked household tasks. J. Home Econ. 55:413–416.

ditional information may supplement or reinforce the worker's evaluations. Different experiences and preferences are brought to bear on the problems. More problems may be visualized than are actually encountered during laboratory testing. Examples of the use of evaluations by persons other than the worker may be found in theses by Mize, Snow, and Steidl (16, 21, 23).

Recording the Data

Data for some descriptions and measures of work can be recorded using only paper and pencil for a written record, whereas others require more elaborate or even specialized equipment (table 1). The purpose of this section is to provide some specific and practical information to help in choice of techniques for initially recording the data. Particular attention is given to the memomotion film technique since information for many of the descriptions and measures of work can be obtained from the films. The pioneering work in determining such usefulness was done by Mrs. Mary Koll Heiner and her colleagues.

Table 1. **Methods of recording data for descriptions and measures of work**

Descriptions and measures of work	Selected methods of recording data			
	Written record	Stopwatch readings	Still picture	Motion picture
	(A)	(B)	(C)	(D)
Movement				
Trips				
total number	x			x
distance	x*			x*
Pattern of movement				
between centers	x			x
sequence of centers	x			x
frequency of use of centers	x			x
part of center used	‡			x
Alignment of body parts				
angle of bend				x
angle of arm lift				x
twists				x
Energy expenditure†				
Task				
Time				
total		x		x
trips		‡		x
work at centers		x		x
parts of tasks		x		x
type of activity		x		x
Type of activity				
type	x			x
time		x		x
sequence	x			x
Rate of work	x + B	x + A		x
Evaluations				
Open-end questions	x		x + A	x + A
Rating scales	x		x + A	x + A

* Basic distance between places must be measured from a drawing or at the place, then multiplied by number of trips.
† Standard equipment used to measure metabolic rate.
‡ May be possible but not tried at this experiment station.

Memomotion film technique

In 1947, Mrs. Mary Koll Heiner heard Dr. Marvin E. Mundel describe his new technique during the National Time and Motion Study Clinic held by the Industrial Management Society in Chicago, Illinois. Mrs. Heiner appreciated the potential of this special form of micromotion study for home management and housing research. During the year following the Chicago meeting, Mrs. Heiner was able to procure the equipment needed for taking the films and analyzing them. She directed the first home economics study using it in the spring of 1949 (9).

A memomotion film is a motion picture film exposed at less frequent intervals than the common rate of 16 frames per second in micromotion films. Memomotion films are commonly made at the rate of 1 frame per second, but also at 10 frames per second. Each "frame" is a picture exposed for a fraction of a second.

A memomotion film provides a series of pictures of a particular situation which can be studied to determine what activity was being done, how it was done, what was used, who was doing it, who else was present, and exactly where it took place. The duration of the activity and the sequence of events can also be determined.

Time can be determined most directly by obtaining a count of the number of frames on the film for the unit of activity being studied. When 1 frame of the film is briefly exposed every second during the observation period, the number of frames counted can be equated to the number of seconds. Reference to a clock in the camera field may also provide information about the passage of time.

Techniques other than the memomotion film are often simpler to use in obtaining a record, quicker to analyze, and require less expensive equipment. What, then, are the advantages and disadvantages of using this technique?

A memomotion film has these advantages:

- It provides a fairly permanent record.
- It can be analyzed for a variety of types of information.
- Observations can be verified.
- It permits reviews of activity which may suggest additional information that will contribute to the solution of the problem or help identify other problems.
- The analyst has less film to review, since it is a more condensed record than a micromotion film.
- Undesirable conditions may be emphasized, since motions are jerky and accentuated.
- It is not necessary for an observer to be present during a trial to record what a subject does.
- An hour's activity can be reviewed at normal speed of 16 frames per second in 4 minutes, thus permitting a quick overview of a trial.
- It is well suited to problems that do not require as detailed analysis as permitted by a micromotion rate of 16 or more frames each second.

One of the major disadvantages of memomotion films may be the invest-

ment in the equipment for taking and analyzing the film. Occasionally this is bypassed by making arrangements for personnel from another department or research project to take the films with their equipment and to loan the equipment for analyzing the films. Other disadvantages may be:

- Supplies add to the cost (film, processing, and possibly photographic light bulbs).
- Setting up the camera and other work with photographic equipment require extra time.
- Filming small spaces is difficult.
- Time elapses between exposure and development of the film.
- Knowledge of photography and skill are needed for getting the desired record.
- Equipment may break down.
- Patience and precision are needed in analyzing the film.
- Time is required to obtain the data from the film (the amount and type of data influences the time, of course).
- Because the record is intermittent, an occasional problem arises in determining the action during the unrecorded periods.

As with any method, it is essential to record the data properly to obtain the desired information. Therefore, preliminary testing in the form of pilot films is just as necessary with memomotion films as with most other research techniques.

The filming of the activity may affect the behavior of some subjects just as the presence of an observer and the sounds accompanying other record-taking will distract some subjects more than others. The making of a motion picture film is generally accompanied by the noises from the equipment and possibly by interruptions to replenish the supplies for the equipment. The additional light required for good exposure of some photographic films may be disturbing and uncomfortable. On the other hand, the subject may be left alone while the memomotion equipment makes the record so that the observer is not a factor in the situation.

Equipment. An investment of more than $1000 in motion picture camera and accessories and another $1000 in equipment for analysis of the films is not unusual. At the present time, the retail cost for a 100-foot reel of 16-mm. black and white reversal film, including processing, is about $10. The 100-foot reel provides film for 1 hour at the rate of 1 frame per second.

The initial investment in photographic equipment may be off-set by increased accuracy and variety of information. Also, the number of observation periods and observers needed to record data may be decreased. At any time, the amount of activity that 1 observer is able to follow is limited and may not suffice for all measures needed. For example, if data are needed concerning the centers used, activity at each center, and time for the work and walking, 2 observers would probably be able to record sufficient detail, but a check on a majority of the details of the records would not be possible.

Description of motion picture cameras and accessories can be found in

various books, including Barnes',[4] Mundel's,[5] and Shaw's.[6] Essential items include: 16-mm. motion picture camera with wide-angle lens, a synchronous motor drive, a sturdy tripod, and light meter.

Essential features in the projector used for analyzing the film are: single frame advancement, forward and reverse operation, operation at slow and normal speeds, built-in heat absorber to permit prolonged examination of a frame, continuously operating fan to cool projection lamp, frame counter, easy re-set of frame counter to zero, and frame counter that will subtract digits when projector is operated in reverse as well as add digits when projector is operated in forward position.

A relatively inexpensive item, but a major contribution to greater ease of analyzing film, is a "projection table" (figure 2). Its design permits analysis of the projected image at the worker's writing level. The plan was developed first for Mize's research (16:86–88). The principles used in a commercial table-top model inspired the development. When a projection table is not available and the image is several feet from the analyst, the measurement of positions or distances on the screen is rather difficult.

Analysis time. The time needed for analyzing the film varies with the type and quantity of information needed. In the supplementary sink study (23:49), between 3 and 3½ hours were required to record frame numbers for the start and end of work at each center used during a trial. (A trial was the preparation, serving, and cleaning up of a simple dinner menu and took about 1 hour, 15 minutes.) Centers were used approximately 100 times so that 200 decisions were made and recorded. The centers used and gross description of the activity had been recorded during the work period. Not so much time was needed to check the analysis as to do it, but about 1½ to 2 hours were needed. The digits from the frame counter were already recorded, but just as many decisions had to be made. In the analysis of the same film for "phase of activity", about 16 hours were needed to record and check the phases and the frame numbers for the work for 1 meal (23:360).

In another study (26, 27, 28) of the activity for a dinner, 20 hours were needed either to analyze 1 trial, or to check it. The analysis was complex for there were several workers, each of whose activity was studied and recorded, and more details were obtained concerning place of work.

Time needed to measure the worker's positions has apparently not been recorded, but again this would be time consuming. The protractor would have to be positioned, read, and data recorded.

Frame-by-frame analysis of film is costly in time, but it is not the only method of analysis that is time consuming. Classification of data obtained from open-end questions during interviews is another example.

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[4] Barnes, Ralph M. Motion and time study. 4th ed. John Wiley & Sons, Inc., N. Y. 1958.
[5] Mundel, Marvin E. Motion and time study: Principles and practice. 3rd ed. Prentice-Hall, Englewood Cliffs, N. J. 1960.
[6] Shaw, Anne G. The purpose and practice of motion study. 2nd ed. Columbine Press, Manchester, Eng. 1960.

Figure 2. **Projection table for film analysis.**

The projector (A) is placed in the table at an angle, and the image is projected to a tilted mirror (B) and reflected by it to a tinted, finely ground screen (C) at writing level and reading angle. This permits the analyst to study each frame at close view, read the frame counter on the projector, operate the projector controls, and record the data from a seated position.

A *tinted* screen reduces the amount of eyestrain because the glare is less than with an opaque ground glass. The finer the grinding of the screen, the sharper the image and the easier to determine details.

Source: (23:48)

Obtaining the motion picture film record. Technical aspects of photography are not included here, since excellent books exist and help is generally available from persons skilled in photography. Discussed rather, are specific situations needing attention before filming is started to assure getting the needed data. Some general suggestions are also made.

One decision that must be made before the film record is obtained concerns the measures that one expects to use. All markings on the worker, in the background, or on the floor must be included at the time of filming or else several types of analysis will not be possible. To determine the adequacy of the test conditions and film record for obtaining the desired information, films need to be made before data collection.

The relationship between the camera and worker and workplaces may be determined by any or all of the following requirements: all workplaces are in the camera field, all activity can be seen, and all of the worker's positions can be noted. When the centers are placed so that the worker is at a right angle to the camera, more of her activity and important positions can be studied than when her back is to the camera. When doors on storage units swing away from the camera, the items being stored or obtained can be seen because the door does not obstruct the view.

Contrast between the worker's clothing and the background makes it easier to identify changes in positions.

A large clock in the camera field provides a check on the passage of time, particularly when there are periods during which the camera is not operating; by placing the clock out of view of the worker, she makes no attempt to regulate or control her speed of work by checking the time, nor is it implied that she should do so.

Identification of the trial in the camera field at the time of the filming saves reference to records, eliminates labeling later, and reduces chance of error in identification. Numbers or letters can be taped on the wall or on equipment in the camera field to identify the test conditions, the worker, the part of the total job, the trial number, and the like.

Additional space may be needed for making a motion picture if it is desirable to include all of the worker as she works at all centers in the test area. The distance between worker and camera will vary with the type of lens and the width as well as the height of the area being photographed. With one wide-angle lens, for example, the camera field covers a width of 9 feet, 5 inches and a height of 7 feet when the distance to the subject is 12 feet. A distance of 25 feet between camera and work area could permit adequate flexibility in arrangement of workplaces.

Other details of memomotion film technique and analysis of film are covered in the theses by Mize (16:80–99) and Steidl (23:16–18, 46–52, 356–362).

Selection of method

Written, dictated, and photographic records and mechanically recorded measurements can be made during the work or test period. The most simple and direct procedure is to make a written record during the test period. Use of a technique more elaborate and precise than needed can increase unnecessarily the cost of recording and analyzing the data. Choice of method deserves careful consideration.

Selection of method for recording the data is controlled first by the information needed. Identify the technique that will provide the essential facts, as completely as possible, and in sufficient detail but not unnecessarily detailed. If a written record of trips will suffice, why make a motion picture?

If time readings can be obtained from a stopwatch, why make a motion picture?

The number of measures of work that are needed also affects choice of procedure. A trained observer can write down the pattern of movement, some details of activity, and gross time intervals, but there is a practical limit to the variety and amount of detail that one person can record. If more than one person can be present during the test period, each can record different data, and the facts needed may still be obtained without making a motion picture. Snow (21) followed this procedure, using two observers.

The combination of measures of work as well as the number may affect choice of procedures. A motion picture is needed for certain details and measures, but not for others, but both a motion picture and written record may well be made. Experience has shown that it is quicker and easier to record certain information, such as place of work and general description of activity, during the test period rather than obtain it from a motion picture. Articles used are not always clear or visible in the film, and analyzing films generally tires the eyes. Therefore, the trips, pattern of movement, and general description of the action would be recorded during the test period even though each could be obtained from the film. Occasionally it is better for an observer not to be present, as in the study in homes by Steidl (26, 27, 28).

Still other considerations enter into choice of procedure: the equipment needed to record the data and analyze the records; availability of supplies: comparative cost of obtaining the record and analyzing it, including time: special abilities or training needed for the researchers; comparative freedom of the record from the researcher's bias; and the time that can elapse between data recording and availability for analysis. Some of these deserve further discussion here.

Written and verbal records are available for analysis immediately after the observation period, but most photographic records are not. The research can often be planned so that this time lapse is not a major limitation.

Written and verbal records provide information as the observers perceived and interpreted the activity in relation to their experiences and the purposes of the research. The verbal record might have the added advantage of variations in tone for help in interpretation. More details can be dictated than written in an equal amount of time. Motion picture records make it possible to analyze for a greater number and variety of factors than can be obtained from a written or verbal record. The test period can be reviewed any number of times, by a number of observers, and analyses verified.

Still pictures have some of the advantages of motion pictures. Situations can be recorded at various times during the test period. Later, the still pictures can be studied and also rated by the worker and/or other persons. Snow (21) indicates that differences in kitchen utensils show up better in color than in black and white. For example, aluminum and stainless steel look alike and glass does not show up well in black and white photographs.

It may be easier for a number of people to view color slides simultaneously than photographic prints.

Information on time can be recorded from stopwatch, clock, and film readings. With a stopwatch, an error in reading the time cannot be corrected nor can data missed be replaced; observer error cannot be checked unless there is another observer; consistency in the basis for decision as to when to read the stopwatch might vary from one observer to another and from time to time, with no possibility of correction; the activity generally occurs too rapidly to obtain its completion point at one center and the starting point at the next. The number of stopwatch readings is necessarily smaller than from films, since each film frame is equated to 1 second and an observer cannot record a stopwatch reading every second. However, fractions of a second can be obtained from a stopwatch but not from memomotion film taken at the rate of 1 frame per second.

With each method, the quality of the record depends on the skill of the researcher and successful operation and excellence of the equipment used. Understanding is always needed of details pertinent to the various types of analyses to which the record is to be subjected. Results can be no better than the basic information recorded.

Conclusions

This bulletin contributes to a summary and evaluation of present methods of studying the human costs of work.

A number of methods currently used to describe and measure household work have been evaluated in relation to problems of arrangement and design of workplaces, requirements for carrying out tasks, and the demands placed on the worker. Means of recording the data were examined.

The majority of our attention has been given to measurement of worker input rather than to the relationship between input and output. Quality of product has generally not been measured. Quality and quantity relationships are dimensions of work that may well receive our attention in future studies.

More measures of the physiological and psychological costs of work are needed and their interrelationships established.

Means of minimizing input of men and women at work is the object of study in several disciplines and types of institutions. We can profit from one another's efforts.

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Contents

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Homemaking Work Units for New York State Households[1]

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Purposes of the Study

Management, whether in homes or in business, has been defined as the "judicious use of means to accomplish an end."[3] Application of this definition to the home involves a recognition of the resources (or means) that families use in creating and maintaining the types of homes they want. The goals in the home may be different from the goals in business, but the process of management used in attaining these goals may be similar. This process involves a constant evaluation of the situation, establishment of short- and long-term goals, determination of courses of action in the use of resources for the attainment of the goals, action based upon the decision, and evaluation of the action. Thus, the process begins and ends with evaluation.

The tools for evaluating the use of resources in the home are limited, partially because many of the resources are not measured in the same terms. Price, expressed in money terms, is a tool which enables us to measure and compare costs of goods which go through the market; costs of nonmarket goods and services cannot always be compared or measured. The work units were designed to provide a basis for comparing time costs in the household.

The homemaking work unit as a tool for making decisions with regard to the use of time was developed at Cornell University approximately 20 years ago (6). A work unit in homemaking, as defined in the current study, is the amount of household work done in one hour under average conditions by an average worker. The major purposes of the current study were the continued

[1] A more complete report of this study can be found in **Homemaking Work Units for New York State Households**, a thesis presented to the Faculty of the Graduate School of Cornell University, June 1955, in partial fulfillment of the requirements for the degree of Doctor of Philosophy. A popular leaflet, **New York State Homemaking Work Units** has been published for homemakers.

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[3] Webster's New Collegiate Dictionary.

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development and refinement of this tool for current use and the determination of additional uses for it, especially with homemakers.

Another purpose of this study was to discover reasons for variations in the work load of homes, and reasons for variations in accomplishment. It has long been recognized that, in a 24-hour day, more is accomplished in some households than in others. Some homemakers have complained of their inability to do as much as they would like to do in a day, and others have said that they never succeed in getting all of their work finished. On the other hand, some people consider the work load in the modern home to be very light because many goods and services are purchased, and modern equipment simplifies many tasks.

It has also been a purpose of this study to find ways to make the work-unit concept usable by families for reaching managerial decisions and by teachers of home management in helping young people and adults learn the process of management.

Cultural changes have occurred which affect family life and make it desirable for families to evaluate frequently the use they make of their resources in attaining the type of home they want. The role of the homemaker is no longer one which follows a set pattern but is a changing one. Many families have to decide whether the homemaker will be a part-time or a full-time one, whether she should use her time to do all of the work of the home or work outside the home to increase financial resources. For many families the decision is one of determining the extent to which the homemaker can participate in community activities. If there is a reduction in the time available for homemaking, decisions must be made as to the means of accomplishing the work of the home to the satisfaction of the homemaker and the family. Some may choose to share the work with family members, some to buy new equipment, some to purchase services, some to simplify work, and some to relax standards of work.

Work units are not meant to dictate to families what should be done with their time; they provide a means for comparing the amount of time used by a particular family with the amount of time that is used in average households to do a similar amount of work. What is done in the average situation may or may not be desirable for a particular family, but, as differences are discovered, the family will have to some extent an objective basis for deciding whether to continue the present arrangement or to make a change. If a change is made, the work units provide a tool for evaluating the effect of that change on methods of work, equipment, or standards. The work units enable one to measure roughly the amount of work to be done in the home; they do not provide a measure of how well it is done, by whom it is done, nor with what equipment it is done. Neither satisfaction nor quality is measured by the work units.

Previous Work Basic to the Study

The use of work units has had a fairly long history in agriculture. According to the Taylors (5:364), in their historical record of agricultural economics in the United States: "The idea of productive-man-work units was developed by [G. F.] Warren and K. C. Livermore in 1912 in an effort to find a better basis than acres or capital for comparing size of business." Boss and Pond (1:244) give this definition: "A productive-man-work unit is the average amount of work done by a man in a ten-hour day on crops or productive livestock, or both."

Agricultural work units were first adapted to the work of the home by Jean Warren [4] in her research on *Use of Time in Its Relation to Home Management* (6). This research was initiated at the suggestion of Helen Canon. Using the records of 502 interviews with homemakers in 1936 in Genesee County, New York, Warren calculated work units for the following 11 tasks of homemaking: meal preparation, baking, packing of lunches, dishwashing, routine care of the house, bedmaking, care of fires, washing, ironing, mending, and care of individual family members. Warren followed the practice used in agriculture of studying the time used by all workers, since ". . . all the homemaking activities were being studied and not just the work done by the homemaker" (6:404). For the determination of the work units "the average time used to accomplish a certain task was obtained, and the time required to do the work of each household at average speed and under average conditions was calculated" (6:442). The work units were expressed in number of minutes per week. (Additional statistical analyses of the work units calculated by Warren were made by Rose Smith and reported in her Master's thesis [4].)

For a doctoral thesis completed in 1953, Wiegand (7) made a study of homemakers' use of time in 250 households in New York State.[5] Between the period of that study and the one made by Warren in 1936, changes had taken place in the use of time for work in the home. Because of the availability of data collected by Wiegand, and the evidence of a need for revision of the work units, the current study was undertaken.

Method

Source of data

The data upon which this study was based were collected from 250 New York households by Wiegand (7) for her research in *Comparative Use of Time of Farm and City Full-time Homemakers and Homemakers in the Labor Force in Relation to Home Management.*

[4] Hereafter, any reference to Warren will indicate the work of Jean Warren.
[5] An Experiment Station Memoir, reporting this study, was published in 1954 (8).

To obtain records from approximately 100 farm households, Wiegand used the census technique of stopping at each farmhouse in Stafford Township, Genesee County, until all eligible families were visited. She then continued her visits in Byron Township until the desired number of records had been collected. These 2 townships were selected because they were considered to be in a good farming area and because this area had been used for a part of the sample studied by Warren (6:5) in 1936. To be eligible for an interview the homemaker had to live on a farm and be the wife of a farm operator "who used a major portion of his time for farming" (7:5). Ninety-five usable records were thus obtained from farm homemakers.

For the group of 155 city homemakers Wiegand used the city of Auburn, which was chosen because it was considered to be "typical of New York State's small cities with many factories" (7:5). The census technique was again used by Wiegand in a section of the eastern part of the city; each house in a block was visited until the homemakers in all eligible households had been visited. The area chosen included few new houses or apartment houses. To qualify for the study, the city homemaker had to be married and living with her husband in a 1- or 2-family dwelling. A homemaker was excluded from tne study if her native tongue was not English. City homemakers who were regularly employed outside the home for 15 or more hours a week were classified as employed city homemakers.

Concerning the interviews, Wiegand (7:223) said:

> Homemakers were asked to answer questions about their use of time on the day before the interview and on the preceding Saturday and Sunday. They also responded to questions concerning their household members, houses, homemaking equipment, meals prepared the previous day, attitudes toward homemaking, and laundering and food shopping practices.

With regard to the method of data collection, Wiegand (8:4) said:

> Studies of the homemaker's use of time were made in several states between 1923 and 1930 with forms prepared by the United States Bureau of Home Economics. The homemakers who cooperated kept a record of their use of time for a week. In 1936, Jean Warren studied farm homemakers' use of time by personal interviews with homemakers in New York State. Marianne Muse made a similar study in Vermont in 1943.
>
> After comparing these two methods of obtaining data from homemakers, the interview method was selected for the research reported here. More records from busy homemakers are usually obtained by the interview method than from mail questionnaires or by asking homemakers to keep time records.

Procedure

For the development of the work unit, the approximate time used for work in each household was related to factors that influence the use of time. The time of each worker in the household—homemaker, hired helper, and other family members—was totaled as a basis for the study of the time of all workers for the record day, which was a 24-hour period beginning at 12:01 a.m. Homemakers were asked to base their answers on their use of time on the day before the interview. The areas of homemaking studied in

this way were: food preparation, meal preparation, dishwashing, regular care of the house, all care of the house, washing of clothing and household linens, ironing, care of family members, and marketing. The time used for each of these tasks was related to the number of persons (all persons, whether or not they were related by blood) in the household, the age of the youngest child, the composition of the household, and the attitudes of the homemaker toward the task. In addition, most of these tasks were studied in relation to one or more factors relating to the specific task. For food preparation, meal preparation, and dishwashing, the types of meals served were studied in relation to the time used. For the regular care of the house and for all care of the house the additional factor studied was the ratio of rooms in use to the number of persons in the household. For the development of a work unit for washing, the factors that were studied, because they relate specifically to washing, were: the number of pieces washed, the frequency of washing, the number of tubfuls of clothes washed, and the type of equipment used for washing. The number of pieces ironed was the only specific factor studied in relation to the time used for ironing.

With the factor that seemed to have the greatest influence upon the time used as a basis, work units were developed for the following tasks: meal preparation, dishwashing, regular care of the house, physical care of family members, washing, and ironing. Because no factor could be found to relate closely enough to the time used to be the basis for a work unit in any of the activities of homemaking other than these 6, units were not developed for other homemaking tasks. The interrelationships of certain factors affecting the time used on the 6 work-unit tasks were also considered so as to determine their influence on the one factor that was used as the basis of the work unit. Time used for each task is affected by more than one factor, but the one with the greatest influence was chosen as the basis of the unit.

The work units were tested by exploratory use with a group of 24 homemakers in the Ithaca area to determine the effect of studying the work of a week as compared with the work of a day. The usefulness of the work-unit concept to the homemaker was also tested in this group.

The possible uses of the work units were also explored in meetings with a group of homemakers and with groups of people professionally interested in home management.

Terminology

Work unit—the amount of household work done by an average worker in 1 hour under average conditions.

Work load—estimate of the amount of work, expressed in work units, required to do work-unit tasks in an average situation.

Part-time homemaker—a homemaker who worked 15 or more hours a week in the labor force.

Full-time homemaker—a homemaker not employed outside the home, or one employed less than 15 hours a week in the labor force.

Composition of household or family composition—classification describing either an all-adult household, or a household with a designated number of children in specified age groups. The age classification of the children was based upon school ages—preschool, elementary school, and junior-senior high school.

Age of youngest child—the age of the youngest person in the household, but only if this person was 10 years of age or younger.

Development of Work Units

Many of the variables used by Wiegand (7) for her study of homemakers' use of time were used also in the current study for the development of the work units.

Other variables were reclassified to increase their usefulness for the current study. These included the following: family composition, attitudes, meal types, and ratio of rooms in daily use to number in the household.

Classification and analysis of household composition

The family cycle and the age of the youngest member of the family were studied by Wiegand (7:9) as indicators of the family composition. For a more detailed analysis in the present study, each member of the household was placed in an age category. Those who were 18 years of age and older were considered to be adults. A second group was made up of children of the adolescent ages, 13 to 17 years. Children of the elementary school ages, 6 to 12 years, made up another group. Children of younger than school age were divided into 2 groups: those of 2 to 5 years, and those 1 year old and younger. The households were then classed as all-adult or 1-child, 2-, 3-, 4-, or 5-children households.

A family's household composition was determined by the number of children in it and their ages. It was thus possible to separate the families according to the total number of children they had or according to whether their children were all of preschool age, elementary school age, high school age, or any combinations of ages.

The average size of the households in the study was 3.6 persons. The families of full-time homemakers were very similar, with 3.8 persons in farm homes and 3.9 persons in city homes; but the households of the employed city homemakers were somewhat smaller, with 3.1 persons. The average number of children in the homes of full-time homemakers was 1.4, whether they lived on farms or in the city. In the households of employed city homemakers the average was 1.0 child.

The most pronounced differences in family composition were between the part-time and full-time homemakers, with some less pronounced differences between the farm and city full-time homemakers (table 1). Few of the part-time homemakers had children under school age, and a higher

Table 1. **Composition of the household in relation to type of homemaker** (250 households, New York, 1952)

Composition of households	Type of homemaker			Total
	Farm	City	Employed city	
	Number			
All households	95	101	54	250
	Per cent			
Households with:				
All adults	43	35	43	40
More than 2 adults	35	21	17	25
Any children	57	65	57	60
A child 1 year and under	21	18	2	16
Any children under 6 years	33	40	11	31
Children 6–12 years	34	34	33	34
Children 13–17 years	19	18	30	21
1 child	18	22	24	21
2 children	14	22	24	19
3 children	14	14	7	12
4 children	8	4	0	5
5 children	1	3	0	2
6 or more children	2	1	2	2

percentage of full-time city than of farm homemakers had children younger than 6 years. More part-time than full-time homemakers had children of high school age. The percentage of the farm households made up of more than 2 adults was larger than the percentage of city households of that size.

More full-time than part-time homemakers had families of 3 or more children. Somewhat fewer of the farm than city full-time homemakers had 1 or 2 children.

Classification and analysis of meal types

The 53 meal types and subtypes used in the 1952 study (7:103) were reclassified to give larger groups for analysis. Originally, the meals were typed according to the amount of food handling that was required for their preparation. In reclassifying, combinations were made according to lengths of time used in preparation, in addition to the amount of food handling required. In the new classification, there were two types of breakfasts and four types of noon or evening meals.

Breakfasts

The mean, median, and modal time for type-1 breakfasts was 0.3 hour. This type breakfast was any combination of easily prepared foods (cold cereal, fruit juice, toast) or a combination of 1 or 2 items requiring a small amount of preparation (eggs, bacon, sausage, hot cereal). and any number of easily prepared foods.

For the more complex breakfast, type 2, the average time used for prep-

aration was 0.5 hour. A type-2 breakfast consisted of 3 items requiring a small amount of preparation plus any number of easily prepared foods, or one item considered to be time-consuming (waffles, pancakes, potatoes) in combination with other more easily prepared foods.

Noon or evening meals

Since some families prepared a heavy meal at noon and others prepared a heavy meal in the evening, these 2 meals were grouped together for study.

The mean, median, and modal time for the preparation of all type-1 meals was 0.3 hour. A type-1 noon or evening meal was made up of any number of already prepared or quickly prepared foods, with or without the addition of a sandwich. Foods classed as already prepared because they could be served without further home preparation were: packaged products such as crackers, canned fruits, beverages, ready-to-serve leftovers, and so on. Those classed as quickly prepared foods because they needed only to be heated or required very little home preparation were: reheated leftovers, frozen or canned foods, hot sandwiches, canned soups, eggs, baked potatoes, frankfurters, and so on.

Type-2 meals required an average of 0.5 hour to prepare. The median and mode for this group were 0.5 hour and the mean was 0.6 hour. A type-2 meal may be made up of leftovers somewhat changed in form, plus any number of already or quickly prepared foods. Also classified as a type-2 meal was one made up of 1 dish requiring time for preparation plus as many as 4 already prepared or quickly prepared dishes. Time-consuming dishes, or dishes requiring home preparation, were: fresh vegetables, meats (chops, roasts), homemade desserts, casseroles, some salads, and so on.

For the type-3 meal the mean time was 0.7 hour, and the median and modal time was 0.8 hour. This meal was made up of 1 dish requiring time plus 5 or more already or quickly prepared foods, or 2 or 3 dishes requiring time plus any number of already or quickly prepared foods.

The mean time for a type-4 meal was 1.1 hours, the median was 1.0 hour, and the mode was 0.8 hour. A type-4 meal was one made up of 4 or more dishes requiring time plus any number of already or quickly prepared foods.

Development of a work unit for meal preparation

The time used in meal preparation was studied in relation to the types of meals prepared, the number of persons in the household, the age of the youngest child, and the composition of the household. Time spent on meal preparation was defined to include the time for preparing the food, setting the table, and serving the meals. Foods which were prepared as "snacks," foods prepared for packed lunches, and foods which were baked or preserved for later use were not included in this category.

Meal types

In determining the effect of the types of meals upon the time used in meal preparation, use was made of the 198 households in which 3 meals were pre-

pared and in which a type-1 breakfast was served. Households were excluded if a type-2 breakfast was prepared, because there were too few for analysis. As the complexity of the meals, *i.e.*, the amount of food handling required for their preparation, increased, there was a gradual increase in the amount of time used for preparation (table 2). The least complex combination of meals served in one day was composed of types 1-1-2,[6] which required an average of 1.4 hours for preparation. The most complex combination of meals included a type 1 and a type 4 plus a type 2, 3, or 4, which required an average of 1.9 hours for preparation.

Table 2. **Time used for meal preparation in relation to types of meals prepared** (198 households, New York, 1952)

Meal types*	Number of households	Average hours used
1 – 1 – 2	11	1.4
1 – 1 – 3	73	1.5
1 – 2 – 2	9	1.6
1 – 2 – 3	44	1.7
1 – 3 – 3	23	1.6
1 – 1 – 4	19	1.8
1 – 2, 3 or 4 – 4	18	1.9
All households	197†	1.6

* Meal types ranged in complexity from the simplest, type 1, to the most complex, type 4. In the numerical description the first number is the breakfast type; the second and third numbers are interchangeable as noon or evening meal types.

† One household serving a 1–1–1 combination of meal types was omitted.

Size of household

The number of persons to whom meals were served was the basis of the meal-preparation work unit as it was originally developed by Warren in 1936. "As the number of meals served increased, the time used for meal preparation increased but the time used per person per meal decreased" (6:411).

The meal-preparation unit used in the Warren study (6:410) was for 1 week and increased from 694 minutes for a 2-person household to 987 minutes for a 6-person household. When these figures were converted into hours per day, the time ranged from 1.7 hours a day for a 2-person household to 2.4 hours for a 6-or-more-person household (table 3). In the smaller households, it took 10 to 20 minutes less time to prepare meals in 1952 than in 1936, while in the larger households it took up to 45 minutes less time in 1952.

When the 1952 data were studied to determine whether a relationship existed between the time used for meal preparation and size of household, it was found that an increase in time did not accompany an increase in the

[6] The first number refers to the type of breakfast; the second and third are interchangeable as noon or evening meal types.

size of the household. This was indicated by the fact that less time was used in the 4- and 5-person households than in the 3-person households, and by the fact that the average hours used were no greater for the 6-person households than for the 3-person households.

Table 3. **Time used for meal preparation in relation to size of household**
(497 households, 1936; 250 households, 1952, New York)

Number of persons in household	1936*		1952	
	Number of households	Average hours used	Number of households	Average hours used
2	75	1.7	70	1.3
3	110	1.8	56	1.7
4	111	2.1	59	1.6
5	85	2.1	41	1.6
6 or more	116	2.4	24	1.7

* Source: (6: 136). Figures were converted from minutes per week to hours per day.

In an attempt to explain the variations in use of time in relation to size of household, the types of meals prepared in various sizes of households were considered (table 4). Although all types were prepared in all sizes of households, the more complex meals were prepared more often in the large households, and the less complex in the small households. As the size of the family increased, the percentage of those serving any type-1 lunch or dinner decreased, while the percentage of those serving a combination of 2 meals of greater complexity than type 1 increased. The average size of the households in which 2 type-1 meals were served was 3.5 persons, while the average size of the households in which 2 of the meals were more complex than type 1 was 4.0 persons. Although the larger households tended to have the more complex meals, size of household itself was not closely related to the amount of time used in meal preparation.

Table 4. **Types of meals served in relation to size of household**
(198 households, New York, 1952)

Number of persons in household	Number of households	Households reporting 2 meals of complexity greater than type 1	Households reporting 2 type-1 meals, plus 1 of any type
		Per cent	
2	49	35	65
3	46	46	54
4	42	48	52
5	39	54	46
6 or more	22	68	32
All households	198	47	53

Composition of household

When the households were studied in more detail to determine whether the age of the youngest child or the total number of children in various age groups affected the amount of time spent in meal preparation, no relationship was found.

On the assumption that the types of meals served may be influenced by the presence or absence of children in the home, meal types were studied in relation to the composition of the household. Almost 60 per cent of the households in which fewer than 3 meals were prepared were all-adult households, and most of the others serving fewer than 3 meals included children of school age only.

On the supposition that school-age children and members of all-adult households have an opportunity to eat 1 meal a day away from home, these 2 groups were combined for consideration. They comprised 86 per cent of all households in which fewer than 3 meals were served, 74 per cent of those in which 2 type-1 meals plus 1 of greater complexity were served, but only 51 per cent of the households in which only 1 simple meal plus 2 of greater complexity were served. Of the 16 families in which a type-2 breakfast was prepared, 14 were either all-adult or included children of school age only.

Work unit for meal preparation

Since the types of meals prepared had the strongest influence upon time used for meal preparation, meal types were used as the basis of the work unit (table 5).

Table 5. **Work unit for meal preparation**

Type of meal served	Meal preparation work unit
Type 1	0.3
Type 2	0.5
Type 3	0.8
Type 4	1.0

Development of a work unit for dishwashing

The time used for washing the dishes was studied in relation to the total number of persons in the household, the age of the youngest child, the composition of the household, and the types of meals served. According to Wiegand (7:116): "Dishwashing was defined to include clearing the table, putting away the food, scraping, stacking, washing, rinsing, drying, putting away the dishes and wiping the counters and range."

Size of household

The amount of time spent in washing dishes increased with the number of persons in the household. The time increased consistently from 0.9 hour for

washing dishes in a 2-person household to 1.6 hours in households with 6 or more persons (table 6).

In the 1936 Warren study (6:417), a similar relation between the number of persons in the household and the amount of time used for dishwashing was noted. In 1936 it took an average of 10 to 20 minutes longer to do the job than in 1952. Since only 30 per cent of the households in the 1936 study (6:45) had running water, as compared with 95 per cent of the homes in the 1952 study, it would appear that the availability of running water reduced the time used for washing dishes.

Table 6. **Time used for dishwashing in relation to size of household**
(248 households, New York, 1952)

Number of persons in household	Number of households	Average hours used
2	69	0.9
3	56	1.0
4	59	1.2
5	41	1.5
6 and over	23	1.6
All households	248	1.2

Composition of household

There was no relation between the average time used for washing dishes and the age of the youngest child. When the households were studied in more detail to determine any effect that might result from variations in the number and ages of children in the households, no relationship was found.

Types of meals

An increase in the complexity of the meals, that is, in the amount of food handling and time required for their preparation, did not result in a consistent increase or decrease in the average time used in dishwashing. In households where a combination of the simplest meals (types 1-1-2) was served, more time was used for washing dishes than in those where a combination including the most complex meal type (type 4) was served.

Work unit for dishwashing

The total number of persons in the household seemed to have the greatest influence on the average time used for dishwashing, and was used as the basis for the work unit (table 7).

Development of a work unit for regular care of the house

The time used for all care of the house and regular care of the house was studied in relation to the total number in the household, the age of the youngest child, the composition of the household, and the number of rooms

Table 7. **Work unit for dishwashing**

Number of persons for whom dishes are washed in a day	Dishwashing work unit
2 persons	0.9
3 persons	1.0
4 persons	1.2
5 persons	1.5
6 or more persons	1.6

per person that were actually used in the house. By Wiegand's classification (7:126):

> The time used for care of the house was divided into three groups, regular or routine care, special or seasonal care, and upkeep. The regular care included such daily and weekly jobs as: bedmaking, mopping, dusting, picking up clothes, putting the rooms in order, vacuum cleaning and caring for the furnace or stove. The special tasks which did not occur daily or weekly involved care of silver, bookcases, windows, floors and rugs. The upkeep of the house was painting, papering, making slip covers or upholstering furniture and planning to remodel the house.

Size and composition of household

There was little or no relation between the total number of persons in a household or the composition of the household and the time used on the record day for *all* care of the house. When the time for *regular* care of the house was considered separately, some effect of the composition of the household on this time was evident, but it was the age of family members and not the total number of them that made the difference.

Ratio of rooms in use to number in household

On the assumption that the amount of time used in house care may be affected by the number of rooms that are cleaned and by the number of persons using the rooms, each household was classified according to the number of rooms per person that were in daily use. No relation was found between the average time used in *all* care of the house and the room-to-person ratio. There was a slight relation between the time used for *regular* care and the number of rooms per person in the household, but this pattern was not a clear one. The time used on regular care tended to increase as the ratio of rooms to persons decreased.

Ninety-seven per cent of the all-adult families lived in houses with 1½ or more rooms to a person (table 8). This percentage decreased consistently as the number of children in the household increased. In only 2 of the 250 households was there less than one room to a person.

The average time used for regular care of the house in all-adult households was 0.6 hour a day, the number of rooms per person apparently making very little difference (table 9). The average time used for regular care in households in which there were children was 1.1 hours a day, and this time

did not vary greatly in relation to the number of rooms per person, nor did such variations as there were follow a pattern.

Table 8. **Number of rooms per person in daily use in relation to composition of the household**
(250 households, New York, 1952)

Composition of households	Number of households	Less than 1.5 rooms per person	1.5 or more rooms per person
		Per cent	
Households with:			
All adults	99	3	97
1 child	52	15	85
2 children	48	25	75
3 children	31	68	32
4 or 5 children	16	75	25
All households	250	24	76

Table 9. **Number of rooms in daily use per person in relation to time used in regular care of the house**
(250 households, New York, 1952)

Rooms per person	All-adult households		Households with children		All households	
	Number	Average hours used	Number	Average hours used	Number	Average hours used
Less than 1	0	*	2	*	2	*
1.0–1.1	0	*	18	1.2	18	1.2
1.2–1.3	3	*	30	0.9	33	0.9
1.4–1.5	6	0.6	26	1.1	32	1.0
1.6–1.7	4	*	23	1.1	27	1.1
1.8–1.9	6	0.8	21	1.1	27	1.1
2.0–2.1	15	0.6	20	1.0	35	0.8
2.2–2.3	8	0.6	11	1.1	19	0.9
2.4–2.5	34	0.6	0	*	34	0.6
Over 2.5	23	0.6	0	*	23	0.6
All households	99	0.6	151	1.1	250	0.9

* Average not computed because there were fewer than 5 households.

Work unit for regular care of the house

There seemed to be no phase of homemaking in which there was less consistency in use of time than in care of the house. This is no doubt one of the areas in which there are great differences in standards and in attitudes.

The only factor that was found to be related to the amount of time used in regular care of the house was the presence or absence of children, and this was, therefore, the factor upon which the work unit was based. The number of work units used for measuring the work load in households in which there were children and in households of all adults was 1.1 and 0.6, respectively.

During the second phase of the study,[7] when 24 homemakers kept time

[7] This phase of the study is reported in the section **Exploratory Uses of Work Units.**

records for a week, a change was made in the work unit for regular care of the house. Because of variations in work patterns, it seemed desirable to compute this unit on a weekly rather than a daily basis. In many households, large amounts of time were used on 1 or 2 days of the week for this task, while very small amounts were used on other days. The results seemed unrealistic when the homemaker compared the use of time in her household with that allowed for by the units if the day used for comparison was one in which only "pick-up" was done, or if the day used was one in which "heavy" cleaning was done. Therefore, a weekly work load for regular care of the house was computed.

This weekly allowance was the daily unit value (0.6 unit in all-adult households and 1.1 units in households with children) multiplied by 6 weekdays, plus 0.4 unit on the seventh day for "pick-up". These average amounts of time were multiplied by 6 because the original records were based upon weekdays; 0.4 unit was estimated for Sunday. For regular care of the house, 4 units a week were allowed in all-adult households and 7 units a week in households in which there were children.

Development of a work unit for physical care of family members

Wiegand (7:169) interpreted the care of family members as physical assistance given to children and adults:

> The care of children included dressing, feeding, bathing, putting to bed, taking them to and from school or the doctor's office, and helping them with their lessons. It did not include such activities as playing with or reading to children. The care of adults involved waiting on elderly or sick persons.

The care of family members, as defined here, does not refer to the total time during which workers are responsible for the well-being of children but only the time in which they are actively engaged in care of children. Much of the time spent in care of children also coincides with time used in other homemaking activities, but the time reported by the homemaker was usually the time exclusively used for care of children.

Warren (6:435) based the unit for care of family members upon the age of the youngest child in the household. The unit decreased from 1390 minutes (about 23 hours) a week for a child under 1 year of age to 25 minutes a week for a 15-year-old child. When these figures were converted into hours per day this range was from 3.3 hours to 0.06 hour.

To select a basis for a work unit, analyses were made of the time used for care of family members as affected by the age of the youngest child, the total number in the household, and the composition of the household.

Age of the youngest child

As the age of the youngest child increased, the time used for physical care of the family members decreased. A similar relationship was apparent in the Warren study (table 10). For households in which the youngest child was under 4, slightly less time was used in 1952 than in 1936, but in households

where the youngest child was over 4 years of age the same amount of time was used.

Table 10. **Time used in physical care of family members in relation to age of youngest child, under 10**
(144 households, 1936; 110 households, 1952, New York)

Age of youngest child	1936*		1952	
	Number of households	Average hours used	Number of households	Average hours used
Under 1 year	20	3.6	24	3.0
1–3 years	50	2.3	37	1.8
4–5 years	26	1.2	19	1.2
6–9 years	48	0.5	30	0.5

* Source: (6: 216). Figures were converted from minutes per week into hours per day.

Size and composition of household

Since the time used in the care of family members was affected by the total number of persons in the family (table 11) as well as by the age of the youngest child, a combination of these 2 factors was studied in the analysis of the composition of the household.

Table 11. **Time used for physical care of family members in relation to size of household**
(250 households, New York, 1952)

Number of persons in household	Number of households	Average hours used
2	70	0.04
3	56	0.5
4	59	0.9
5	41	1.2
6 or more	24	2.4
All households	250	0.8

To distinguish the effect of each age group, families with all of their children in only one of the various age groups were used for analysis. To determine the effects of any specific age group it was necessary to eliminate families with children in a combination of age groups, such as preschool and school age. To determine as nearly as possible the amount of time involved in the care of a baby, only 1-child households were studied, since households with more than 1 child had children of other ages as well. In the 1-child households the average time used for the physical care of the baby was 2.1 hours (table 12). For households in which all children were between the ages of 2 and 5, the average time used for physical care was 1.2 hours. The average time was 0.5 hour and 0.05 hour, respectively, for the households in which all children were between the ages of 6 and 12 years and 13 and 17 years. Since later study indicated that little or no time was used for 11- and

Table 12. **Time used for physical care of family members in relation to composition of household**
(250 households, New York, 1952)

Composition of households	Households with:				All households	
	1 child		2 children			
	Number of households	Average hours used	Number of households	Average hours used	Number of households	Average hours used
Households with:						
A baby	7	2.1	..	..	39	2.9
All children 2–5 years	12	1.0	6	1.5	19	1.2
All children 6–12 years	16	0.4	13	0.7	31	0.5
All children 13–17 years	17	0.04	2	0.15	19	0.05
Any children	..	..	..	..	151	1.2
All adults	..	..	..	..	99	0.05

12-year-old children, they were grouped with the 13- to 17-year-old children for the work units. As the size of the family increased, the time used for each child decreased.

Work unit for physical care of family members

Since the relationship was closest between the composition of the household and the time used in the care of the family members, this factor was made the basis of the work unit (table 13).

Table 13. **Work unit for physical care of family members**
(250 households, New York, 1952)

Family member to whom daily care is given*	Work units
Youngest family member	
1 year or younger	2.0
2–5 years	1.0
6–10 years	0.6
Over 10 years	0.0
Second family member	
2–5 years	0.5
6–10 years	0.3
Over 10 years	0.0
Third family member	
2–5 years	0.2
Over 5 years	0.0

* To calculate the work load in care of family members start with the youngest child.

If the youngest person in the household was more than 10 years of age, no unit was allowed for his care. Because few households in the study had a third child of school age and few had a fourth or fifth child of any age, units were not established for these children.

In computing the work load in physical care of family members, the units of work required for the care of the youngest child were combined with those for the second-youngest child and for the third-youngest child.

Development of a work unit for washing clothes

To determine their effect upon time used for washing, the following characteristics of the household were studied: the total number of persons in the household, the age of the youngest child, and the general composition of the household. Some characteristics of the wash load, washing procedure, and equipment for washing were also studied. The activities classified as washing by Wiegand (7:250) included: gathering clothes for laundry; preparing equipment; sorting, washing, hanging up, taking down, and folding clothes.

Size of household

Warren (6:424) based the work unit for washing upon 2 factors: the number of persons in the household and the age of the youngest child. In the current study there seemed to be some effect of number of persons in the household upon time used for washing, but the pattern was not so clear as in the earlier study. In contrast to the time spent on most other homemaking activities, the time used for washing was greater in 1952 than in 1936 (table 14). The increase in the number of households with running water and the increase of mechanical washing equipment have possibly reduced the homemaker's concern with reducing the wash load, thus leading to an increase in number of pieces to be washed. It is also possible that there has been a change in standards of cleanliness.

Table 14. **Time used in washing clothes in relation to size of household**
(501 households, 1936; 250 households, 1952, New York)

Number of persons in household	1936*		1952	
	Number of households	Average hours	Number of households	Average hours
2	75	0.3	70	0.5
3	111	0.4	56	0.7
4	112	0.4	59	0.8
5	86	0.5	41	0.7
6 or more	117	0.7	24	0.9

* Source: (6: 427). Figures were converted from minutes per week to hours per day.

Composition of household

When the households in the 1952 survey were studied, the relation of age

of the youngest member to total time used for washing clothes was not as evident as in the 1936 study.

When household composition, the factor which combined the number of persons in the household and ages of the children, was studied, it was found to have some relation to the amount of time used for washing. This time was greater in households with all children from 6 to 12 years of age than in households with children younger or older than that.

Number of pieces washed

When the time used for washing was related to the number of pieces washed, a definite relationship was found. According to the weighting done by Wiegand (7:278), something as simple as underwear rated as a 0.25 piece; an apron, towel, nightgown, pillow case, or child's dress rated 0.5 piece. A sheet, tablecloth, shirt, pair of overalls, or dress was considered to be 1 piece. There was a progressive increase from 0.6 hour for fewer than 10 pieces to 3.2 hours for 60 or more pieces (table 15). The difference in time used was greater between 10 and 20 pieces than between 30 and 40 pieces. This seems to indicate that it takes time to get ready to wash, and that the cost in time per piece is greater when only a few pieces are washed at one time.

Table 15. **Time used for washing in relation to number of pieces washed** (73 households, New York, 1952)

Number of pieces	Number of households	Average hours used
0–9	10	0.6
10–19	17	1.3
20–29	18	2.1
30–39	9	2.9
40–49	10	3.0
50–59	6	3.1
60 and over	3	3.2

The number of pieces washed was related somewhat to the size of the household. Variations in the number of pieces of clothes washed and the age of the youngest child did not seem to be related.

Composition of the household was studied in an attempt to determine the effect of the total number of children and their ages upon the number of pieces of clothes washed. There was little difference in the number of pieces washed on the record day in households with 1, 2, 3, 4, or 5 children. There were some differences when age groups were separated. In households where all children were of school age more pieces were washed than in households in which all the children were under 6 years.

Frequency of washing

The average time used in households in which washing was done once a week was 2.2 hours on the record day (table 16). This time decreased con-

Table 16. **Time used on the record day for washing in relation to usual frequency of washing and number of tubfuls of clothes washed**
(239 households, New York, 1952)

Frequency of washing	Number of households	Number of households in which washing was done	Average hours for those who washed	Average number of tubfuls washed*
Biweekly	15	3	2.3	9.0
Once a week	155	47	2.2	5.3
Twice a week	35	21	1.8	4.8
Three times a week	18	12	1.2	2.1
Four or more times a week	16	14	0.6	1.7
All households	239	97	1.7	4.2

* Based upon 69 households for which records were available for number of tubfuls of clothes washed.

sistently as the frequency of washing increased. The more frequently washing was done, the less was the time spent and the fewer the number of tubfuls of clothes that were washed in a day.

More than one-half of the households in which no washing was done were all-adult households, and more than 90 per cent of the households in which the washing was done only once in 2 weeks were all-adult households (table 17). In only 7 per cent of the all-adult households, and in 41 per cent of households with children, washing was done more often than once a week. In 3 per cent of the households with children and in 20 per cent of the all-adult households washing was not done, or it was done every 2 weeks. The percentage of those washing more than once a week tended to increase as the number of children increased from 2 to 3 or more. Almost two-thirds of the families with a baby washed more than once a week. One-half of the

Table 17. **Composition of household in relation to frequency of washing**
(248 households, New York, 1952)

Composition of households	Number of households	Frequency of washing			
		None	Bi-weekly	Once a week	More than once a week
		Per cent			
All households	248	4	6	62	28
Households with:					
All adults	97	5	15	73	7
Any children	151	3	*	56	41
A baby	39	5	3	26	66
All children under 6 years	41	5	2	42	51
All children 2–5 years	19	5	0	58	37
All children 6–12 years	31	3	0	58	39
All children 13–17 years	19	0	0	74	26
1 child	52	2	2	58	38
2 children	48	4	0	60	36
3 children	31	0	0	58	42
4 or 5 children	16	6	0	38	56

* Less than 1 per cent.

families in which all children were under 6 years of age washed 2 or more times a week.

Type of washer

The type of washer used affected the time spent in washing. Households with an automatic washer used an average of 0.8 hour, while those with a nonautomatic washer used 2.1 hours on the record day.

The frequency of washing was found by Wiegand (7:149) to be related to the type of machine used. In 18 per cent of the households with an automatic washer, washing was done daily; in two-thirds of the households with an automatic washer, washing was done at least twice a week. In three-fourths of the households with nonautomatic washers, washing was done once a week or less frequently. More than three-fourths of the 19 households without a washer were all-adult households, and less than one-fourth of 45 with automatic washers were all-adult households. Households in which there were small children were more likely to have an automatic washer than those made up of all adults or those in which children were of high school age (table 18).

Table 18. **Type of washing machine in relation to composition of the household** (249 households, New York, 1952)

Composition of households	Number of households	No washer	Nonautomatic washer	Automatic washer
			Per cent	
All households	249	8	74	18
Households with:				
All adults	98	15	75	10
Any children	151	3	74	23
A baby	39	0	69	31
All children under 6 years	41	2	71	27
All children 6–12 years	31	6	68	26
All children 13–17 years	19	0	90	10

Tubfuls of clothes washed

The number of tubfuls of clothes washed and the amount of time used for washing were closely related. The average time used for washing 1 tubful of clothes was 0.4 hour (table 19). This time increased consistently to 3.0 hours for washing 7 or 8 tubfuls.

The average number of tubfuls of clothes washed on the record day by the users of nonautomatic machines was 5, while the average for users of the automatic washers was only 2. While only 9 per cent of the users of the wringer-type machines washed 1 load of clothes, 45 per cent of the users of automatic machines washed only 1 tubful of clothes.

Table 19. **Time used for washing clothes in relation to number of tubfuls washed**
(68 households, New York, 1952)

Number of tubfuls	Number of households	Average hours used
1	14	0.4
2	9	1.0
3	9	1.8
4	9	1.9
5-6	13	2.7
7-8	9	3.0
9 or more	5	4.3
All households	68	1.9

An estimate of the tubfuls washed per week and the time used per week was made by multiplying the tubfuls washed and time used on the day before the interview by the number of times a week the homemaker said that she usually washed. When this was done, the average time used a week was 2.7 hours for those who had an automatic washer and 3.4 hours for those who had a nonautomatic washer. The time per tubful of clothes was less and the average number of tubfuls of clothes washed a week was the same in households in which automatic washers were used as in households in which nonautomatic washers were used.

No relation was found between the number of tubfuls of clothes washed and the number of persons in the household.

The number of tubfuls of clothes washed in one day varied considerably with the composition of the household (table 20). In households where all members were adults the average number of tubfuls of clothes washed was 5.1, as compared with 3.9 in households where there were children. A comparison of table 20 with table 17 shows that those households in which washing was done least frequently were likely to have more tubfuls when washing was done.

Table 20. **Number of tubfuls of clothes washed in relation to composition of the household**
(68 households, New York, 1952)

Composition of households	Total number of households	Number of households in which washing was done	Average number of tubfuls washed on one day	Average number of tubfuls washed per week
Households with:				
All adults	99	18	5.1	5
Any children	151	50	3.9	8
A baby	39	17	3.2	9
All children under 6 years	41	14	2.6	6
All children 6–12 years	31	12	5.3	10
All children 13–17 years	19	4	3.8	5
1–2 children	98	31	3.8	7
3–5 children	47	16	4.3	9

When the number of tubfuls washed was multiplied by the number of times a week that homemakers said they usually washed, a relation was found between the number of tubfuls of clothes washed and family composition. Households in which all members were adults washed an average of 5 tubfuls a week. Households in which there was a baby and those in which there were from 3 to 5 children washed an average of 9 tubfuls a week. Since two-thirds of the households in which all children were under 6 years and one-half of the households in which there were 3 to 5 children also included a baby, it would appear that the total number of children was responsible for heavy washing loads often assumed to be caused by the baby. The greatest number of tubfuls (10) was reported in households in which all children were of the school ages of 6 to 12 years.

Work unit for washing

The number of pieces and the number of tubfuls of clothes washed bore the closest relation to the time used in washing. Since the number of tubfuls of clothes washed was easy to calculate and since it related as closely to use of time as did the number of pieces washed, it was used as the basis of the work unit. The number of work units allowed for washing was 0.5 for each tubful washed. The day's work load in washing was computed by multiplying by the unit the total number of tubfuls of clothes washed.

Development of a work unit for ironing

The time used for ironing was studied as it was affected by the number of persons in the household, the age of the youngest child, the composition of the household, and the number of pieces of clothes ironed. Time for ironing was defined as the time used for sprinkling and ironing personal clothes and household linens and putting these articles away after ironing.

Size and composition of household

There was little relation between time used in ironing and number of persons in the household.

More time was spent in ironing in the households in which all of the children were between the ages of 6 and 12 years than in households where there were children in other age groups (table 21). As in washing, the demands seemed to be greatest in households in which the children were of elementary school age. Ironing had been done in more of the 5-person households than in households of any other size on the day before the interview.

Number of pieces ironed

All pieces ironed were classed as 1 piece, with the exception of 2 towels or 2 napkins which were rated as equal to 1 piece, and 6 handkerchiefs, again rated as equal to 1 piece.

The number of households for which data were available was small, but

Table 21. **Time used for ironing in relation to composition of the household**
(250 households, New York, 1952)

Composition of household	Total number of households	Per cent of households in which ironing was done	Average hours used in households in which ironing was done
Households with:			
All adults	99	30	1.6
A baby	39	46	1.3
All children under 6 years	41	42	1.3
All children 2–5 years	19	37	0.8
All children 6–12 years	31	52	1.8
All children 13–17 years	19	21	0.9
All households	250	38	1.5

the pattern was definite and showed a consistent increase of time used for ironing with an increase in number of pieces (table 22).

There was no apparent relation between number of persons in the household and number of pieces ironed (table 23). The average number of pieces ironed in households where there were children was somewhat higher than in households where all members were adults (table 24). The frequency of ironing may possibly be interrelated with the total number of pieces ironed and the number in the household.

Table 22. **Time used for ironing in relation to number of pieces ironed**
(29 households, New York, 1952)

Number of pieces	Number of households	Average hours used
0–9	7	1.1
10–19	9	1.5
20–29	4	1.7
30–39	6	1.9
40 and over	3	3.6

Table 23. **Number of pieces ironed in relation to size of the household**
(29 households, New York, 1952)

Number of persons in the household	Number of households	Per cent of households in which ironing was done	Average number of pieces ironed
2	70	10	14
3	56	7	13
4	59	14	33
5	41	22	18
6 or more	24	4	42
All households	250	12	22

Table 24. **Number of pieces ironed in relation to composition of the household**
(250 households, New York, 1952)

Composition of households	Number of households	Per cent of households in which ironing was done	Average number of pieces ironed
Households with:			
All adults	99	8	17
Children	151	14	23
All households	250	12	22

Work unit for ironing

Warren (6:431) based the work unit for ironing upon the number of pieces ironed. The unit increased from 40 minutes for 2 pieces to 236 minutes for 24 pieces.

Since the number of pieces ironed had the closest relation to the time used for ironing, this factor was again used as a basis for a work unit. The average time required to iron one piece was determined by totaling the number of pieces ironed in each category and dividing the total time for that category by this number. This time per piece decreased as the number of pieces increased.

Because the ironing unit was based upon a small number of cases, the ironing time for 23 households for which ironing records were available during the second phase of the study[8] was analyzed in relation to the number of pieces ironed. When the total of 44 ironing periods in these households was added to the total of the original 29 cases for which data were available, 2 minor changes were made in the unit (table 25). According to the new classification there were only 3 subdivisions of the size of load in number of pieces instead of the original 4.

The decrease in time per piece as the number of pieces increases is evi-

Table 25. **Revised work unit in ironing**
(29 households, 1952, and 23 households, 1955, New York)

Size of load in number of pieces	Total number of pieces in all households in which a load of this size was ironed		Average hours per given number of pieces		Ironing work unit	
	1952	1952 and 1955	1952	1952 and 1955	Original	Revised
1–4	7	20	0.3	0.2	0.3	0.2
5–9	26	90	0.2	0.2	0.2	0.2
10–19	145	281	0.1	0.1	0.1	0.1
20–29	88	257	0.08	0.07	0.1	0.07
30 and over	358	647	0.06	0.07	0.06	0.07

[8] This phase of the study is reported under **Exploratory Uses of Work Units.**

dence that the extra time required for "getting out and putting away" is less per piece when the number of pieces is large. It may be some indication, too, that a worker will set up an ironing board to do a few pieces only if the pieces are those that are more time-consuming.

To determine the work load in ironing, the number of pieces ironed was multiplied by the per-piece unit value allowed in the appropriate category of number of pieces. For example, if 8 pieces were ironed at one time, the units allowed were 8 times 0.2, or 1.6 units. If 16 pieces were ironed at another time the per-piece unit value (0.1) was multiplied by 16 pieces, or 1.6 units.

Exploratory Uses of Work Units

Use of work units with individual homemakers

In line with the objective, exploring uses of the work units, 24 homemakers from Ithaca and the surrounding area were asked to keep records of the time used in homemaking by all workers in their households for one week. The homemakers were asked to estimate at the close of each day the time used rather than to record "clock-watched" times. These weekly records had 2 purposes: to provide a basis for computing the work load for each day and for studying weekly work-pattern variations. The records for the 250 households upon which the work units were based were for one weekday only, and it therefore seemed desirable to check the work load for one week. Interviews with the homemakers provided an opportunity for experimenting with uses for the work units.

Procedure

An information sheet indicating the basis for, and the amounts of time allowed by, the units and a work sheet for measuring the work load were developed, reorganized, and clarified as the homemakers posed questions regarding their use. There were 2 revisions of both the information and the work sheets during the period in which the first 8 homemakers were recording the time used in homemaking and in computing the work load in their homes. Both full-time and part-time homemakers who could be readily reached and who were willing to assist were used.

To fill out the remainder of this exploratory group, staff members were asked for names of homemakers who would fit each of the following categories: homemakers who were busy because they had 2 or 3 children under 8 years of age, homemakers active in community activities, homemakers employed outside the home, and homemakers who lived on a farm. From the list thus obtained names were selected, somewhat at random, until there was a total of at least 5 homemakers in each of the above categories.

Each homemaker was called by telephone and asked if she would be willing to assist. At this time an estimate was made of the amount of time that

would be involved in keeping the records and for 2 visits by the author. The homemakers were told the purpose of keeping the records and the use that would be made of them in the study. When a homemaker expressed a willingness to cooperate, an appointment was made for a short visit in her home.

At the initial visit, the method of keeping the weekly record was explained, but the work units were not discussed. The kinds of activities which should be included in each of the categories of homemaking and the fact that the time was to be estimated rather than "clock-watched" were emphasized. A time was then set for a second visit to be made about a week later.

The interview at the time of the second visit was mainly unstructured. If certain kinds of information were not forthcoming in conversation, specific questions were asked. No notes were taken during the interview, but a detailed record was written immediately afterwards. This procedure was used to allow as much freedom of expression as possible during the interview. In general, work units as used in agriculture and their application to the work of the home were discussed. The development and basis of each of the units were discussed briefly before the work load for one day of the week for which the record was kept was computed. (This day was selected by the homemaker as one that she was interested in analyzing.)

The time spent by all workers of the household in doing each of the 6 tasks for which there are work units was compared with the average time used in the 250 households to do a similar amount of work. As these amounts of time were compared, the homemaker usually indicated, if the amounts of time were different, the possible reasons for the difference; if the times were similar, she usually indicated her satisfaction. The total day's work load, expressed as the total number of work units, was examined to find areas in which disproportionate amounts of time were being used and to note areas in which help was received from family members or paid helpers.

Finally, a definite effort was made to get the reaction of each homemaker as to the value of the units in examining the work to be done in her home.

Analysis of the one-week records

The records of the work of the households for a one-week period were studied to determine day-to-day variations in the work pattern.

Regular care of the house was of special interest in relation to work patterns. Variations were noted when the records for a week were examined. In many households large amounts of time were spent on 1 or 2 days of the week for this task, while very small amounts were used for it on other days.

As a result of the study of the weekly cleaning patterns, which varied considerably from house to house, a change was made in the plan of computing the work load in regular care of the house.[9] This change involved totaling

[9] For original method used, see page 16.

work. Three-fourths of the homemakers spoke of relaxing standards of work in one or more areas, and a similar number mentioned the help given by members of the family. About three-fifths of the homemakers indicated that they considered their planning a help in accomplishing their work. Several indicated the advantage of a schedule of work; one felt that this was a real timesaver, in that she was getting the job done while other homemakers were deciding whether or not to do it.

About one-third of the homemakers used some outside help, and almost as many told of their "tricks" for simplifying work. Only one-fourth of the homemakers mentioned the use of such outside services as commercial laundries or laundromats, restaurant meals, frozen or prepared foods. Three homemakers told of ways in which they had learned to make a disliked task more acceptable: 2 watched television while they did the ironing, and another ironed the more difficult pieces in the afternoon when her 10- and 12-year-old sons came home from school so that she could chat with them at the same time.

Mentioned as reasons why it was difficult to get the work done were: the presence of small children who frequently needed assistance and caused interruptions in the work, work done outside the home by the homemaker to reduce financial pressures, her assistance with the work of a family occupation, work in community activities, high standards of either the homemaker or other family members, and a lack of interest in the tasks of homemaking. Community activities were frequently mentioned as a reason why it was difficult to get all of the work of the home done. Some spoke of an effort to reduce the number of these activities; some spoke of being disturbed because they couldn't do more; some felt that they had obligations to the community; and some considered these to be leisure activities that made the work in the home somewhat more acceptable.

The number of homemakers who indicated high standards in one or more areas of homemaking was the same as the number who indicated a relaxing of standards. One-half of the 16 homemakers indicated that they had relaxed their standard in one area while they had maintained a high standard in another area. Only one-fourth of the homemakers mentioned a high standard in 2 or more of the 6 work-unit tasks of homemaking, while over one-half mentioned the relaxing of standards in 2 or more of them. The 2 tasks for which homemakers most frequently indicated they had relaxed standards were cleaning and ironing. About two-thirds of the homemakers said that they had relaxed their standards in cleaning, and the same number had relaxed their standards in ironing; one-fourth of the homemakers had relaxed standards in both of these tasks. Cleaning and ironing were the homemaking tasks that the largest percentage of the 250 homemakers in the 1952 group disliked. In the 1952 study, cooking was liked by the greatest number of homemakers, and only 3 of the 16 homemakers interviewed in 1955 said that they had relaxed standards in meal preparation. Several additional homemakers said that they served simpler meals at noon than they used to, but that they continued to have high standards for other meals.

Use of work units with groups

The work units were used in meetings with a group of homemakers and with groups of professional persons interested in the management of homes. The homemakers were local leaders in a home demonstration group. Those with a professional interest in work units included home demonstration agents, county agricultural agents, state leaders, specialists in farm and home management, and undergraduate and graduate members of a home management class.

With the group of homemakers, the units were used by a home management specialist to introduce a series of discussions on simplifying household tasks. The specialist found this an effective way to stimulate the interest of the group.

To the professional groups the work units were presented as tools designed to help families make decisions regarding their use of time in homemaking. It was explained that with the work units as an objective measure of their use of time, families can determine areas in which they differ from the average. Such a difference does not in itself indicate a need for a change; but, if the family is pressed for time or is dissatisfied with the household work, this difference may suggest that it should accept a different standard, adopt new work methods, purchase new equipment, or purchase services. The use of the work units can help families determine whether the homemaker might work outside the home, on the farm, or in the family business to relieve financial pressures, or whether she might give additional time to community activities. Work units can also help in determining whether contributions to the work of the home might be made by other family members.

Use of work units as a research tool in home management

The work units were used in the research for a Master's thesis by Kubach (2). They were used as a measuring tool in comparing the time spent by students in the homemaking apartment[10] with the time spent by homemakers in doing similar household tasks.

Reid (3) used the work units with another group of students in the homemaking apartment to test their usefulness as an evaluating tool in this situation. As a result of this work, she suggested that the homemaking work units be used to stimulate interest. She said:

> The work units used as a comparative tool, in conferences with the students on the time they had used in each task, served to stimulate the students to think and to analyze the reasons for their using large amounts of time in tasks and to think of ways they might work with time in the homemaking apartment and later as a homemaker (3:70).

[10] Students live in the homemaking apartment while they are enrolled in the homemaking residence course in the New York State College of Home Economics, Cornell University, Ithaca.

Summary

The method of measuring the work of the home quantitatively by means of work units was adapted by Warren (6) in 1936 from a similar measure utilized in agriculture. Using the work-unit concept thus developed and data collected by Wiegand (7) from 250 homemakers in New York State for her study of homemakers' use of time, the writer has developed work units for measuring quantitatively the work involved in 6 major homemaking tasks. A work unit, as used in this study, is defined as the amount of household work done under average conditions by an average worker in 1 hour.

A study was made of the factors which affect the amount of time used for each task; the factor found to have the greatest influence upon the amount of time used was taken as the basis of the work unit for the task. Work units were developed for these 6 homemaking tasks: dishwashing, meal preparation, regular care of the house, physical care of family members, washing of clothing and household linens, and ironing. The time used in performing these 6 activities represented an average of 78 per cent of the total time used in homemaking.

A major objective of this study was to explore the possible uses of the work units. This exploration was made in two directions: the use of the units with individual homemakers, and the use of them in meetings with homemakers and professional persons interested in home management.

The work units were used with 24 individual homemakers after they had kept a one-week record of the time used on homemaking tasks by all workers in their households. The record for one day was used to illustrate the value of the work units for computing the work load, and the record for the week was used for comparing the records of one day for 250 households with those of one week for the smaller group. Discussion with the homemakers also disclosed reasons for variations in the work load.

The chief purpose of the reports to professional groups on the use of work units was to describe to them the work-unit concept. The work units were presented to them as tools designed to assist families in making decisions regarding the use of time.

The work units were based upon the use of time in 250 households in New York State. These may be somewhat like other households in the State, but not necessarily like those in other geographic locations. The work-unit concept can be applied to other regions, but variations in customs make it desirable for work units to be developed for the section in which they are to be used. The agricultural work units are also applicable only in the region for which they are developed.

Revisions in the work units will be necessary as changes occur in homemaking practices, as new housing materials and equipment appear, if automatic equipment now on the market is more widely used, and if services outside the home increase in use. Frequent revisions of the agricultural work units have maintained their usefulness to farm managers from 1912 to the present.

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Appendix

New York State Homemaking Work Unit Chart

(Based on work in households of 250 families in Genesee County and Auburn, New York, in 1952)

Homemaking activity	Work done	Work units
Dishwashing	Number of persons for whom dishes are washed	
	2 persons	0.9 unit/day
	3 persons	1.0 unit/day
	4 persons	1.2 units/day
	5 persons	1.5 units/day
	6 or more persons	1.6 units/day
Meal preparation	Types of meals served*	
	Type-1 meal (very simple)	0.3 unit/meal
	Type-2 meal (simple)	0.5 unit/meal
	Type-3 meal (moderately complex)	0.8 unit/meal
	Type-4 meal (complex)	1.0 unit/meal
Physical care of family members (Playing with and reading to children not included)	Age of family members cared for daily	
	Youngest member under 2 years old	2.0 units/day
	Youngest member 2 to 5 years old	1.0 unit/day
	Youngest member 6 to 10 years old	0.6 unit/day
	Youngest member over 10 years old	0.0 unit/day
	Second member under 5 years old	0.5 unit/day
	Second member 6 to 10 years old	0.3 unit/day
	Second member over 10 years old	0.0 unit/day
	Third member under 5 years old	0.2 unit/day
	Third member over 5 years old	0.0 unit/day
Washing clothes	Number of tubfuls washed	0.5 unit/tub
Ironing clothes	Number of pieces ironed	
	1 to 9 pieces	0.2 unit/piece
	10 to 29 pieces	0.1 unit/piece
	30 or more pieces	0.07 unit/piece
	Each piece = 1 piece, except that:	
	2 towels or napkins = 1 piece	
	6 handkerchiefs = 1 piece	
Regular care of the house (All *daily* and *weekly* tasks)	Composition of households during the week	
	All-adult households	4.0 units/week
	Households with children under 18 years of age	7.0 units/week

* See pages 9–10 for explanation of meal types.

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Properties, Qualities, and Characteristics of Most and Least Liked Household Tasks

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Properties, Qualities, and Characteristics of Most and Least Liked Household Tasks[1]

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Studies in the field of home management over the past 35 years indicate an interest in determining which tasks are liked and which disliked by homemakers. The present study was not concerned with identification of liked and disliked tasks, but with what were the characteristics of these tasks that made them most or least liked.

Characteristics were thought to cut across task lines, thus the approach for this study was labeled "cross task." Miller (1:304) has stated:

> In order to identify common social factors of work situations it is necessary to divorce arbitrarily each occupation from its technical function. When stripped of their usual referents, jobs which seemed wide apart suddenly reveal themselves in striking similarity.

Because of an association between fatigue and attitude toward tasks reported earlier (2:38), it was hoped that by identifying the reasons tasks were most or least liked, further research could help find ways of altering the characteristics.

Group Interviewed

In the Binghamton, New York, area, 120 eligible homemakers were interviewed who had a kindergarten child in one of 11 of the schools in the area. Appointments were made by telephone with homemakers whose husbands were in occupational levels 3, 4, or 5, by the Hollingshead Occupational Scale (3). Occupation was ascertained by checking the City Directory and from information given over the telephone by the homemaker; occupation classification was successfully made during the telephone conversation.

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[1] Based on a thesis presented to the Faculty of the Graduate School of Cornell University, June 1962, in partial fulfillment of the requirements for the degree of Doctor of Philosophy. The research was supported by New York State Research Project No. 45.

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"Quality" was used to designate particular aspects of a household task within a property, and "characteristic" was used to indicate an aspect of a quality distinguishing liking from disliking a task.

Methodology

Open-end questions, specific questions, and graphic rating scales were used to find the characteristics and qualities of the most and least liked tasks. The methods were used in this sequence to minimize suggestions to the interviewee from the interview schedule.

Table 5. **Graphic rating scales used in interview schedule, by properties of tasks***

Means–end relations		
	Long-term results	Short-term results
Intrinsic interest		
	Like supplies and materials with which I work	Dislike supplies and materials with which I work
	Almost always completed as planned	Almost never completed as planned
	Like time spent	Dislike time spent
	Creative	Not creative
	Interesting	Monotonous
	Pride in results†	No pride in results
	Satisfying	Not satisfying
	Light work	Heavy work
	Much attention required	Little attention required
	Uses much manual skill	Uses little manual skill
	Uses much mental skill	Uses little mental skill
	Work with many parts or things	Work with few parts or things
	Can set own pace	Cannot set own pace
	Have much skill in this task	Have little skill in this task
	Not tiring	Tiring
	Can do as thoroughly as I'd like	Cannot do as thoroughly as I'd like
Social or physical situation		
	Adequate equipment	Inadequate equipment
	Results are appreciated by family	Results are not appreciated by family
	Can choose time of doing	Cannot choose time of doing
	Convenient arrangement of work area	Inconvenient arrangement of work area
	Pleasant location	Unpleasant location
	Easy to put off	Difficult to put off
	Another adult generally present	Another adult not generally present

* The graphic rating scales were presented in different random orders for the most and least liked tasks.
† Pride in results was considered in the thesis under "means–end relations" but appears in this publication under "intrinsic interest" because of the findings of the thesis.

The homemakers were first asked the open-end questions "What makes you like (*most liked task*)?" and "What makes you dislike (*least liked task*)?" The responses were independently classified by the author and another research worker, as nearly as possible according to qualities of tasks in the 24 graphic rating scales.

Specific questions were asked about the postural position of the worker, the amount of time spent on the task, interruptions of the task and how much they bothered the homemaker, and the past experiences of the homemaker with the task.

The graphic rating scales were made up of 24 sets of bipolar phrases (table 5). Scoring for the graphic rating scales was 1 through 5, from the positive to the negative side of the quality.

1 = positive side of scale describes task "very closely"
2 = positive side of scale describes task "fairly closely"
3 = "does not apply" or "both sides describe the task equally well"
4 = negative side of scale describes task "fairly closely"
5 = negative side of scale describes task "very closely"

The scoring did not appear on the interview schedule.

Characteristics of the most liked task were established from the graphic rating scales as those with a low mean score and small standard deviation. Characteristics of the least liked task were established from the graphic rating scales as those with a high mean score and small standard deviation.

Findings

Graphic rating scales. Characteristics of the most and least liked tasks, as established from the graphic rating scales were as follows:

Most Liked Task	Least Liked Task
Means–end relations	***Means–end relations***
	Short-term results
Intrinsic interest	***Intrinsic Interest***
Like supplies and materials	Dislike time spent
Almost always completed as planned	Not creative
Like time spent	Monotonous
Pride in results	Uses little mental skill
Satisfying	
Can set own pace	
Social or physical situation	***Social or physical situation***
Adequate equipment	Another adult not generally present
Results are appreciated by family	

A characteristic of either the most or least liked task did not indicate that the opposite was true for the other task. For example, "adequate equipment" was a characteristic of the most liked task—but the converse, "inadequate equipment," was not a characteristic of the least liked task. The

mean score for the least liked task for adequacy of equipment was 1.7, with a standard deviation of 1.1, while the mean score for the most liked task was 1.6, with a smaller standard deviation of .9 (table 6).

Open-end questions. Information about the qualities of tasks was strengthened through the open-end questioning (see p. 9), but less than 20 percent of the homemakers ever gave a quality that was not in the graphic rating scales.

Six characteristics not given in response to the open-end question by as many as 5 homemakers were "like supplies and materials," "like time spent," "adequate equipment" for the most liked task, and "not creative," "uses little mental skill," and "another adult not generally present" for the least liked task.

Table 6. **Qualities and accepted characteristics of most and least liked tasks from graphic rating scales and open-end questions**
(120 urban homemakers, Binghamton area, New York, 1961)

Quality	Graphic rating scale				Response to open-end question comparable to graphic rating scale‡	
	Most liked task		Least liked task		Most liked task	Least liked task
	Mean score	Stand. dev.	Mean score	Stand. dev.	Percent of 120 homemakers	
Means-end relations						
Duration of results	3.4	1.5	3.9*	1.4	†	18
Intrinsic interest						
Attitude to process	...	...	...	...	10	12
Attitude to supplies	1.6*	.8	2.5	1.4	†	15
Completion	1.5*	.9	2.4	1.6	11	17
Attitude to time	1.6*	.9	4.2*	1.2	..	23
Creativeness	2.7	1.5	4.3*	1.2	4	†
Interest and monotony	1.8	1.1	4.5*	1.0	12	9
Pride	1.2*	.4	2.0	1.2	63	7
Satisfaction	1.2*	.5	2.5	1.5	7	†
Past experience	...	...	...	...	6	†
Physical effort	2.2	1.2	2.7	1.6	†	†
Attention	2.4	1.3	2.6	1.4	7	4
Manual skill	3.0	1.3	2.9	1.5	†	..
Mental skill	3.7	1.3	4.2*	1.2	†	†
Number of parts	2.4	1.3	2.8	1.5	†	†
Pace-setting	1.5*	1.0	1.8	1.2	8	..
Possession of skill	2.1	.9	2.9	1.3	†	4
Tiredness	2.2	1.2	3.7	1.5	†	7
Thoroughness	2.0	1.3	2.4	1.5	..	..
Social or physical situation						
Adequacy of equipment	1.6*	.9	1.7	1.1	†	†
Amount of work	...	...	...	...	4	7
Appreciation	1.5*	1.0	2.5	1.2	27	..
Choice of time	1.7	1.2	2.0	1.4	..	8
Convenience of arrangement	2.1	1.5	2.6	1.5	..	6
Pleasantness of location	1.8	1.2	2.3	1.4	4	†
Position of worker	...	...	...	...	..	17
Postponability	3.4	1.5	2.7	1.7	14	8
Presence of adult	4.3	1.2	4.5*	1.0	8	†
Other	...	...	...	...	9	5

* Accepted as a characteristic of most or least liked task.
† Fewer than 5 homemakers.
‡ 120 homemakers gave 256 reasons for most liked task and 225 reasons for least liked task.

Importance of characteristics: graphic rating scales. The homemakers were asked to indicate from those included in the graphic rating scales their 3 most important reasons and their 3 least important reasons for liking the most liked task and disliking the least liked task. More than 20 percent of the homemakers gave the following qualities as most and least important:

Liking Most Liked Task		Disliking Least Liked Task	
Most Important	***Least Important***	***Most Important***	***Least Important***
Pride	Duration of results	Duration of results	Creativeness
Satisfaction	Creativeness	Attitude toward time	Presence of adult
Adequacy of equipment	Mental skill	Interest and monotony	
Appreciation	Tiredness	Tiredness	
	Presence of adult		

"Not creative" and "another adult not generally present" were considered least important in disliking the least liked task, and were not given in response to the open-end question by even 5 homemakers, but qualified as characteristics.

It should be noted that tiredness was one of the most important qualities in disliking the least liked task, although it was not accepted as a characteristic of the task. This fact supported Van Bortel and Gross (2) in that fatigue and attitude toward a task were associated.

The most important qualities in disliking the least liked task are of particular interest since further research could be done to alter these qualities. Duration of results may be a technological problem to which home economics cannot readily contribute. However, antecedents of attitude toward time, monotony, and tiredness remain unknown and may well be fruitful avenues for research concerning attitudes toward household work.

Importance of characteristics: open-end questions. Pride and appreciation were most important qualities in liking the most liked task in answers to the open-end questions; and duration of results and attitude toward time spent were somewhat supported as most important qualities in disliking the least liked task (table 7).

Specific questions. The specific questions concerned items that were not suitable for ratings. The mean time spent on the most liked task was 2.4 hours, and on the least liked task, 1.6 hours. The difference in time spent was significant ($X^2 = 20.20$, df $= 2$, $P < .01$) (table 8). Almost one-fifth of the least liked tasks were done monthly or less frequently, while only 7 percent of the most liked tasks were done monthly; the difference in frequency was significant ($X^2 = 8.60$, df $= 2$, $P < .025$).

Both the most and the least liked tasks had usually been learned at grade school age from the mother.

Table 7. **Importance of characteristics and qualities of most and least liked tasks from graphic rating scales and open-end questions**
(120 urban homemakers, Binghamton area, New York, 1961)

Quality	Graphic rating scale				Response to open-end question comparable to graphic rating scale	
	Most liked task		Least liked task		Most liked task	Least liked task
	Most important*	Least important*	Most important*	Least important*	Most important	
	Percent of 120 homemakers					
Means-end relations						
Duration of results	†	23	32	12	†	11
Intrinsic interest						
Attitude to supplies	8	4	8	12	..	9
Completion	7	†	12	†	†	8
Attitude to time	6	8	32	13	..	14
Creativeness	12	22	10	20	†	†
Interest and monotony	11	13	51	14	4	7
Pride	52	4	7	10	34	4
Satisfaction	50	†	8	8	6	†
Physical effort	†	13	8	12	†	†
Attention	†	9	5	9	5	†
Manual skill	..	17	4	9	..	..
Mental skill	..	21	6	15	..	†
Number of parts	†	11	†	13	..	†
Pace-setting	11	9	4	16	4	..
Possession of skill	4	12	5	16	†	†
Tiredness	7	23	36	11	..	†
Thoroughness	11	5	16	4	..	..
Social or physical situation						
Adequacy of equipment	22	5	†	17	†	..
Appreciation	48	†	7	13	20	..
Choice of time	16	16	10	15	..	5
Convenience of arrangement	12	10	10	6	..	†
Pleasantness of location	12	17	†	9	†	..
Postponability	†	9	15	8	†	†
Presence of adult	†	28	†	22	5	†

* One of 3.
† Fewer than 5 homemakers.

More than three-fourths of the homemakers moved around while doing the most liked task; one-half moved around while doing the least liked task. The difference in the movement while doing the most and least liked tasks was significant ($X^2 = 22.39$, df $= 1$, $P < .01$).

The homemakers were asked if they were usually interrupted when doing the most and least liked tasks, and if so, they rated how much the interruption bothered them. Interruptions by children—to be expected from the group studied—were reported more frequently than any other kind (table 9). For both the most and least liked tasks, more than half of the interruptions bothered the homemakers "sometimes."

In answer to a question that is not reported further here, "Why do you do it [most or least liked task] at this time?" almost one-third of the responses for the least liked task and more than one-fourth of the responses for the most liked task were classified as "to avoid interruption."

Table 8. **Qualities of most and least liked tasks from specific questions**
(120 urban homemakers, Binghamton area, New York, 1961)

Quality	Specific question	
	Most liked task	Least liked task
	Percent	
Intrinsic interest		
Actual time spent		
1 hour or less	22	49
1.1 hours - 2.0 hours	42	27
2.1 hours or more	35	21
Other	1	3
Frequency		
Daily or more	34	33
Weekly	57	47
Monthly or less	7	19
Other	2	1
Past experience in learning task		
When:		
Grade school age	45	45
High school age	27	27
After marriage	25	24
Other	3	4
From:		
Mother	53	55
Self	27	30
Other	13	11
Combination, mother and any other	7	4
Social or physical situation		
Postural position/movement		
Sit	2	2
Stand in one position	12	38
Move around	78	53
Both stand in one position and move around	6	2
Other	2	5

Table 9. **Kinds of interruptions in most and least liked tasks, and bother to homemaker**
(120 urban homemakers, Binghamton area, New York, 1961)

Kind of interruption	Bother to homemaker			Total interruptions
	Very much	Some-times	Hardly at all	
	Number of interruptions			Number
Most liked task				
Children	26	39	14	79
Telephone	5	35	14	54
Husband, neighbors, salesmen	6	7	4	17
Meals, equipment	1	3	1	5
Total	38	84	33	155*
Least liked task				
Children	26	38	9	73
Telephone	9	19	10	38
Husband, neighbors, salesmen	2	6	2	10
Meals, equipment	..	2	1	3
Total	37	65	22	124†

* 90 homemakers.
† 77 homemakers.

Groupings of Qualities

Methodology

The qualities of the most and least liked tasks were analyzed for groupings, and the groupings were examined with reference to the framework of the 3 properties of tasks: means–end relations, intrinsic interest, and social or physical situation. The 3 methods used for grouping the qualities were: principal components analysis, factor analysis, and cluster analysis (McQuitty method). Only the cluster analysis is presented here since the results compared favorably with the other two more complex analyses (6:152–174).

Cluster analysis is a method for grouping variables so that every variable within a cluster is more highly correlated with variables within the cluster than with any variable outside the cluster. McQuitty (7:207) has devised a procedure for elementary linkage analysis, or cluster analysis, which has as advantages "its provision for investigating a particular theoretical position, its speed, and its objectivity. . . The original solution of a linkage analysis gives the desired structure; no rotation is required."

A correlation matrix was computed using the 5-interval data, for all 24 graphic rating scales for the most and least liked tasks. The cluster analyses yielded interrelated clusters, particularly for the most liked task.

In examining the clusters, the correlations, and the distributions of the scale scores, two decisions were reached in an effort to find discrete groupings of the qualities.

The first decision was to divide the qualities into evaluative and non-evaluative. The decision was based on the interrelatedness of the clusters for the most liked task and on the relatively high correlations for the least liked task of 5 of the qualities that were judged to be evaluative: pride, satisfaction, creativeness, interest and monotony, and attitude toward time spent.

The second decision was to reduce the 5-interval scale to 2 intervals, with near-median dichotomization. The decision was based on the skewed distributions for some of the scales. Product–moment correlations were used for the non-evaluative qualities and tetrachoric correlations for the evaluative qualities.

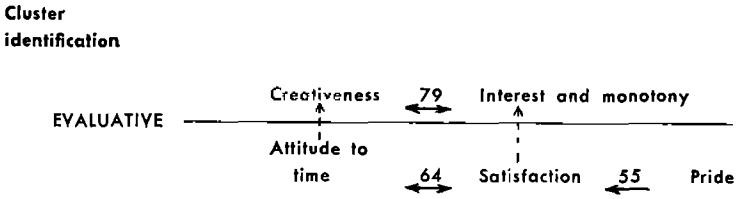
After locating the clusters from the correlations of the 2-interval data, the correlations between or among the reciprocal pairs of variables were found which were significantly different from 0.

Findings

The correlations for the 5 evaluative graphic rating scales, using the 2-interval data (near-median dichotomization) yielded 2 related clusters, with creativeness and interest and monotony as reciprocal pairs of variables in both the most and least liked tasks (figs. 1 and 2).

The correlations, for the 19 non-evaluative graphic rating scales with

Figure 1. Cluster analysis of evaluative graphic rating scales, two intervals, for most liked task.
(120 urban homemakers, Binghamton area, New York, 1961)



Key:

⟷ Reciprocal pair of variables.

⟵ Variable at the tail of the arrow is correlated highest with the one at the head, but the one at the head is not correlated highest with the one at the tail.

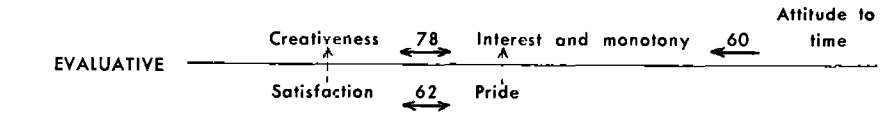
⟵ – – One member of the reciprocal pair of variables is correlated with a member of another reciprocal pair of variables (all – – – ⟶ correlations are significantly different from 0; all such correlations are omitted).

═══ Clusters considered independent, having no members of pairs of variables correlated significantly different from 0 with any other members of pairs of variables in other clusters.

Correlations rounded to 2 places; decimals omitted.

Note: This key applies to Figures 1-4.

Figure 2. Cluster analysis of evaluative graphic rating scales, two intervals, for least liked task.
(120 urban homemakers, Binghamton area, New York, 1961)



near-median dichotomization, clustered into groups related to the properties of tasks for both the most and least liked tasks (figs. 3 and 4).

Tiredness and physical effort dominated the cluster labeled by the author, *demands of task*; the cluster, *control over task,* included choice of time, pace-setting, and thoroughness for both the most and least liked tasks.

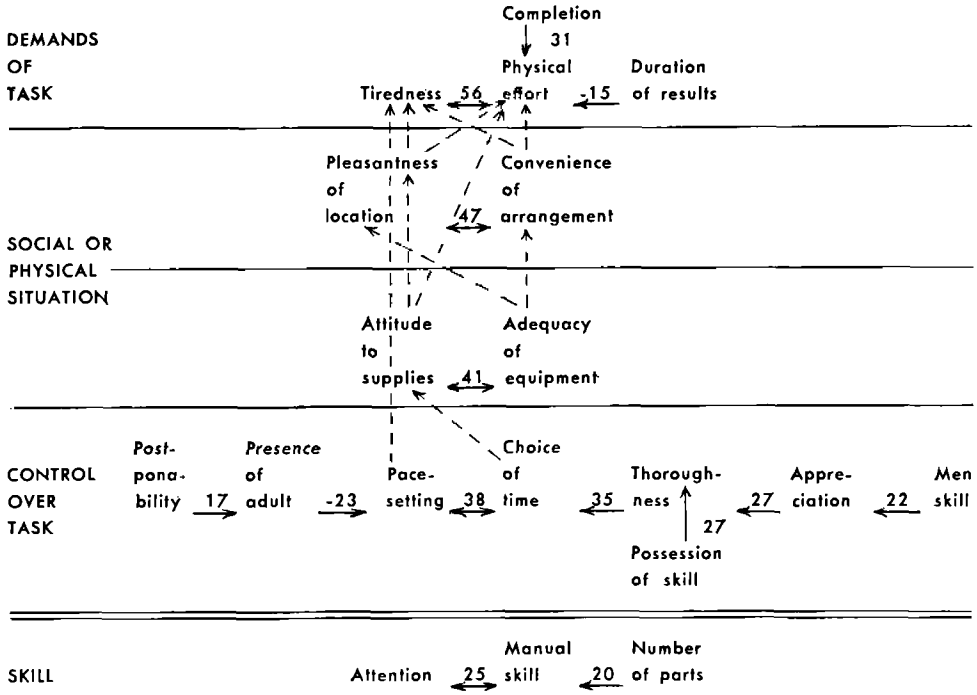
Social or physical situation for the most and least liked tasks was composed of pleasantness of location, convenience of arrangement, attitude toward supplies, and adequacy of equipment.

Skill included attention, manual skill, and number of parts for the most and least liked tasks.

One cluster possibly representing *means–end relations* for the least liked task contained duration of results, presence of adult, and mental skill;

***Figure* 3. Cluster analysis of non-evaluative graphic rating scales, two intervals, for mos liked task.**

(120 urban homemakers, Binghamton area, New York, 1961)

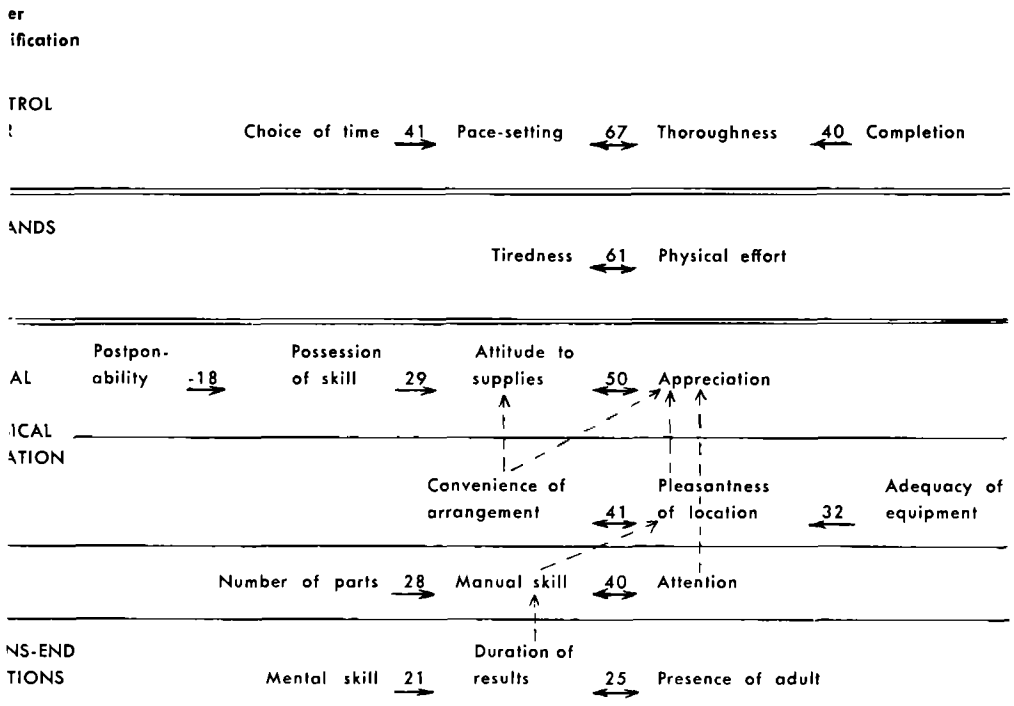


the same grouping did not appear in the most liked task.

The most liked task particularly revealed the complexity of qualities of tasks and the difficulty in delineating them; there were many interrelationships between reciprocal pairs of variables in different clusters.

Figure 4. **Cluster analysis of non-evaluative graphic rating scales, two intervals, for least liked task.**

(120 urban homemakers, Binghamton area, New York, 1961)



Summary

In the spring of 1961, 120 homemakers were interviewed to determine characteristics of most and least liked household tasks. This group of urban full-time homemakers comprised mothers who had a kindergarten child and all other children under 8 years of age, in middle social positions, in households with no adults other than the homemaker and her husband, and who had lived in the present home for at least 4 months.

The homemakers were living in the Binghamton, New York, area. All cooperative eligible homemakers who had a kindergarten child in one of 11 of the schools in the area were interviewed.

Most and least liked tasks, as defined by the homemakers, were classified by levels of generality of task definition: task area, general task, specific task, and very specific task. There was a significant difference (X^2) between the most and least liked tasks, with more homemakers reporting a general task as the least liked. The description of the most and least liked tasks was classified into 3 parts: "getting ready," "doing," and "putting away." Almost every homemaker reported "doing," although few reported "putting away" as a part of the most or least liked task.

Cooking, cleaning, and washing were given most frequently as most liked; cleaning and ironing as least liked tasks.

Open-end questions, specific questions, and 5-interval graphic rating scales were used in the interview schedule.

Characteristics of the most liked task as established from 24 graphic rating scales were: "pride in results," "satisfying," "adequate equipment," "results are appreciated by the family," "like supplies and materials," "like time spent," "can set own pace," and "almost always completed as planned." The first 4 were given by the homemakers as most important in liking the most liked task. Least important qualities were: duration of results, creativeness, mental skill, tiredness, and presence of adult other than homemaker.

The characteristics of the least liked task as established from graphic rating scales were: "short-term results," "dislike time spent," "monotonous," "not creative," "uses little mental skill," and "another adult not generally present." In addition to the first 3 characteristics, tiredness was given as most important in disliking the least liked task, although it was not accepted as a characteristic. Least important characteristics were: "not creative" and "another adult not generally present."

Through specific questioning, significant differences in most and least liked tasks (X^2) were found in the length of time spent on the task, frequency of doing the task, and movement of the homemaker while standing to do it.

Of the 24 graphic rating scales, 5 evaluative and 19 non-evaluative scales were cluster-analyzed by the McQuitty method. Near-median dichotomization of the scale data was used for correlations.

For the most and least liked tasks, groupings of the non-evaluative qualities were labeled: *control over task, skill, demands of task, social or physical situation,* or a combination of these. The groupings were related but not identical to 3 properties of tasks: means–end relations, intrinsic interest, and social or physical situation. Qualities accepted as characteristics existed in all properties.

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SIGNS OF THE TIMES

HOME ECONOMICS IN PENNSYLVANIA COLLEGES

LAURA W. DRUMMOND

So you are coming to Pittsburgh! Pennsylvania welcomes you and extends a cordial invitation to visit the many colleges within easy access of Pittsburgh. Plan for extra days to adventure into the beautiful mountains and fertile valleys of the state. You will find interesting colleges and universities in every direction as you enter and leave the convention city.

Of the thirty-seven Pennsylvania colleges and universities open to women, fourteen offer instruction in home economics. In addition, two of the thirteen state teachers colleges, two technological schools, and one negro institution offer home economics courses, making a total of nineteen.

Two of the nineteen colleges, Margaret Morrison College of Carnegie Institute of Technology and Mt. Mercy College, are close to convention headquarters in Pittsburgh. Mercyhurst College and Villa Maria are in Erie on the way to Canada and the Great Lakes. A one-day circle tour can be planned to include Indiana State Teachers College in the town of Indiana; the Pennsylvania State College in the geographical center of the state; Juniata College in Huntingdon, the heart of the Amish district; and Seton Hill College in Greensburg. Farther to the northeast is Mansfield State Teachers College, where a new home economics building is under construction. Close to the Pocono Mountains, famous for clear air and cool forests, are Misericordia College in Dallas and Marywood College in Scranton. The remaining eight colleges are in the historic southeastern part of the state: Albright College in Reading, Cedar Crest College in Allentown, Beaver College in Jenkintown, Immaculata College in Immaculata, Cheyney Training School for Teachers in Cheyney, and Mt. St. Joseph College, Drexel Institute of Technology, and Temple University in Philadelphia.

Over 1,700 young women were registered in home economics curricula in Pennsylvania colleges during 1937–38, many of them preparing to teach home economics. The demand for teachers in the secondary schools is so great that several institutions reported 100 per cent placement last year. The great need for home economics teachers prepared to work effectively with adult groups, boys' classes, and in home and community projects has required more adequate provision for this type of undergraduate experience. The new state plan makes such provision. The plan is the result of group thinking in the Pennsylvania Home Economics Teacher Education Conference, a group including representatives of the thirteen colleges with curricula approved for vocational teacher preparation and of the Department of Public Instruction. The Conference has been meeting regularly for the past two years in an effort to integrate and improve home economics teacher education programs in Pennsylvania. The project undertaken by the group this year has been to suggest, organize, and make available vital learning experiences appropriate to carefully articulated goals for the preparation of teachers.

During the last five years there has been a marked growth in the number of college courses in home economics open to all students. Pennsylvania colleges are in-

creasingly accepting responsibility for educating all their young people in many aspects of family living. In ten of the nineteen colleges, service courses in home economics are now available to students not majoring in the field. Several institutions welcome students from other departments into the regular home economics classes, and a few provide individual instruction for students with special interests. Institutions serving the largest groups are the Pennsylvania State College and Temple University.

This year the Pennsylvania State College organized classes in home economics for 457 freshman and sophomore women in the lower division of the School of Education and the School of Liberal Arts, in addition to serving 368 undergraduate students majoring in home economics. Instruction included the relation of food to health, family food service, personal grooming, problems of student purchasing and finance, and family life adjustments. Fifty-three men enrolled in service courses, most of them in Catering for Fraternities. Eight men are following the new sequence in hotel administration.

Temple University finds courses in food selection, clothing selection, textiles, and social behavior popular with both men and women students from many departments. Over one hundred men and women registered for the new interdepartmental course, Marriage and Family Relationships, offered for the first time this spring.

Although preparation for teaching and homemaking are the primary purposes of home economics instruction in Pennsylvania colleges, some offer special preparation for allied fields. Institutional administration is chosen by many students at Drexel Institute, the Pennsylvania State College, Seton Hill College, and Carnegie Institute. Summer participation and winter visits to hospitals, cafeterias, restaurants, and tearooms form an important part of the undergraduate experience. Two colleges, Marywood and Temple, use their own hospitals to provide direct institutional experience as part of regular classwork. Drexel Institute and Carnegie Institute offer special preparation for commercial and retail fields through options in applied art, textile economics, merchandising, and dress design.

Graduate work in home economics leading to the master's degree is offered in three Pennsylvania colleges—Drexel Institute, Temple University, and the Pennsylvania State College. The Pennsylvania State College also offers courses in home economics education, nursery school, nutrition, and textile chemistry leading to the doctor's degree in philosophy or education. This land-grant college is well known for its research in the textile field.

For several years an interesting project in adult education has been developing on the State College campus. Sponsored by the College and the State Federation of Pennsylvania Women, the School of Family Relationships meets in June for one week of intensive study of family problems. This year parents, teachers, and leaders of adult groups will gather for the sixth annual meeting of the School from June 13 to 17 to discuss questions of concern to all members of the family. Home gardening, consumer education, correction of speech and reading difficulties, and character development in the home will receive special emphasis. The meetings will be open to visitors and to students attending intersession.

A number of Pennsylvania colleges offer summer session courses in home economics. In most of these institutions adjustments will be made for those who so desire to attend meetings of the American Home Economics Association in Pittsburgh. Plan to come early to visit Pennsylvania colleges and stay for a holiday in the Pennsylvania mountains.

TURKISH TOWELS AND SPECIFICATIONS

MARGARET B. HAYS

Turkish or terry towels occupy an important place in the textile budget for the household. The woman who wishes to replenish those in her linen closet, however, is often unable to reorder the quality she found so satisfactory last year. True she can buy the same brand, but each manufacturer makes an extensive range and designates each quality to the wholesale trade by a number or name. Unfortunately it is not so identified to the ultimate consumer. To help her select a towel suitable for her needs from the vast array offered, the Bureau of Home Economics has suggested dividing cotton turkish towels into five types.[1] Specifications have been outlined for four of these types. The fifth type represents ribbed towels; because these are at present available only in relatively limited numbers and because their construction has special features, no specifications for them have yet been set up.

The classification of towels into the four proposed types is on the basis of the ply of the ground warp and the ratio of the number of ground to pile yarns. For convenience, type 1 is the designation for those that have a single-ply ground warp with half as many ground as pile ends. Those having a single-ply ground and an equal number of ground and pile yarns are called type 2. Type 3 has 2-ply ground warps with half as many ground as pile ends. In this type as well as in type 1, two pile yarns weave as one. In type 4, the ground warps are 2-ply and equal to the pile yarn in number. No quality rating is indicated or implied by the sequence of the numbers 1 to 4. The designations were selected simply for convenience.

In a study conducted at the Bureau of Home Economics, 74 qualities of turkish towels, sold under 12 brands, were analyzed. Three of these were ribbed. Of the remaining 71, all but one could be classed within the four types outlined above. This one exception was a so-called "triple thread" towel with three pile yarns woven as one. Among the other 70 towels, on the basis of the proposed classification, there were 26 that could be classed as type 1, 12 as type 2, 12 as type 3, and 20 as type 4.

Specifications for 4 types of turkish towels

TYPE	PLY OF GROUND WARP	YARNS PER INCH			WEIGHT PER SQUARE YARD	BREAKING STRENGTH (STRIP)		WATER ABSORBED PER SQUARE YARD
		Ground	Pile	Filling		Warp	Filling	
		number	*number*	*number*	*ounces*	*pounds*	*pounds*	*ounces*
1	single	22	44	26	8.0	18	30	32
2	single	26	26	30	8.0	26	30	36
3	double	26	52	32	10.0	34	34	40
4	double	30	30	34	11.0	44	34	40

The values for number of yarns per inch, weight per square yard, and breaking strength were found to vary considerably for each of the four types. Using the analysis of these 70 qualities of towels as a basis, the Bureau of Home Economics suggested the specifications given in the above table as possible minima for the four types. In the case of colored towels, there should be a specification regarding colorfastness to laundering in addition to the points here mentioned.

Considering the proposed specifications

[1] M. B. HAYS. A consumer classification and specification for cotton turkish towels. *Rayon Textile Monthly*, Vol. 19 (April 1938), pp. 253–254, 280.

as a whole, it was found that 18 of type 1, 8 of type 2, 9 of type 3, and 17 of type 4 met all the requirements for number of yarns per inch, weight, breaking strength, and amount of water absorbed. An article on page 406 reports that for towels meeting the specifications for types 1 and 4, the towels of type 4 were stronger and heavier throughout service than were those of type 1. However, further serviceability studies are needed to determine the relative use value of towels that just meet these suggested standards. The proposed classification is of immediate use as a general guide to enable consumers to obtain the kind of towel best suited to their needs.

AMERICAN ASSOCIATION FOR HEALTH, PHYSICAL EDUCATION, AND RECREATION

KATHARINE MCFARLAND ANSLEY

The conference held in Atlanta, Georgia, from April 20 to 23, 1938, was the forty-third annual meeting of the American Association for Health and Physical Education, but the first since this association joined forces with the National Education Association by merging with the Department of School Health and Physical Education last year. At that time, home economists were pleased to note that in the Health Education Division (there are three divisions: health education, physical education, and recreation, each further divided into sections) the importance of nutrition in the health education program had been recognized and a nutrition section formed.

At the Atlanta meeting, this section got off to a very good start. The program was arranged by Jennie Tilt of Florida State College for Women, and was well attended by an interested and representative crowd. In all the talks, aspects of the importance of the school lunch in the health program were accented. The first speaker was Eleanor Green of Florida State College, who based her discussion of "The Organization of the Health Education Program in the School" on her recent work and the interesting studies made on health habits of children in Nassau County, New York. The American Home Economics Association was represented on the program by its executive secretary, who spoke on "The Contribution of the Home Economics Teacher to the School Health Program." Mrs. Ethel A. Martin of the National Dairy Council discussed "Home-School Co-operation," bringing out the fact that without such co-operation there can be no effective school health program. Anna Tracy of Florida State College, president-elect of the American Dietetic Association, spoke on "The Administration of the School Lunch," particularly emphasizing the necessity of having the school board, or its counterpart, recognize the school lunch as an integral part of the school system and assume the responsibility for it and for determining its general policies.

Marjorie Heseltine, nutritionist, U. S. Children's Bureau, spoke on "The Contribution of the Public Health Nutrition Program to the Health of the School Child," closing the session by bringing out very clearly that the two words "health" and "education" should be given equal emphasis. She made the point that earnest health workers often lose sight of the necessity for sound educational method and that educators get absorbed in method to the exclusion of presenting up-to-date, factual health material.

At the business meeting of the section, the present officers—Carlotta C. Greer, John Hay Technical High School, Cleveland, and Dr. Marietta Eichelberger, Evaporated Milk Association, Chicago—were re-elected as president and secretary. Pro-

posed by-laws and standards for membership in the section were approved.

Since the Association requires that a section shall have a minimum number of members, it is important that home economists realize that, since health education in the schools is a co-operative project in which they wish to play a part, they should begin by applying to the secretary for membership. Dues are $2 a year.

At the New York meeting of the National Education Association, there will be no individual section programs of this department; each section will contribute to the division program. Home economists frequently feel that they have very little opportunity to preach the gospel to others than their own already converted colleagues. The American Association for Health, Physical Education, and Recreation affords this kind of opportunity.

EDITORIAL

PITTSBURGH, JUNE 28 TO JULY 1

Speakers and topics for the two general and many smaller group sessions to be held during the thirty-first annual meeting of the American Home Economics Association have been listed in detail in the *Bulletin* sent to all members in May. So, too, have the many pleasant diversions planned by our hospitable Pennsylvania hostesses. Practical arrangements for travel, hotels, and trips have also been described. The only thing left to do here is to indicate very briefly some of the more important matters of business which may come up for action.

The first is the election of a vice-president, a treasurer, and a councilor-at-large by members of the council. The nominating committee has proposed the following slate: for vice-president, Clyde Mobley, state supervisor of home economics, Baton Rouge, Louisiana, and Jessie W. Harris, director of the School of Home Economics, University of Tennessee; for treasurer, Mrs. Kate W. Kinyon, supervisor of home economics, Denver, Colorado, and Laura W. Drummond, director-elect of the home economics department, Pennsylvania State College; for councilor-at-large, Ivol Spafford, University of Minnesota, and Mrs. Bessie Brooks West, Kansas State College.

Reports of officers, departments, divisions, and committees often seem tedious; yet the strength and influence of an organization depends largely on a well-informed, actively interested membership. Mrs. Burns hopes that this year the business sessions may be made more vital by leaving more of the routine business to the executive committee and using the time of the council and the general members for informal consideration of important matters of policy. The more members join in the discussions, the better.

Always important is the report of the legislative committee. The committee and the officers of the Association are anxious for the action taken on this to represent the well-considered judgment of the general membership. The report will be presented at the council meeting on Tuesday but will not be acted on until the full business session on Thursday. Time will be allowed for general discussion.

Another subject which it is hoped will be freely discussed is the Consumer-Retailer Relations Council which was formed a year ago with the American Home Economics Association as the first consumer member.

REPORT OF THE ADVISORY COMMITTEE ON EDUCATION

The general features and recommendations contained in the report of the President's Advisory Committee on Education (often called the Reeves Committee) were described on pages 334 and 335 of the May JOURNAL. The purpose of the present editorial is to point out special statements of particular concern to home economics.

The first of these (on page 75) summarizes the home economics work hitherto done under federal grants for vocational education:

> Home economics until recently has had only a small percentage of the total Federal funds for vocational education in public schools. Some funds were provided for home economics even in the original Smith-Hughes Act of 1917, however, and a federally assisted program has existed since then for home economics instruction in the schools. At the

same time, local school authorities, with some State supervision and leadership, have continued to develop extensive programs in home economics. An effort apparently was made in some quarters to foster the conception that only the federally aided program was vocationally valuable, and an artificial distinction between "vocational" and "nonvocational" home economics was promoted. The federally aided program unquestionably had the effect of raising standards, but dissatisfaction and reduction in the full benefits of the program have resulted from the separatist tendencies it engendered in the teaching of home economics.

In recent years the administration of Federal aid for home economics has been substantially more satisfactory to State and local authorities than was once the case. Arbitrary rulings have been less frequent, and the responsible Federal officials have apparently attempted to cooperate with all groups in the home economics field. Emphasis has been placed upon a broad type of instruction, and much content of a social nature is now included within the field of home economics. The evidence points clearly to improved offerings and an increased demand for instruction in homemaking in the future.

Under the heading "The Coordination of Federal Educational Activities" we find the following (pages 188 and 189):

These various activities are not well coordinated from an educational point of view. They are operated independently and seldom unite except on a temporary basis of cooperation. For example, the Vocational Division of the Office of Education, the Agricultural Extension Service, and the Department of Labor all have certain common interests through some overlapping of functions, but they operate independently and without sufficient regard to the mutual adjustment of their activities for the best results.

The establishment of a new executive department including public health, education, and welfare would facilitate the problem of coordinating educational activities. Many and perhaps most of the Federal educational activities, however, in order to retain their effectiveness must retain their present locations within the structure of the executive branch. . . .

A somewhat similar problem has been effectively dealt with for the fields of health and welfare by the establishment of the Interdepartmental Committee on Health and Welfare, under the chairmanship of the Assistant Secretary of the Treasury in charge of public health activities. The Committee recommends the establishment of similar facilities for coordination of the educational activities of the Federal Government.

Elsewhere (page 220) the Committee recommends that "an interdepartmental committee should be established for coordination of the educational activities of the various agencies of the Federal Government."

In a section (page 206) discussing desirable changes in existing statutes and the provisions to be included in new ones, there is a paragraph which approves the policy of leaving it to the states to define what shall be considered as vocational education, emphasizes the importance of vocational guidance, and ends with this sentence:

Funds available for vocational education in agriculture and homemaking should be available for cooperation with the Cooperative Agricultural Extension Service in club work for rural boys and girls, regardless of their age or academic status.

On the next page we read:

The present minimum age of 14 for pupils should be retained as a general provision in connection with special Federal aid for vocational education, although an exemption from any minimum age limit should be provided in connection with club work for rural boys and girls.

The section on "The Land-grant Colleges and Associated Activities" (pages 213 and 214) is worth quoting almost in full:

1. If the Cooperative Agricultural Extension Service continues to be primarily an educational agency administered by the land-grant colleges, increasing attention should be given to the development of appropriate relationships between the Extension Service and the public school systems in the rural areas of the various States.

2. No Federal agency should officially sponsor national organizations of youth or promote youth organizations with commercial assistance, although desirable types of club work under State and local educational agencies and under private noncommercial auspices may well be encouraged.

3. Eventually it may be possible for teachers in rural schools to be of much assistance in the local

promotion and development of 4-H club activities. The Extension Service should continue to maintain a major interest in club work in cooperation with the schools, and continue to employ specialized personnel for the purpose, particularly among the subject-matter specialists stationed at the land-grant colleges.

4. Attention should be given to the development of increased cooperation between the Extension Service and the schools in providing adult education for agriculture and homemaking. In view of the established position of the Extension Service in the special type of education it provides for adults, public schools should seldom provide courses in agriculture and homemaking for adults in farming areas without the sponsorship and active cooperation of the local representatives of the Extension Service.

5. The existing grants for instruction in the land-grant colleges and for the related activities of research and extension should be continued, and the increases now authorized by law should be made. Whenever the legislation providing for these grants is reconsidered, careful attention should be given to the bases of allocation among the States and to the revision of the matching requirements that now exist in connection with certain of the funds. The land-grant colleges and the United States Department of Agriculture should give increased attention to a more equitable distribution of the extension funds within States.

Up to the present, the U. S. Office of Education has been the only agency in the federal government from which home economics can expect help in the form of surveys, reports, and advisory conferences on trends in home economics education. For some years before the Federal Board for Vocational Education was amalgamated with it in 1933, there had been a specialist in general home economics on the staff of the Office of Education. Since then, the only home economics work done in the Office has been that for vocational homemaking education. All this gives special interest to some of the Reeves Committee recommendations regarding the Office (page 219):

The United States Office of Education should remain predominantly an agency for research and leadership; its administrative duties should be confined primarily to the administration of grants. Provision should be made for an adequate staff of highly competent leaders in the various educational fields who can cooperate effectively with the States on an advisory basis in the planning of programs. . . .

Appropriate provision should be made for the utilization of advisory services by the Office of Education. Systematic and frequent conferences with a council made up of the chief State school officers of the various States should be one of the major procedures in the development of cooperative plans for the administration of Federal grants to the States. The consultative services of specialists should be available and should be used, both by bringing in individual consultants from time to time and through the use of special advisory committees representing educational and lay interests. Flexible appointment procedures and funds should be provided for these purposes.

The committee further recommends that the existing Federal Board for Vocational Education be abolished on the ground that in its present form (reorganized in 1933) it seems unable to fulfill the advisory functions for which it was planned.

The final section, "Long-range Planning for Education," includes a paragraph of decided interest to home economics (page 220):

The basic research needed for educational planning should to a large extent be carried on by educational agencies, Federal, State, local, and private. Among these agencies, the departments of rural sociology and of agricultural and home economics in the land-grant colleges should be included. There is need for leadership in bringing about joint effort among the land-grant colleges, the colleges of education, and the State departments of education of the various States.

FEDERAL AID TO EDUCATION BILL

On April 19 a bill was introduced into the Senate by Messrs. Harrison of Mississippi and Thomas of Utah to implement the major provisions of the Reeves Committee report. Technically, it is called an "amendment (in the nature of a substitute)" to S. 419, the Senate version of the Harrison-

Fletcher bill already before both houses of Congress. The new measure was drawn up by representatives of various educational organizations; a preliminary draft was discussed at a conference of yet more organizations (including the American Home Economics Association) but was later changed to make it acceptable to certain groups. Title I deals with grants to states for the improvement of public elementary and secondary education and includes four parts: general federal aid, improved teacher preparation, construction of school buildings, and administration of state departments of education. Title II deals with grants to states for adult education; Title III, with grants to states for rural library service; Title IV, with grants for co-operative educational research, planning, and demonstrations; Title V, with education of children of federal wards and employees residing on federal reservations and at foreign stations; and Title VI, with general and miscellaneous provisions.

A point on which the new bill differs considerably from the Reeves Committee recommendations is that it makes no important changes in the way in which existing funds for vocational education are to be administered.

Advantages for home economics in the proposed measure come from the share which individual state plans may give to it in the grants for general aid to education, adult education, and rural libraries; from the provisions for better co-ordination of the educational programs of federal agencies within a state; and from more educational research, planning, and demonstration.

Underlying the whole measure is, of course, the principle of general federal aid for education in the states—a principle on which the American Home Economics Association has never formally expressed itself, save as it has approved measures like the Smith-Hughes and Smith-Lever Acts, which carry federal aid for special forms of education. If the bill has not been passed when the Association meets late this month, it will undoubtedly be brought up by the legislative committee and the membership can decide whether or not it wishes to support the measure and the principle on which it is based.

FOOD, DRUG, AND COSMETIC ACT

Until April 14 the status of federal legislation for the revision of the food and drug bill remained much as described on page 250 of the April JOURNAL. On that day, a new version of the oft-amended S. 5 was reported to the House by the Committee on Interstate and Foreign Commerce. Section 701 (f) of this version contained a provision according to which regulations issued by the Secretary of Agriculture would be subject to slow, judicial review and would prevent quick and effective action against dangerous and fraudulent products. A minority report protested against this section and quoted Secretary Wallace as saying:

> I am of the opinion that if section 701 (f) remains in the bill its effect would be to hamstring its administration so as to amount to a practical nullification of the substantial provisions of the bill.
>
> It is the Department's considered judgment that it would be better to continue the old law in effect than to enact S. 5 with this provision.
>
> If there is to be exploration into new fields of administrative law, may I urge that it not be in the field of vitally important public health legislation.

The American Home Economics Association was one of fourteen organizations in the Women's Joint Congressional Committee whose representatives promptly sent a letter of strong protest to all members of the House, saying that unless the section was struck out, their organizations must oppose the enactment of the measure. State associations were informed of the situation, with the suggestion that they protest immediately to their congressmen.

CHILD LABOR LEGISLATION

In *The American Child* for April is a half-page article headed "Status of State Child Labor Legislation." The first half column states very succinctly the three features which it is generally agreed are essential to any good child labor law, and the second summarizes the extent to which state laws now provide these features. We reprint them here as an aid to state home economics associations or individual home economists working for child labor legislation.

WHAT A GOOD CHILD LABOR LAW SHOULD PROVIDE

1. *A 16-year age minimum for employment during school hours.*
   Children under 16 years belong in school, not in industry. Every available job should go to an older youth or adult, millions of whom are still unemployed.
2. *An 18-year age minimum for hazardous employment.*
   It is estimated that in a year of normal employment conditions 50,000 boys and girls 17 years and younger are injured in industrial accidents.
3. *Limitation of hours for minors under 18 years.*
   Boys and girls under 18 years have not yet attained full maturity and growth. When they enter industry definite restrictions should be placed upon the number of daily and weekly hours of work permitted. At a time when limitation of hours even for adult workers is being increasingly demanded, the desirability of such protection for minor workers would seem to be almost self-evident.

WHAT STATE CHILD LABOR LAWS DO PROVIDE

1. Only 10 states have a 16-year age minimum for employment during school hours. Three states have a 15-year age minimum; 24 have a 14-year age minimum; 8 through exemptions still permit children under 14 to leave school for employment.
2. Thirty-one states have practically no restriction on hazardous employment for 16- and 17-year-old minors. Nine states have practically no such regulation even for children of 14 and 15 years.
3. *For children under 16 years.*
   Of the states permitting factory employment under 16 years, only 3 have limited working hours to 44 a week; 29 to 48 hours; 6 permit 54 hours or more.
   For minors 16 and 17 years.
   Only 17 states have limited hours to 48 a week or less and in 5 of these the limitation applies only to girls; 14 have a 49½ to 54 hour week, but in 11 it applies only to girls; 9 have a 55 to 60 hour week but in 5 it applies only to girls; 8 states have no limitation.

Of course the actual laws are complex. A detailed summary or analysis of those of any state will be sent on request by the National Child Labor Committee, 419 Fourth Avenue, New York City.

THE SEVENTH INTERNATIONAL MANAGEMENT CONGRESS

From September 19 to 23 the Seventh International Management Congress will be in session in Washington, D. C. As usual, attendants at the Congress will be not official delegates of organizations but individuals sufficiently interested in being present to spend the time and the $10 registration fee. Although the name of the Congress hardly suggests it, the program will include material of decided significance to home economics.

An International Management Congress brings together persons from various countries who are interested in the application of scientific principles to the management of any enterprise. The movement began perhaps a quarter of a century ago when the principles in which Taylor was a pioneer were coming to play a decisive part in developing methods of mass production and modern industry in general. At first the movement was often spoken of as Taylorism; then more general terms were used, scientific management, efficiency engineering, or simply management being preferred in this country and rationalization in Europe.

Although it is foolish to carry the parallel

between industrial and household management too far, the resemblance between them made it natural that people concerned with home management should try to apply some of the new principles of efficiency in business to household efficiency. The United States, with its lead in mass production, its shortage of paid household workers, and its "gadgeteering" propensities, naturally saw a tremendous tide of theoretical discussion and practical experimenting with labor saving in the home; and though some of it now looks a bit quaint and overdrawn, our present philosophy and practices of homemaking owe much to the movement. The same has been true in many other countries, though often with somewhat different emphasis.

To Czechoslovakia is probably due the credit of effecting the entry of domestic management into the program of the International Management Congresses. Home economists in this country may remember how after the Rome Congress of 1926 Dr. Stan Špaček of the Ministry of Public Works, Czechoslovakia, while on an official mission to the United States, urged them to get behind the effort to promote such a section in the next congress. His fundamental arguments were that without efficiency in household production, one principal field of production would be dangerously out of step with production elsewhere and that without efficiency in ultimate consumption—that is, in the home—the other elements of the national economy would not operate with maximum efficiency. These arguments had been accepted by the Congress, at least to the point of adding a domestic management section to the program for the 1929 Congress in Paris. The American Home Economics Association co-operated in arranging for several American papers, and Anna E. Richardson was present to speak for the Association in the deliberations about future policies. Similar action was taken in connection with the 1932 Congress in Amsterdam, and again in 1935 when the Congress met in London.

It was hardly to be expected that the domestic management section should cut a wide swath at any of these congresses, but at least it functioned; and at each congress its meetings were stronger than at the preceding one. At London, the Congress entrusted the arrangements for the section program to a group of leading Englishwomen; and though some of them were not technically familiar with the field, they had enough pride in their sex to see to it that the section made a good showing. In fact, their publicity arrangements were so much more carefully worked out than those of the Congress in general that the women's meetings got far more than their share of attention in the London papers.

The prospects for the section at Washington are excellent. The American committee on arrangements has made Mrs. William Brown Meloney of New York the chairman for this section, a choice that insures prestige and skillful, sympathetic handling. Associated with her as vice-chairman is Mrs. Lillian M. Gilbreth, whom all American home economists know as an efficiency engineer who has applied her professional training to practical problems of home and family management. What some of them may not realize is that Mrs. Gilbreth is unquestionably the leading—almost the only—woman in the permanent councils of the congresses and that she enjoys the great respect and liking of her confrères. Mrs. Meloney has appointed as a sponsoring committee about a score of men and women nationally known for their interest in some phase of the subject. And as technical advisers she has selected a representative group of 20 persons well known in home economics and allied fields.

Another good omen for the section at Washington is the change of name. This year it is officially designated "Home

Management," a term which to Americans at least suggests a much wider conception of the subject than the old "Domestic Management," with its implications of overemphasis on physical routine. The plans for the five sessions show that, so far as is feasible, the discussions will emphasize first the underlying philosophy of home management and then developments in certain special phases. It is customary with these congresses to ask the various national committees to solicit papers for the various sections. The American committee has invited carefully selected persons to submit papers on designated topics. All of the papers on a given topic are summarized by a rapporteur, whose report forms the basis of discussion at a section meeting. Each contributor present may speak briefly, after which others may also speak. The international character of the meetings, especially difficulties of language, naturally give a greater formality than we are used to in most of our meetings. Discussion is aided, however, by the fact that the papers are printed in advance and distributed to registrants.

The meetings for the home management section are scheduled for the forenoons of Tuesday, Wednesday, and Thursday, and the afternoon of Wednesday. Further information will be given in September. Meanwhile, registration blanks and general information may be obtained from Nathaniel W. Barnes, executive secretary, Room 1201, 347 Madison Avenue, New York City.

CERTIFYING THE CERTIFIERS

Seals of approval and other certificates of the quality of goods or the performance of equipment are becoming more and more common as producers and dealers feel the demand from their patrons for factual information about the merchandise offered for their selection. Such endorsements are of great value to consumers providing they are based on adequate tests by responsible agencies, but often there is no way to tell whether or not this is the case. Last year the Association of Consulting Chemists and Chemical Engineers was sufficiently impressed with the dangers of the situation for it to ask the American Standards Association "to set up standard methods and procedures for the guidance of testing laboratories and other public endorsement agencies." The chemists pointed out that in catering to the consumer's desire for facts, some vendors are doing so by "half-truths or by implications which have no real significance. In other cases there is no evidence of the existence of standards, and if they do exist they are not available to the public. Some vendors use 'certified' as a trade designation" and there are enough irresponsible endorsements claiming significance which they do not possess to throw the whole system into disrepute.

In accordance with this request, the American Standards Association arranged a conference on April 6 which was attended by representatives of ten of its member bodies and at which a committee was organized to undertake the work. The official news release contained the following paragraphs:

> The proposal of the testing engineers and chemists, many of whom are heads of laboratories, has been heartily endorsed by the National Bureau of Standards, the National Association of Purchasing Agents, the American Home Economics Association, the Consumers' Division of the U. S. Department of Labor, and the American Society for Testing Materials.
>
> The plan is to set up standard practices covering fundamentals which should underlie approval procedures—such standards to be developed cooperatively by consumers, producers, distributors, and advertisers, many of whom were represented at the meeting.
>
> Among the points suggested for inclusion are: a clear statement of the auspices under which any plan of approval is operated; adequate independent sampling and testing of the product to determine

its conformity with definite, published standards; systematic re-examination to insure continuing conformity; records of test to be publicly available; and compliance with these principles to be indicated on labels or tags.

At the meeting, Thomas A. Wright of the Association of Consulting Chemists and Chemical Engineers was appointed chairman and B. L. Oser secretary.

Like the chemists and engineers, many home economists have been troubled by the difficulties raised by uncertified certification for household commodities and they heartily approve of having the American Home Economics Association co-operate in this attempt at adequate, voluntary regulation.

CORRECTION

In an editorial on page 249 of the April issue, a sentence quoted from *Advertising & Selling* linked together the magazine *National Consumer News* and the Consumers Foundation, saying that both "'presumably enjoy the blessing of the Institute of Distribution and other chain store interests.'" The publisher of *National Consumer News* has since written us denying this connection. He says:

National Consumer News is not connected with the Consumers' Foundation. Moreover, it is not connected with any other organization. The publication is absolutely independent and is the voice of no group, no association, or no interest other than the consumer interest.

The JOURNAL uses this, the first opportunity, to correct this quoted error, knowing that the statement will be welcomed by home economists who find so much helpful material in *National Consumer News*.

HOME ECONOMICS AT THE NATIONAL EDUCATION ASSOCIATION

The Department of Supervisors and Teachers of Home Economics will meet during the annual convention of the National Education Association in New York City. The home economics sessions will come on the afternoons of June 27, 28, and 29, with the banquet on the evening of the 29th. All four will be held at the Hotel Pennsylvania, Department headquarters.

RESEARCH

A SERVICE STUDY OF FOUR QUALITIES OF COTTON TURKISH TOWELS

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NO REPORTS on the serviceability of turkish towels have ever been published, although at present there is a widespread demand among consumer groups for information on the relative serviceability of all types of household and garment fabrics. The present study of the serviceability of turkish or terry towels of different qualities was based on a 4-type classification proposed by the junior author as the result of an analysis of 74 samples (1, 2). Type 1 has a single-ply ground warp with two pile ends woven as one; type 2 has a single-ply ground warp and single pile ends; type 3 has a two-ply ground warp with two pile ends woven as one; and type 4 has a two-ply ground warp and single pile ends.

Four qualities of towels were selected. Two (1A and 1B) were of type 1, and two (4A and 4B) of type 4. In the samples of type 1, the cotton cellulose of the 1A quality showed less chemical deterioration than that of 1B, and similarly in type 4, 4A was less damaged chemically than 4B.

The type-4 towels were larger than those of type 1. When new, towels of lot 1A were $21\frac{1}{2}''$ x $43''$ in size, and 1B were $22\frac{3}{4}''$ x $45''$. The towels of lot 4A measured $24\frac{1}{2}''$ x $45''$, and lot 4B, $24\frac{3}{4}''$ x $46\frac{1}{2}''$. The towels of lot 4B had applied colored terry fabric hems, and all the others had colored stripes woven in each end.

A dozen towels of each of the four lots were purchased in local retail stores. The 1935 price for those designated 1A and 1B was 29 cents and 25 cents, respectively, while 4A and 4B cost 63 cents and $1 per towel.

Test methods. Two of each lot of towels were analyzed when new, and the others were given identifying numbers and put into service. They were issued at random to the persons co-operating in the study. Each towel was used one day by one person and then returned to the Bureau for laundering. Two towels of each lot were removed every 20 washes up to and including the 100-wash period. Provision was made for test samples only through 100 washes, since Brisker (3), in experimental work done at the U. S. Bureau of Home Economics, found that towels of type 3 in the proposed classification were badly worn at the end of 90 washes in a commercial laundry.

The towels were laundered in a vacuum-cup type electric home washing machine. They were given one 6-minute suds at 30°C. and one 10-minute suds at 60°C., four 4- to 5-minute rinses at 60°C., and one cold rinse for 4 minutes. Softened water and liquid soap made from neutral flakes were used throughout. The machine was drained and refilled between each operation. The temperature, time, and number of suds and rinses are those recommended in the commercial whitewash formula. Excess

moisture was removed by centrifuging; then the towels were stretched over rods to dry at room temperature.

Shrinkage, number of yarns per inch, weight per square yard, breaking strength, bursting strength, rate of water absorption, fluidity in cuprammonium hydroxide, copper number, and methylene blue absorption were determined at each test period.[1] The new towels were desized before the water absorption measurements and the chemical tests were made. The same methods of sampling and testing, except that for thickness, were used as in the study previously reported by the authors (2). A compressometer (4) was used to measure the thickness at one-pound pressure. In addition, the percentages of moisture and of ash were determined on the new desized towels and on those laundered 100 times. Moisture content was determined by drying 5-gm. samples of the conditioned fabric at 105°C. Ash content was determined by igniting 5-gm. samples to constant weight in a muffle furnace. All values reported are the average for two towels.

Results. With one exception, all towels were still serviceable at the time of testing, even at the end of 100 washes. That exception was a towel in the 1B group which had to be removed after 75 launderings because it was badly worn.

As shown in table 1, all of the towels decreased lengthwise and increased widthwise with laundering and service. Towels of type 1 gained in width more than did those of type 4. The difference between the shrinkage of individual towels at any test period was considerable, but the amount was not related to the length of service or to towel quality or type. At 20 washes, it ranged from 4 to 6 per cent, although Brisker (3) reported 11 to 12 per cent for towels laundered 20 times in a commercial laundry. The percentage change in area throughout the study was greater for towels of type 4 than for those of type 1.

When new, towels of lot 1B had fewer yarns per inch than the somewhat smaller towels of 1A; 4A and 4B had approximately the same number of yarns initially and appreciably more than either quality of type 1. Throughout service, the number of yarns in one inch of fabric was essentially the same warpwise for each of the four lots of towels. Fillingwise there was an increase after 20 washes, after which the number remained approximately the same.

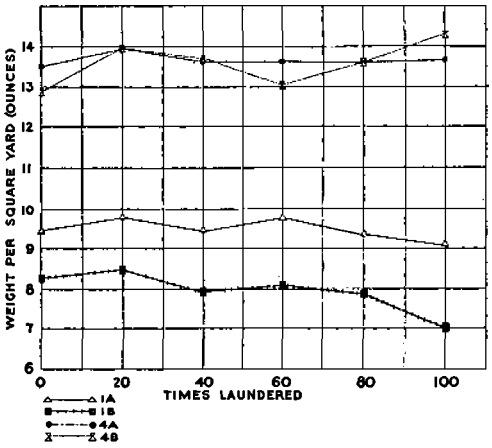

CHART 1. WEIGHT PER SQUARE YARD OF FOUR LOTS OF COTTON TURKISH TOWELS GIVEN VARIOUS AMOUNTS OF SERVICE

As shown in chart 1 and table 1, the weight per square yard decreased with service for the 1A and 1B towels. Towel 1A, which was initially 14 per cent heavier per unit area than 1B, was 30 per cent heavier at the end of 100 washes. The variations for 4A and 4B resulting from service were no larger than the differences that existed between the two towels of either lot at any test period. Towels 4A and 4B, which initially weighed 1½ times as much as 1B, weighed approximately twice as much as 1B after 100 washes.

All towels increased in thickness with

[1] Appreciation is expressed to M. Alice Sawyer, Helen G. Wheeler, and Delia A. Taylor for laboratory assistance.

20 washes. After that there was a slight decrease with service, though all except the 1B towels were thicker at the end of the study than they were originally.

As shown in chart 2 and table 1, breaking strength of all four lots decreased progressively with service. Towels of type 4 were stronger warpwise throughout than were those of type 1. After 100 washes, towels of type 4 were stronger warpwise than were those of 1A and 1B when new. The difference in fillingwise strength for the four lots was small, with towels in the 1A group having the lowest values.

Brisker (3) reported a greater warpwise percentage loss in breaking strength for towels than fillingwise and observed losses of 57 per cent for the warp and 39 per cent for the filling after 90 washes. In the present study, the percentage loss in strength after 100 washes was approximately the same in both directions. For example, lot 1A lost 54 per cent warpwise and 50 per cent fillingwise, while the values were 37 per cent and 36 per cent, respectively, for lot 4A. Similar values for lots 1B and 4B show that the percentage loss in strength was significantly greater for type 1 than for type 4.

Bursting strength (table 1) also decreased

TABLE 1

Physical analysis of four qualities of cotton turkish towels given various amounts of wear and laundering

TOWEL QUALITY	TIMES LAUNDERED	CHANGE IN DIMENSIONS			YARNS PER INCH			WEIGHT PER SQ. YD.	THICKNESS	BREAKING STRENGTH		BURSTING STRENGTH	WATER ABSORPTION	
		Length	Width	Area	Ground	Pile	Filling			Warp	Filling		1st period	2nd period
	number	*per cent*	*per cent*	*per cent*	*number*	*number*	*number*	*ounces*	*inches*	*pounds*	*pounds*	*pounds*	*inches*	*inches*
1A	0	—	—	—	24.0	48.0	31.5	9.44	0.072	28.8	31.8	55	7.4	2.9
	20	−4.28	+1.84	−2.52	23.6	47.5	33.2	9.76	.094	27.2	31.6	48	7.8	3.1
	40	−4.98	+2.10	−2.97	23.2	46.2	33.0	9.41	.092	22.5	28.2	35	8.1	3.3
	60	−4.66	+1.86	−2.93	23.6	46.5	33.7	9.70	.088	18.0	20.6	34	6.6	2.6
	80	−5.38	+4.92	−0.72	24.3	47.8	33.8	9.39	.090	17.6	21.2	26	7.4	3.0
	100	−3.57	+4.82	+1.07	23.1	45.9	33.0	9.09	.085	13.3	16.0	30	6.6	2.7
1B	0	—	—	—	22.2	43.5	25.2	8.25	.066	19.6	38.4	33	6.7	2.5
	20	−4.88	+3.28	−1.75	21.1	42.4	27.0	8.34	.082	15.9	37.9	35	6.8	2.8
	40	−4.48	+4.04	−0.62	21.7	42.8	26.9	7.96	.081	13.8	35.8	37	8.2	3.2
	60	−5.20	+3.73	−1.66	21.2	41.2	26.9	8.08	.079	11.1	25.8	27	6.6	2.7
	80	−4.74	+3.40	−1.49	21.9	43.0	28.2	7.89	.076	9.2	22.8	30	6.9	2.8
	100*	−5.43	+4.61	−1.07	21.6	41.8	27.6	7.00	.065	6.7	15.2	24	7.1	2.8
4A	0	—	—	—	39.5	38.6	38.2	13.50	.098	57.6	34.9	84	5.0	1.8
	20	−5.97	+1.98	−4.11	38.0	38.9	41.8	13.88	.118	49.6	34.8	66	7.8	3.0
	40	−6.79	+0.66	−6.18	38.8	38.8	41.2	13.67	.116	48.2	34.6	47	8.2	3.2
	60	−6.00	+1.62	−4.47	38.8	38.2	42.0	13.61	.116	41.1	27.8	56	7.6	2.7
	80	−7.20	+1.30	−5.99	39.0	38.8	41.4	13.62	.116	39.0	26.2	46	7.6	2.9
	100	−5.34	+1.93	−3.51	38.9	38.8	42.1	13.64	.110	36.5	22.5	48	7.0	2.7
4B	0	—	—	—	38.6	38.1	38.1	12.95	.092	54.3	36.8	82	5.2	2.1
	20	−6.02	+0.74	−5.33	38.5	38.4	40.2	13.90	.118	48.6	36.2	72	7.4	3.0
	40	−3.68	−0.20	−3.87	38.7	38.5	39.7	13.74	.118	45.2	33.1	74	9.0	3.4
	60	−3.40	+0.82	−2.60	38.6	38.6	40.4	13.06	.110	38.9	29.0	60	7.8	3.0
	80	−4.38	−0.14	−4.52	38.8	38.6	40.2	13.64	.115	37.8	28.5	55	7.1	3.0
	100	−2.19	+1.21	−1.01	38.3	37.9	40.7	14.12	.112	33.2	22.7	54	7.9	3.2

* Only one towel was tested at this period since it was necessary to discard a towel after 75 washes.

with increasing amounts of service. As measured by this test, the rank of the fabrics in the order of increasing deterioration was 4B, 4A, 1A, and 1B, while in warp breaking strength the order was 4A, 4B, 1A, and 1B.

At the end of the first 20 washes, towels of type 4 had increased in rate of water absorption more than those of type 1. As cotton and that no appreciable deterioration had resulted from bleaching or other finishing processes. Towels of lot 1B remained more deteriorated chemically throughout service than those of lot 1A, and likewise the 4B towels were more damaged than were the 4A. A comparison of the values for the two types shows that the towels of type 4, in general, were more

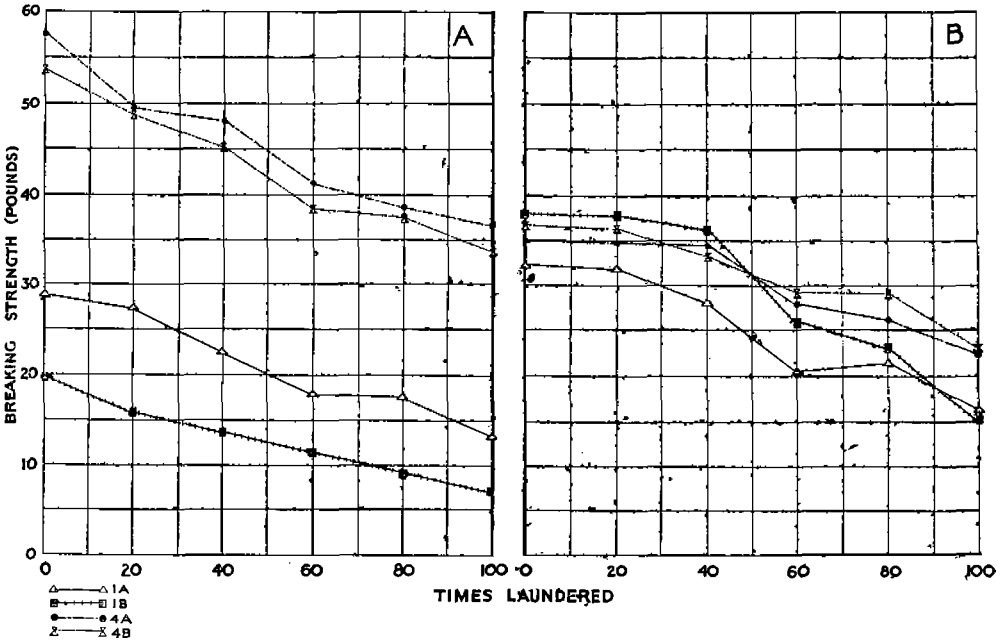

CHART 2. BREAKING STRENGTH OF FOUR LOTS OF COTTON TURKISH TOWELS TESTED AT INTERVALS DURING SERVICE: A, WARPWISE; B, FILLINGWISE

wear progressed further, there was no significant change in rate of absorption for any of the four lots.

Although the towels of A quality in types 1 and 4 were originally less deteriorated chemically than those of the respective B quality, the fluidity in cuprammonium hydroxide, the copper number, and the methylene blue absorption values (table 2) show that there was not much difference chemically in the cellulose of the four lots. This and the fact that the values are low, indicate that all four groups of towels had been manufactured from undamaged raw deteriorated chemically than were those of type 1.

No relationship was found between price and chemical quality. The 4B towels, which cost $1 each, showed more chemical deterioration through the major part of this study than the 1A, which retailed at 29 cents. However, the more expensive towels, those of type 4, had higher warp breaking strengths and weights per square yard than the cheaper type-1 towels.

The values for the chemical tests of all four groups of towels increased progressively with service (charts 3 and 4),

showing that chemical deterioration becomes steadily greater as wear and laundering continue. Increasing damage with service is also shown by decreasing values for breaking strength.

TABLE 2

Fluidity in cuprammonium hydroxide, copper number, and methylene blue absorption of four qualities of cotton turkish towels given various amounts of wear and laundering

TOWEL QUALITY	TIMES LAUNDERED	FLUIDITY	COPPER NUMBER*	METHYLENE BLUE ABSORPTION†
	number	*reciprocal poises*		
1A	0	4.5	0.10	1.9
	20	6.5	0.22	2.2
	40	7.2	0.49	3.0
	60	10.2	0.65	4.5
	80	11.9	0.70	4.8
	100	13.3	1.03	5.6
1B	0	6.6	0.29	2.2
	20	8.3	0.34	2.4
	40	9.1	0.56	3.2
	60	11.2	0.82	4.7
	80	12.4	0.89	5.1
	100	14.4	1.21	5.3
4A	0	6.6	0.21	1.5
	20	8.1	0.30	1.7
	40	10.1	0.45	2.5
	60	12.1	0.59	4.0
	80	12.9	0.68	4.6
	100	14.5	0.97	5.2
4B	0	8.8	0.29	1.8
	20	10.3	0.33	2.2
	40	11.4	0.53	2.7
	60	14.1	0.78	4.2
	80	14.5	0.83	4.6
	100	15.4	1.03	5.2

* Grams of copper reduced by 100 gm. of dry cotton

† Millimols of methylene blue absorbed by 100 gm. of dry cotton

Although one towel of the 1B group was badly worn at the end of 75 periods of wear and laundering, these towels as a group were no more deteriorated chemically than the 4B towels, all of which were serviceable throughout the study. The 1B towel failed because of its low warpwise breaking strength rather than from any excessive chemical tendering.

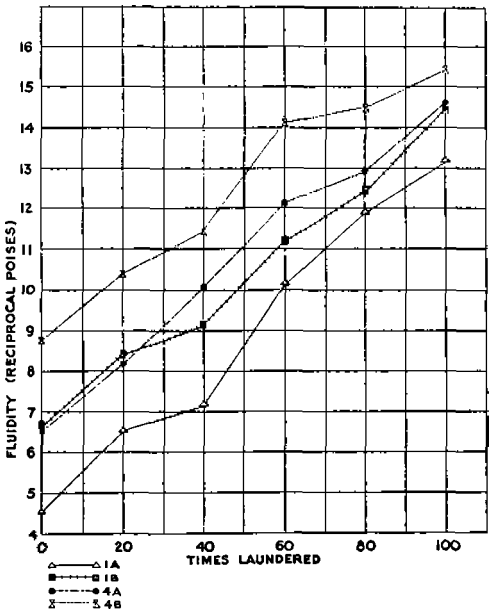

CHART 3. FLUIDITY VALUES OF CUPRAMMONIUM SOLUTIONS OF THE FOUR LOTS OF TOWELS TESTED AFTER VARIOUS PERIODS OF SERVICE

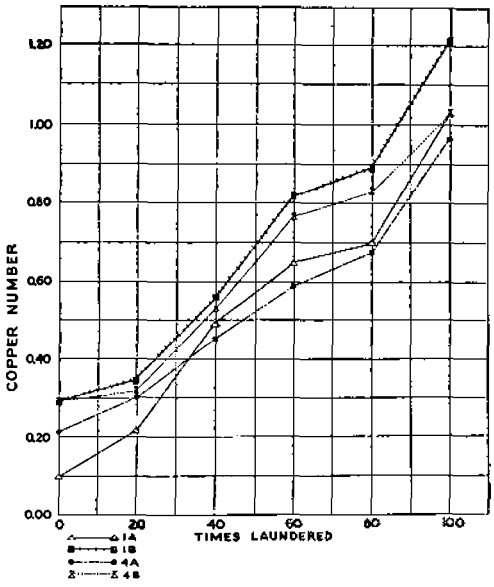

CHART 4. COPPER NUMBER VALUES OF THE FOUR LOTS OF TOWELS LAUNDERED VARIOUS NUMBERS OF TIMES

Wear and laundering produced the type of oxidized cellulose that is formed in alkaline solutions and is characterized by increased copper numbers and methylene blue absorptions (table 2). Downey and Elmquist (5) found that ironing produced an oxidized cellulose which gave increased copper numbers but decreased absorption.

There was no significant difference in the percentage of moisture of the four lots of towels when new. After 100 periods of service the moisture content of each group was less than that of the corresponding new towels (table 3). Similarly, a loss in moisture content of cotton was reported by Downey and Elmquist (5) as a result of deterioration from ironing at high temperatures.

TABLE 3

Moisture and ash content of four qualities of cotton turkish towels

TOWEL QUALITY	TIMES LAUNDERED	MOISTURE	ASH
	number	*per cent*	*per cent*
1A	0	6.89	0.06
	100	6.74	0.30
1B	0	6.64	0.09
	100	6.40	0.32
4A	0	6.96	0.07
	100	6.66	0.24
4B	0	6.88	0.05
	100	6.71	0.24

The ash content of the new, desized towels varied from 0.05 to 0.09 per cent and that of those laundered 100 times from 0.24 to 0.32. This increase is approximately the same as that reported by Griffith, Sprague, Berg, and Edgar (6) for bleached cotton sheeting. The percentage of ash in their new sheeting was 0.07 and in that repeatedly laundered 100 times in softened water, 0.23.

All towels except one of type 1B were usable beyond 100 periods of service. If there had been sufficient material to complete this investigation, undoubtedly the towels of type 4 would have outlasted those of type 1 because throughout the study they had a greater weight, were stronger, and showed no excessive chemical damage.

Conclusions. Although the more expensive towels had a higher warp breaking strength and a higher weight per square yard than the cheaper ones, there was no correlation between price and chemical quality.

Warpwise, the towels of type 4 were stronger after 100 washes than were those of type 1 when new. The difference in fillingwise strength for the four lots of towels was small.

As service continued, the breaking and bursting strength of all four groups of towels decreased, while the chemical deterioration, as measured by fluidity in cuprammonium hydroxide, copper number, and methylene blue absorption, increased.

For each type of towels, the quality which originally showed more chemical deterioration continued to do so throughout service.

The percentage of moisture decreased after 100 periods of laundering, while that of ash increased.

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fabrics as affected by variations in pressure and in length of exposure during ironing. U. S. Dept. Agr. Tech. Bull. No. 517 (1936) 32 pp.

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PRACTICAL SIGNIFICANCE OF RESULTS

This study is the first to report a comparison of the serviceability of different types of turkish towels. The variations in physical properties, such as weight and breaking strength, were found to be larger and to influence the length of service more than differences in chemical characteristics.

BOOKS AND PERIODICALS

NEW BOOKS

Food Service in Institutions. By BESSIE BROOKS WEST and LEVELLE WOOD. New York: John Wiley & Sons, Inc., 1938, 543 pp., $4.50.

By the instructor who has struggled to bring together source material for institution management classes this new *Food Service in Institutions* by Bessie Brooks West and LeVelle Wood will be enthusiastically received. The authors lay no claim to presenting original investigations in the field but rather have chosen to assemble accepted facts for classroom use. Available material carefully organized in a single volume, logically presented, and augmented by the helpful and varied experiences of the authors, will be especially welcome in a field long handicapped by a serious shortage of textbooks.

The aim of the authors has been "to put in a usable form, for those interested in various fields of institutional food service, the details of the preparation of food in large quantities and of the administration of food services."

The book is divided into three sections. The first, devoted to quantity foods, begins by tracing briefly the history of food service in institutions, then takes up meal planning and food preparation in institutions, stressing such points as the basic factors in successful institutional meal planning and the effects of good food preparation and discussing methods of food preparation and the necessity of high food standards. The authors hold that the common concept that there is an inevitable difference in the character of food prepared at home and that prepared in large quantities is unscientific. The remainder of the section gives information on composition, nutritive value, selection, and principles of preparation of specific food products, particularly in relation to quantity food preparation.

The second section deals with equipment for food services, its selection, operation, and care. Such questions as the physical plant, space allowed for various units, building materials, refrigeration, and air conditioning, and factors affecting the selection and care of equipment and furnishings are discussed. Tables of characteristics of the large equipment for the various units make needed data readily available.

The last section deals with organization and administration and stresses the importance of these in the food services of various types. Tables and charts are used as illustrations. Especially good chapters on legal aspects and cost control are included.

Recognizing that "not all people are suited by nature for such a Herculean task and that still others with marked native ability find their efforts handicapped by the lack of essential training," the last chapter of the book is devoted to the personal qualifications and training of the food director.

The classified list of books and references at the end of each chapter and the appendices—"Suggested Course Outline for Quantity Food Preparation," "The School Lunch," "Cooperative Residence Hall Service on a College Campus," "Cooperative Meal Service for College Students Not in a Residence Hall," and "Food Services for Organized College Groups"—will add greatly to the usefulness of the book, which promises to be not only a good textbook for the student but also a ready reference for the busy administrator.—KATHARINE MCFARLAND ANSLEY, *American Home Economics Association, Washington, D. C.*

The Family: Past and Present. By BERNHARD J. STERN. New York: D. Appleton-Century Company, Inc., 1938, 461 pp., $2.75.

"The Commission on Human Relations [of the Progressive Education Association], sponsor

of and collaborator in the publication of this book, has been charged with the responsibility of helping young people with the urgent problems of human living which exist today. As one of its activities, the Commission is offering to students, parents and teachers, a series of books which deal with the special problems of human relations in today's world.... This book, *The Family: Past and Present*, is primarily a source book to be used in the study of the changing form of the family and the contemporary trends in family life. Although this book is designed for independent use in colleges and universities, it is also intended to serve as background material for use with the Commission's book, *Society and Family Life*, prepared for use by high-school students." The chairman of the Commission is Alice V. Keliher.

Today's Consumer Family. By AGNES M. ERKEL and WINIFRED P. WAGNER. Minneapolis, Minn.: Burgess Publishing Company, 1937, 35 pp., $1.25.

Outlines for discussion successfully used by groups of homemakers in Minneapolis and St. Paul. They are based on the theory that long-time goals are basic to a family spending plan which will give satisfaction and happiness, and are intended "to motivate whole families to set up a long-time plan for spending after analyzing their immediate needs and goals in living." Both authors are home demonstration agents.

Food Preparation Studies. By ALICE M. CHILD and KATHRYN B. NILES. *Second edition.* New York: John Wiley & Sons, Inc., 1938, 162 pp., $1.75.

The revision of a combined textbook and record book for college use, the first edition of which was noted on page 931 of the JOURNAL for October 1932 and which is now brought up to date without change in the general setup.

Food for the Family. By JENNIE S. WILMOT and MARGARET Q. BATJER. Chicago: J. B. Lippincott Company, 1938, 619 pp., $3.

This elementary college text is planned by the authors for classes which include both students who wish "a practical contribution to the profession of homemaking" and those who need the work toward a professional degree. The material is arranged in 34 units, three dealing with health and nutrition, 25 with the selection and preparation of different classes of foods, and six with family meal planning and table service. The authors are assistant professors of home economics at the University of Texas.

Principles and Practice of Public Health Dentistry. By J. A. SALZMANN. Boston: The Stratford Company, 1937, 584 pp., $4.

The editor of the *New York Journal of Dentistry* attempts in this book to provide a comprehensive account of dentistry as a factor in the public health program. Such a volume, hitherto lacking, is more and more urgently needed now that dental public health workers are being employed under funds provided through the Social Security Act, and it will be valuable as reference to nutritionists and other home economists in social service and public health.

Alfred Owre: Dentistry's Militant Educator. By NETTA W. WILSON. Minneapolis: The University of Minnesota Press, 1937, 331 pp., $4.

His colleagues on the faculty of the School of Dentistry at the University of Minnesota have co-operated in assembling both the source materials and funds necessary for the production of this memorial volume about a dean of the School. It shows him as a cultivated, traveled man of Norwegian birth, a successful practicing dentist whose desire to raise the standards for his profession led him into education and educational administration (first at the University of Minnesota and then at Columbia University), made him a leader in much needed reforms, and brought him into conflict with some of the established professional groups. A hundred pages of the book are given over to excerpts from his writings.

The Heritage of Cotton: The Fibre of Two Worlds and Many Ages. By M. D. C. CRAWFORD. New York: Grosset & Dunlap, 1924, 244 pp., $1.95 cheap edition.

This history of the production and uses of cotton from the earliest recorded beginnings

in India to the present brings together the economic, social, and artistic aspects of the subject for the benefit not so much of the technicians as of those interested in the history of art and technology as expressed in fabrics. With its pleasant style and beautiful illustrations, it is likely to prove good reference reading for college home economics classes in textiles. The author, formerly on the textile research staff of the American Museum of Natural History, is now research editor of *Women's Wear*. The present low price will attract those for whom the original price of $7.50 made the volume too expensive.

First Steps in Weaving. By ELLA VICTORIA DOBBS. New York: The Macmillan Company, 1938, 85 pp., $1.

A former professor of applied arts at the University of Missouri offers this book "to those persons, young or otherwise, who wish to gain practical experience in the fascinating processes of weaving but know nothing of its terms, its tools, or its procedures." She includes nothing beyond this beginning because other books are available for workers who have passed the first stages of the craft. Discussion, directions, and illustrations are all clear and practical and adapt the book to either amateur weavers or elementary school teachers.

Social Arts Digest. By NELL M. EBERTS. Los Angeles: Suttonhouse, 1938, 127 pp., $1.75 cloth, $1.25 board.

"A twenty weeks' course streamlined to the 1938 methods of teaching, covering the family as an institution, laws protecting the family, the family as a moulder of character, family adjustments, social etiquette for all occasions, personality and character development, personality tests, and references. A classroom manual for a wide range of institutions." The topics included are similar to those commonly found in high school courses designated by such names as personal regimen or personal relationships.

The Public Assistance Worker: His Responsibility to the Applicant, the Community, and Himself. Edited by RUSSELL H. KURTZ. New York: Russell Sage Foundation, 1938, 224 pp., $1.

A timely addition to the Foundation's series of authoritative handbooks on various phases of work connected with social welfare. Of particular interest to home economists because of the increasing number concerned with public assistance programs.

U. S. One: Maine to Florida. Compiled and written by the FEDERAL WRITERS' PROJECT OF THE WORKS PROGRESS ADMINISTRATION. Sponsored by the U. S. No. 1 Highway Association. New York: Modern Age Books, Inc., 1938, 344 pp., $0.95.

One of the volumes which taken together are expected to furnish accurate guides to the United States. It follows U. S. Route 1 along the Atlantic Seaboard from Maine to Florida, with historical and literary as well as topographical and statistical information about the places traversed. A novel and welcome section describes characteristic foods of each state. Though it needs to be supplemented by maps and lists of hotels and other stopping places now easily obtainable from various sources, the little book, with its attractive illustrations, will serve both as guide and souvenir to a trip along U. S. Route 1.

Both Sides of the Microphone: Training for the Radio. By JOHN S. HAYES and HORACE J. GARDNER. Philadelphia: J. B. Lippincott Company, 1938, 180 pp., $1.25.

Prepared both for use in vocational guidance and to help listeners understand "the fundamentals of radio," this book first describes the organization and operation of the station and the network, including the program, sales publicity, and engineering departments, and then presents a series of short papers by well-known radio personages, telling what the listener should expect from different types of radio programs.

ABSTRACTS

CHILD DEVELOPMENT AND FAMILY RELATIONSHIPS

Contributed by the Institute of Child Welfare, University of Minnesota

Frequency of choice of play materials by preschool children, M. S. McDowell. *Child Development* **8**, No. 4 (Dec. 1937) pp. 305–310.

More information regarding the play materials preferred by nursery school children is needed because at this age lifetime habits of thinking and acting are being formed. To discover the interests of the children in the nursery school at the Pennsylvania State College, observations were conducted during the free play periods on the frequency of choice of the materials, attention span, and use of materials. The children, 9 boys and 11 girls, represented the upper socio-economic levels and ranged in age from 24 to 48 months. For all the children, the materials ranked as follows: first, those used in constructing other objects; second, those requiring manipulative skills and those used in playing house; third, those requiring much physical activity; fourth, those used in creative design materials; fifth, books; and last, those which required little activity. The building material was more popular with girls than with boys and with 3-year-olds than with 2-year-olds. Slight differences between the sexes were observable, also age differences in use of materials.

Sex differences in behavior of nursery school children, L. A. Hattwick. *Child Development* **8**, No. 4 (Dec. 1937) pp. 343–355.

In the Winnetka Public School Nursery and in the W.P.A. nursery schools of Chicago, 283 boys and 296 girls, ranging in age from 2 to 4½ years, were observed and rated on 60 behavior items classified under 9 headings: (1) eating habits, (2) sleeping habits, (3) nervous habits, (4) elimination habits, (5) speech difficulties, (6) fears, (7) reaction to adults, (8) reaction to children, (9) other reactions. The boys displayed aggressive, extroverted behavior, undesirable work habits, such as "asks for unnecessary help," "wastes time at routines," and "leaves tasks incomplete," more tendency to stuttering, lisping, or lalling than girls and more boys showed a tendency to masturbate. Among the girls there were noted withdrawing or introverted tendencies, twisting of the hair, more frequent refusal of food, and a tendency to be more bossy than boys. No sex relationships were revealed in connection with bed-wetting or the majority of nervous tendencies; however, age differences were apparent. It may be that the traditional roles of the sexes have left a mark on early behavior.

Parent-child relationships from the child's point of view, A. Sowers. *J. Exptl. Educ.* **6**, No. 2 (Dec. 1937) pp. 205–231.

This study was based on an analysis of 2,000 essays in which children from 10 to 22 years old discussed the influence of family relationships on family happiness, and on replies given to questionnaires by 500 college students. The three age groupings—10 to 13 years, 14 to 17 years, and 18 to 22 years—showed differential emphasis on certain questions; also slight sex differences. All groups agreed on the following points: (1) that the most desirable traits in parents were kindness, sincerity, fairness, and justice, and that these ranked higher than the material comforts in the home; (2) that they desired companionship with parents; (3) that they desired firm and fair discipline, avoidance of nagging, seeing the child's point of view, and punishment to follow the act and to accord with the age of the child; (4) that the children were not inclined to be critical of their own parents but said that when they themselves were parents they would be more up-to-date, understanding, and just; (5) that they would like a voice in the family plans and decisions made in family conference. Twenty-eight per cent of the essay group and 83 per cent of the college students considered parental example important. In the college group, sex, personality adjustment, and environmental background were not of great influence in determining the attitudes and opinions. On a self-rating sheet filled in by the 500 college students, the students rating highest were urban, well-adjusted, from small families, and children of college parents.

Survey of experiments of children's attitudes toward their parents: 1894–1936, R. STOGDILL. *J. Genetic Psychol.* **51,** No. 2 (Dec. 1937) pp. 293–303.

This survey of the literature shows what has been accomplished by means of tests and questionnaires in the field of measuring children's attitudes. Although children are greatly ndent upon their parents, they become less ent and choose others as ideals as they s[illegible] 6 to 16 years of age. Both sexes e mother to the father except among ts, who more often choose the parent pposite sex. Younger children prefer fits on the basis of "value received," and children believe that parents prefer offspring of the opposite sex. Greater freedom from control and supervision than parents feel they want to give, would be desirable to the children; this is advocated by the child guidance specialists also. Strict discipline and religious attitudes in the child's early home life are clearly associated with delinquency, maladjustment, and unhappiness. Homes in which these are less rigid are more likely to produce happy and well-adjusted children. Children's attitudes and behavior are determined by interaction of influences in the complex social environment. Parents and family are more influential than such factors as intelligence and socio-economic status.

The family habits of work, G. D. STODDARD. *Natl. Parent-Teacher* **32,** No. 7 (March 1938) pp. 10–11+.

A child may seem to learn nothing about work habits before the age of six or before he starts to school; nevertheless, even if he is brought up in luxury without having to assume responsibility for his own possessions, he gains from those around him some idea of attitudes toward work. Every child senses the rhythms of the going to and from work of his father, the attitudes and habits of his mother in her daily household responsibilities, and the routine of servants in the home. Very early in his own life he must distinguish between work and play. As the child grows capable—mentally, socially, and physically—duties may be given him for which he alone is responsible. Punishment for failure to function in his capacity at a given time or up to an adult standard is ruled out, nor should this failure be regarded as cute or insignificant. During the preschool years more is learned by example than by actual practice. The habit of doing things right and on time is frequently a family habit, accepted by each member as a pattern to be carried over into life's activities. If the child functions happily and with satisfaction in his work, this stimulates growth in other areas of personality.

Youth and education for family life, E. MCGINNIS. *Parent Educ.* **4,** No. 2 (Dec. 1937) pp. 80–85.

Recent statements indicate a new trend in family education on the secondary school level. Preparation for the future responsibilities of family life has not been attempted in the schools, but educators are aware of the importance of such education to increase the number of happy and effective homes and to decrease the dissatisfactions and tragedies springing from mating, marriage, and family life. The needs, activities, and interests of youth must be fully understood in order to educate for effective family living. Thanks to the increase of records of experience with youth, parents and teachers are now being educated to a better and fuller understanding of youth and his problems. The community is becoming more aware of the gap between youth and parents, and family projects are being set up which require the co-operation of both generations. The change in family life which is resulting from changes in the social order, brings out the importance of individuals' adjustments and appreciation of family relationships. Home economics has attempted to deal with family problems but needs further courses to prepare for a greater understanding of the family.

M. E. M. M.

CONSUMER PROBLEMS

An advertising critic speaks up, D. MASTERS. *Advertising & Selling* **31**, No. 2 (Feb. 1938) pp. 28–30.

Acknowledging the almost unlimited powers of advertising, the author mentions three possible sources of control. The first, self-regulation by the advertising business, admittedly does not work. The third, government regulation, has proved too leisurely to be effective. The second, consumer organization, while occasionally used as a "front" by certain trade organizations, is on the whole exercising a restraining influence on excessive advertising claims.

Liberty or license? R. RUBICAM. *Advertising & Selling* **31**, No. 4 (March 1938) pp. 29–30.

In this discussion of the controversy between advertising and the forces attempting to limit it, the author makes it clear that only by exercising restraint and responsibility can advertisers hope to maintain their right to "freedom of the press."

"Consumers' Forum." *Atlantic Mthly.* **161.**

What do you know about waterproofs? M. DANA, No. 1 (Jan. 1938) pp. 86–88.

How warm is wool? M. DANA, No. 3 (March 1938) pp. 345–347.

Silk stockings and how to know them, M. DANA, No. 4 (April 1938) pp. 519–522.

Papers from which readers of above-the-average income may gain information helpful in the selection of the goods described.

The great consumer movement. Watch it! L. HAHN. *Bull. Natl. Retail Dry Goods Assocn.* **20**, No. 1 (Jan. 1938) pp. 15–16, 94.

By giving business enough time to meet their demands in an orderly manner, consumers can get the co-operation they deserve without appreciable increase in production costs. The suggested creation of a State Bureau for Consumers in Michigan may mean the beginning of an epidemic of such bureaus. These consumer bureaus could become virtual dictators over all business done within the state. It is to be hoped that by sincere effort at co-operation, they may become sound and constructive allies of both consumers and good retailers.

What size, please? L. R. GILBERT. *Bull. Natl. Retail Dry Goods Assocn.* **20**, No. 1 (Jan. 1938) pp. 31–32.

A standard sizing system for dresses is presented by the National Bureau of Standards for use as a voluntary commercial standard. The system designates sizes based on bo[illegible] measurements and consistent for all gar[illegible]

Consumer education in the scho[illegible] SIEGLER. *Bull. Natl. Retail Dr[illegible] Assocn.* **20**, No. 2 (Feb. 1938) pp. 1[illegible]

There are two types of consumer educ[illegible] one which broadens the "cultural" training include practical and useful knowledge of social and business conditions; and another which involves an intensive study of selected material and services. Arising from a variety of causes, this consumer education trend should lead to more intelligent buying, greater co-operation between consumers and retailers, and better informed salespeople.

Business finds its voice, S. H. WALKER and P. SKLAR. *Harper's Mag.* **176**, No. 1 (Jan. 1938) pp. 113–123; No. 2 (Feb. 1938) pp. 317–329; No. 3 (March 1938) pp. 428–440.

In self-defense against the increasing animosity of the public, businessmen have been making a concerted effort to improve their public relations by "selling" the idea of business as a sociological policy. To this end, the advertising methods ordinarily employed to popularize a specific product are being used in the interest of business as a whole. Radio, the press, and private publications have for four years been carrying the message of the value of our system to the well-being of people. Commercial films have recently become another medium through the development of the "talking slide film" and the interest of a few producers and distributors in the exceptional possibilities of films for improving public relations. Other phases of the effort are: the establishment of customer research, in which the views of customers on matters of style and design of products and improvement in policies are solicited; the forming of closer contacts with youth through contests and scholarships; the publication of bulletins on social and economic questions. In 1937 it

began to be apparent that these methods were not producing the results expected, and the need was recognized of improving the product and educating businessmen themselves rather than "the public." This involves co-ordinating each business organization so effectively that the policies worked out by the uppermost level of management may be sold step by step down to labor and the dependencies of the industry, including stockholders. By decentralization of large plants, the value of an industry is brought home to a community and big business assumes more nearly the aspect of local industry. At the same time, the policy-making function is increasingly centralized; and when a crisis arises, as in the case of the automobile strikes of 1934 and the chain-store tax of 1935, a concerted program of public relations may be negotiated with notable success.

What the National Pajama Guild is doing for standard sizes, F. B. SHIPLEY. *Ind. Stand.* **9**, No. 2 (Feb. 1938) pp. 44–46.

Only by purchasing pajamas in a good shop and made by a reputable manufacturer is it possible to be sure of getting a suitable size. In cheaper grades the specified size may be much too small in any of the 15 basic measurements. There is no law governing the sizes of such garments. The National Pajama Guild is setting up machinery to protect against misrepresentation, at present only in the matter of size, but looking toward a wider program.

The need for a federal consumer agency, C. F. WARE. *J. Am. Assocn. Univ. Women* **31**, [illegible] (Jan. 1938) pp. 79–82.

[illegible]he need for a separate consumer agency [illegible]vide the consumer with legitimate and [illegible]ary services which he is not now receiving seems very clear. The existence of such an agency should have the effect of strengthening the agencies now rendering partial service to the consumer by providing additional research itself in the economic field, by stimulating technical research in its effort to secure the development of standards, and by providing a more adequate channel through which the results of research and of protective activities may reach those for whom such activities are carried on, the ultimate consumer."

Teaching economics to children, J. E. MORGAN. *J. Natl. Educ. Assocn.* **27**, No. 2 (Feb. 1938) pp. 33–34.

By educating children to a sense of relative values and an appreciation of money and its responsible use, it is possible to make them careful consumers with a common-sense background to help them resist the efforts of advertisers to exploit their desires. Fifteen possible steps in this educative process are suggested: (1) Give the child an understanding that the right to enjoy the fruits of civilization is earned by doing his part to help maintain civilization. (2) Let the child share in the financial problems of the family. (3) Encourage the child to be careful of his possessions and to take pride in them. (4) Develop in the child a strong curiosity to know the sources of everything he uses and the subsequent processes and influences involved in bringing these things to the point where he acquires them. (5) Discuss advertising, and teach children to distinguish between honest and dishonest claims. (6) Develop a sense of values by making children list the things they commonly use as necessities, comforts, luxuries, harmful products. (7) Teach the cumulative effect of small expenditures, and encourage the habit of looking forward and saving for a purpose. (8) Discourage installment buying, but note occasions that sometimes justify debt. (9) Strike hard and constantly at gambling in all its forms. (10) Show how wise expenditure creates wise industries and vice versa. (11) Note the power of parasitic industries, such as liquor and tobacco. (12) Consider safe ways of saving. (13) Consider life earnings in relation to lifetime planning. (14) Consider with the children local economics relating to community activity. (15) Discuss war in its relation to the standard of living. Finally, teach the child that humanity must always be the first consideration.

Milk: a food or a medicine? E. L. WEART. *New Republic* **93**, No. 1209 (Feb. 2, 1938) pp. 359–361.

Having been told by nutrition workers that milk is an almost perfect food, we now learn that it lacks vitamin D, iron, copper, and iodine in certain localities, is a poor source of vitamin B, and loses its vitamin C through pasteurization. The lack of vitamin D is now being

remedied. Is this the first step toward making milk a medicine rather than a food? Will we be confronted by I milk, Fe milk, Cu milk, and a vitamin B milk? The medical profession opposes this. The advertising campaign of New York State, advocating milk as an alkalizer, is severely criticized and the claims that it has increased the sale of milk are disputed.

Food eyes the consumer. *Printers' Ink* **182,** No. 5 (Feb. 3, 1938) p. 23.

A brief comment on the new emphasis seen at the Food Week sessions in Chicago. Hitherto, descriptive labeling has been viewed as a legislative threat. Now the concern is as to what the consumer thinks about it. The representative of one of the first full-line, nationally distributed packs to adopt the new labels reports consumer comments almost unanimously favorable, making for a better relationship not only with his own brand but with canned foods in general.

How to teach consumers: composite course taking in 25 main units, E. REICH. *Printers' Ink* **182,** No. 7 (Feb. 17, 1938) pp. 81–92.

The author bases his discussion on a comprehensive view of many consumer education courses now available, with the comment that they should properly be known as consumer goods courses, since consumer education implies more than they give. They differ widely in aim and content. The student will be given a text and many references and will learn about consumer research organizations and government and industrial sources of information. He will learn many technical terms, something of the problems of standardization and grading, and the principles of testing and identification. A complete composite course, based on those at present available and comprising 25 units, is outlined.

Alice in Blunderland, E. WELTON. *Retailing* **10,** No. 5 (Jan. 31, 1938) p. 22.

In this revision of Alice's adventures in the Pool of Tears and at a Mad Tea Party, the buyer of floor coverings for a large department store sees Alice come back to life and take a stroll through Retail Advertising, which she finds "curiouser and curiouser." She picks her way through a "jungle of conflicting and entangling Christmas advertising," meets a White Rabbit who urges her to join a consumers' organization (" 'It's quite simple,' said the Rabbit. 'We debunk advertising.' "), and finds that if the March Hare and the Mad Hatter did what their ads say about meeting prices they would soon "be giving all your goods away for nothing. And I know you don't do that so I don't believe either of you." After which the author leaves "time to write the end of this story, hoping that newspapers and retailers will get together to correct advertising abuses and restore consumer confidence. Hoping they do it, that is, before it is done for them in a much more painful manner by Consumer Organizations or Government censorship. For then, dear children, the fury of the latter two may well be like the Fury of the Mouse's Tail: 'I'll be judge, I'll be jury,' said cunning old Fury. 'I'll try the whole case and condemn you to death.' "

Consumers under way, D. E. MONTGOMERY. *Survey Graphic* **27,** No. 4 (April 1938) pp. 213–217.

"The consumers' counsel of the A.A.A. defines, so far as the mixed contemporary situation permits, what is being done in an organized way by, for, and to consumers, and ventures to suggest what the future holds for the Consumer Movement." Three desires which explain the increased interest in consumer problems are for more information about the goods offered, for lower prices, and for more satisfactory standards of living for all. As the movement becomes more coherent, business tries "to keep in step" by various devices, while consumers consider the relief possible through education, negotiation, legislation, and co-operation.

R. A. H.

FAMILY ECONOMICS

ne Division of Family Economics, Bureau of Home Economics, United States Department of Agriculture

umer, C. F. WEHRWEIN. *Rev.* **28,** No. 1 (March 1938) 92–99.

Contrary to popular belief, the theory is unsound that taxes, directly or indirectly imposed upon the consumer, cannot be shifted. A business concern, if operating under competitive conditions, may pass its taxes forward by increasing the price of its product, or backward by decreasing the amount it is willing to pay for the raw materials used. How successful or in which direction such shifting will be depends on the degree of competition and the elasticity of the demand for the finished product and of the supply of raw materials. The author believes that in a like manner the consumer may shift taxes passed to or levied directly upon him. The forward shift is through an increase in the price of the product he himself sells, even though it is unrelated to the article on which he paid taxes, or through a demand for higher wages. The backward shift is through a refusal to pay prices including taxes; this is possible only for luxuries, not for necessities. The only "final consumers" are children and some housewives who do not earn money for personal needs. They alone cannot shift taxes forward, but they can shift them backward.

Medical costs in California, P. A. DODD. *Am. Labor Legislation Rev.* **28,** No. 1 (March 1938) pp. 21–26.

The California Medical-Economic Survey shows that in so far as medical costs create a problem among the lower-income groups, the problem is present during recovery and recession. The need for medical care in California is greatest among families of low income and least among families of high income. Moreover, the degree of care needed and received is closely related to income. In 1934, California families spent, on the average, approximately 3.5 to 4 per cent of the total family income for medical services. Families with low incomes, especially those with incomes between $1,200 and $2,500, spent 4 to 5 per cent of the total income for medical services. In contrast, expenditures for similar purposes among families with incomes of $10,000 and over averaged between 1 and 2 per cent. Thus, the lower- and middle-income groups found the burden of these costs relatively heavier than did the well to do.

The influence of size of business on department store operating results, E. A. BURNHAM. *Harvard Bus. Rev.* **16,** No. 2 (Winter 1938) pp. 211–225.

Information available from 400 to 600 department stores for the period 1922 through 1936 (including an average of 4 statements per firm) shows clearly that significant differences in operating margins and in operating costs were associated with differences in the volume of business. In the majority of the years studied the small stores sustained operating losses; whereas in more than half of the years reviewed, larger stores achieved profits. Large stores had some purchasing advantages over small stores, but a substantial part of the gross margin thus secured was required to cover relatively high operating costs. The economies realized by large stores in such items as interest, taxes, insurance, and administrative pay roll were more than countered by high expenses developing from urban locations, the organization and management of large specialized staffs, the operation of expensive selling departments not found in small stores, and the provision of costly services to customers. The middle-sized stores occupied a position midway between the large and the small stores, some of the advantages and disadvantages of large-scale operation being reflected in their statistics. The small stores, serving small potential markets and operating at relatively low costs, obtained low percentages of gross margin with which to defray their expenses. These unfavorable margins, which may have resulted partly from the disadvantages associated with small-scale purchasing, also reflect the relatively heavy markdowns on merchandise usually taken by these firms.

Sales taxes. *Index* **18,** No. 1 (Spring 1938) pp. 11, 14–19.

At the close of 1937, sales taxes had been adopted by 24 states, and this system of revenue, virtually unknown prior to 1930, appeared firmly established. The revenue for 1936 represented 32.2 per cent of all income of the states in which sales taxes were in operation. The increasing use of the sales tax is imposing an added burden upon both manufacturers and the consuming public. The danger in the retention of state sales taxes lies in creating an illusion that they provide an income which the states can afford to spend, when in reality they are artificially increasing the cost of living and thereby tend to retard the normal processes of economic improvement for the country as a whole.

National standards for farm products, C. W. KITCHEN. *Ind. Stand.* **9,** No. 3 (March 1938) pp. 62–65.

In addition to grading tobacco, cotton, and grain as provided for by specific federal laws the Bureau of Agricultural Economics has developed grades for 71 fruits and vegetables. National standards for permissive use have been developed for many other farm products such as butter, eggs, cheese, dressed poultry, hay, beans, wool, livestock, meats, canned fruits and vegetables, rice, soybeans, and several others. Although opinions vary among different producer and distributor groups as to the advantages and practicability of uniform national quality standards, the value of such standards, uniformly applied, as an aid in marketing seems to be more and more widely accepted.

Tendencies in consumer financing, R. NUGENT. *J. Am. Statist. Assocn.* **33,** No. 201 (March 1938) pp. 42–50.

The sale of goods on credit is as old as the process of exchange, and many present techniques of consumer financing may be traced to earlier centuries. The significant features of recent origin are the widespread use of consumer credit, the increased amount of individual commitments in relation to incomes, the use of powerful collection instruments, and the development of a variety of specialized

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Consumer financing and its relation t commercial bank, D. C. BARRY. *J. Statist. Assocn.* **33,** No. 201 (March 1 pp. 51–58.

Until recently American commercial bank has functioned primarily as an aid in the financ ing of agricultural, productive, and commer cial enterprise. Recent developments have changed the attitudes of many bankers toward consumer credit, but little data are available on present bank participation in this field. The results of operations of a single bank in a typical American industrial city indicate that the average loan to a borrower, as originally placed, was $187.20, of which $78.21 had since been repaid. These loans have been made for the general purposes of house and electrical appliances (39.90 per cent); refinancing existing accounts (15.14 per cent); autos and accessories (13.01 per cent); real estate investment and home improvement (10.78 per cent); dental, medical, and hospital care (4.59 per cent); interest, insurance, and taxes (4.15 per cent); miscellaneous purposes (12.43 per cent).

The economic function of the sales finance company, M. V. AYRES. *J. Am. Statist. Assocn.* **33,** No. 201 (March 1938) pp. 59–70.

The sales finance company does not make loans to consumers; its contacts with consumers are wholly through the collection of installments on goods which consumers have purchased. The finance company has made possible a much larger volume of installment selling than otherwise could occur. The total volume of installment selling has increased during recent years, but there has been no marked increase in the percentage of the total taken by any particular goods. For the year 1935, the average outstanding debt on the open-account sales of retail stores was estimated to be $1,273,000,000, and on installment

ies $1,597,000,000. The installment debt as a little less than 8 per cent of the outstanding bank loans and only 1.35 per cent of the long-term debt, consisting of stocks, bonds, mortgages, and the like.

Public supervision of consumer credit, W. T. FOSTER. *J. Am. Statist. Assocn.* **33,** No. 201 (March 1938) pp. 71–80.

There are several urgent needs in the field of consumer credit: (1) workable laws, governing small cash loans in states which have no effective draft of the Uniform Small Loan Law; (2) [illegible] states which have work- inadequate administra- ive supervision of such cash-lending agencies as pawnbrokers, industrial banks, personal loan departments of commercial banks, credit unions, and the lesser lenders, in order that borrowers may be informed fully and accurately regarding the costs of credit and the risks they take. The installment buyer should be told the price in terms enabling him to make comparisons with other credit services in other credit markets. He should know how long he may lapse in payments before the merchandise will be repossessed or his wages garnisheed, what repossession charge must be paid to get his merchandise back, what penalty charges are assessed for late payment, and what refund will be granted if installments are paid before due. In many cases the installment buyer does not know what legal fees may be charged against him, what security he gives, or what insurance is provided even when he pays a special charge for insurance.

What should be done about farm tenancy? H. C. TAYLOR. *J. Farm Econ.* **20,** No. 1 (Feb. 1938) pp. 145–152.

The author concludes that the federal government should participate in providing an adequate educational system for rural people; an occupational outlook service; free entry into all occupations; a good credit system; a good system of land appraisal; a stable currency; an open market for farm products; an open market in which farmers can buy consumption goods at fair prices, uninfluenced by excessive tariffs, monopolistic price fixing, or monopolistic wage fixing. If these conditions are taken care of by the government and if the farmers respond to the educational and occupational opportunities, tenancy will, in the course of time, cease to be a serious problem.

Expenditures for electrical appliances by workers in 42 cities. *Mthly. Labor Rev.* **46,** No. 2 (Feb. 1938) pp. 447–454.

Figures now available on expenditures for electrical appliances and equipment by white and Negro families in cities covered by the Bureau of Labor Statistics study of the money disbursements of wage earners and lower-salaried clerical workers show that the average annual expenditures by white families varied from $8.84 in New York City to $23.35 in the east north central area. The averages for the east north central, the west north central, and the southern regions are strikingly similar. Average expenditures by Negro families were lower and varied more widely from region to region than those of white families. Within each racial group, variations in expenditures for electrical appliances and equipment were greater from one economic level to another than from one region to another. Expenditures for electrical refrigerators were larger than those for any other item. Expenditures for washing machines were next and for vacuum cleaners, third.

Cost-of-living inquiry in Great Britain. *Mthly. Labor Rev.* **46,** No. 2 (Feb. 1938) pp. 456–457.

In October 1937 a survey was begun by the Ministry of Labor of Great Britain to furnish basic data for the revision of indexes of cost of living. The households of 30,000 adult wage earners and small-salaried employees in agriculture and industry, selected by random sampling, were requested to report their expenditures for the week ending October 23, 1937. These same families will be asked to furnish similar data for selected weeks in January, April, and July 1938.

M. Y. P.

SOCIAL WELFARE AND PUBLIC HEALTH

Contributed by the social welfare and public health department, New York City Home Economics Association

The social security program for children, M. M. HESELTINE. *Child* **2,** No. 8 (Feb. 1938) pp. 167–169.

Nutrition services, as part of a maternal and child health program, are almost entirely educational in nature. These services include (1) the education of families to make the best use of their food money; (2) encouraging welfare boards to raise food allowances to an adequate standard; (3) advising children's institutions on the provision of adequate, nutritious, palatable food as economically as possible; (4) consultation service to staff in nutrition, co-ordinating the nutrition services in the community.—L. K. A.

Services by nutritionists on state maternal and child-health staffs, M. M. HESELTINE. *Child* **2,** No. 8 (Feb. 1938) pp. 169–170.

Nutritionists were employed on the staffs of the maternal and child health divisions of 17 state health departments by January 1, 1938. Direct services to families included home visits and consultations with the family and such professional workers as the doctor and social worker. Educational activities included the preparation of pamphlets, posters, and exhibits; instruction in organized classes; institutes for nurses and other professional workers; and public talks and demonstrations. In three states school-lunch surveys were made.—L. K. A.

Chicago standard budget for dependent families, 1937. (Sixth edition revised.) Prepared under the supervision of the Family Service Section, Division on Family and Child Welfare, Council of Social Agencies of Chicago (Sept. 15, 1937) 40 pp.

This minimum standard budget is primarily for agencies serving dependent families in Chicago. Provision is made for rent; food; clothing; fuel for heating, cooking, and lighting; refrigeration; carfare to and from [illegible] schools, and clinics; incidentals, such as [illegible] materials, toilet articles, and medical s[illegible] and there is an allowance for replace[illegible] kitchen equipment and small or mino[illegible] hold furnishings. It should not be [illegible] the needs of self-supporting famili[illegible] budgets necessarily carry such additional ite[illegible] as medical and dental care and more gener[illegible] allowances for recreation, education, insuran[illegible] and savings. The money allowances indicat[illegible] are to be considered valid for a limited ti[illegible] after publication. The lists of commoditie[illegible] well as prices will ne[illegible] communities where [illegible] different from t[illegible] of the bookl[illegible] 30 c[illegible] by mail, 25 cent[illegible] called fo[illegible] -M. Y. P.

A national health program and some propo[illegible] toward its design. A statement sent JOSEPHINE ROCHE, chairman of the inter-de[illegible] partmental committee to co-ord[illegible]e heal[illegible] and welfare activities, to the resident c[illegible] the United States. *J. Am. Med. Associ* **110,** No. 9 (Feb. 26, 1938) pp. 656–664.

Attention is called to the fact that illness with its enormous economic burdens, is one o[illegible] the most important causes of social and economic insecurity. Methods of public health and medical sciences offer hope of reducing [illegible] burdens of illness, and the essential inadequa[illegible] in respect to health services is in the power t[illegible] distribute services rather than in the capacit[illegible] to produce them. The need for expansion o[illegible] services in the following fields is discusse[illegible] detail: maternal and child health care, tu[illegible] culosis, pneumonia, venereal diseases, chr[illegible] diseases of middle and old age, mental eases, industrial hazards.

An effective system of modern health ser[illegible] is impossible without adequate profe[illegible] personnel and institutional equipmen[illegible] present number of physicians probabl[illegible] be sufficient if they were better distri[illegible] relation to the need for service. Ma[illegible] [illegible] cities, and whole states ar[illegible] [illegible]h physicians. In the field [illegible] [illegible]ng there is a definite under[illegible] [illegible]. There is a deficiency, pa[illegible] [illegible]l and sparsely settled regions