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Foods and Household Management

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From the London and Country Cookbook, 1770. Courtesy of the Bryson Library.

FOODS AND HOUSEHOLD MANAGEMENT

A TEXTBOOK OF THE HOUSEHOLD ARTS

BY

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PREFACE

This volume, like its companion, *Shelter and Clothing*, is intended for use in the course in household arts in the high school and normal school, whether the work be vocational or general in its aim. It is hoped that both volumes will prove useful in the home as well, including as they do a treatment of the homecrafts, and the related topics now so significant to the home maker,—the cost and purchasing of foods and clothing, the cost of operating, the management of the home, and questions of state and city sanitation vital to the health of the individual family.

The volume treats specifically of foods, their production, sanitation, cost, nutritive value, preparation, and serving, these topics being closely interwoven with the practical aspects of household management, and they are followed by a study of the household budget and accounts, methods of buying, housewifery, and laundering. It includes about 160 carefully selected and tested recipes, together with a large number of cooking exercises of a more experimental nature designed to develop initiative and resourcefulness. *Shelter and Clothing* deals with the organization and ideals of the home, house sanitation, decoration, and furnishing; and treats in full, textiles, sewing, costume design, and dressmaking.

Some of the recipes here given are adapted from those of such authorities as Mrs. Lincoln, Miss Farmer, and Miss Barrows, and others are original and from private sources.

The authors are glad to acknowledge their indebtedness to those who have read and criticized the manuscript: Professor Mary Swartz Rose of Teachers College, for her criticism and contributions to the book; Miss L. Ray Balderston, of Teachers College, for reading the chapters on Housewifery and Laundering; Professor May B. Van Arsdale, of Teachers College, for reading the chapters on Food; Professor Van Arsdale, Miss Bertha E. Shapleigh,

and Miss Mary H. Peacock for their assistance in arranging for photographs; Miss Laura B. Whittemore, formerly of Teachers College, and Miss Amy L. Logan of the Horace Mann School for criticizing the manuscript from the point of view of the high school teacher; and also Professor Hermann Vulté for his kind assistance.

SUGGESTIONS TO TEACHERS

The topics in this volume are so arranged that they can be followed in sequence as the course of study develops through the year, with such modifications as seem necessary to the teacher in order that the work may best meet the needs of the pupils. The practice has become quite general of beginning the practical work in the autumn with the preparation and preservation of fruit, especially for those pupils who have had previous work in foods; and this plan commends itself as being seasonable and as making an appeal to the interest of the pupils. The opening chapters furnish material that is in part preliminary and that may also be studied as the practical work progresses from Chapter V onward. The preparation of a meal need not be deferred until all types of dishes have been cooked singly, as it is possible to prepare a luncheon box, to set an invalid tray, or to serve a simple breakfast quite early in the course, provided the equipment permits. If the school program allows, it is well to give a period to recitation at stated intervals, which would include a discussion of the text and of problems that arise from the laboratory work. The cost of food is a topic to be borne in mind throughout the year. It is an excellent plan for the pupils to record the current prices of each food material as it is used, and the cost of a given dish for a given number of people, the topic culminating in a detailed discussion when the chapter on the cost of food is read. A similar method may be pursued in connection with the nutritive values of food, the theme developing from lesson to lesson, until the pupils are ready for the chapter on menus and dietaries. An occasional lesson on housewifery or laundering may be introduced from time to time, if a complete sequence of lessons on these topics does not seem practicable; and through the year the pupils may be encouraged to keep simple accounts for themselves and in connection with the supplies of the school kitchen. Those teachers are fortunate who may coöperate with a school lunch room, thus affording their pupils opportunity for dealing with practical administrative and economic problems. The way in which the topics are used must of necessity vary with the previous experience of the pupils, whether or not they have had cookery, chemistry, and physiology, and the teacher will use the exercises at the end of the chapters with freedom, omitting some questions, and adding others as the need arises.

The following references will prove useful to teachers in developing the different topics of the volume:—

Laboratory Handbook for Dietetics—Mary S. Rose.
Chemistry of Food and Nutrition—Sherman.
Food Products—Sherman.
Science of Nutrition—Lusk.
The World’s Commercial Products—Freeman and Chandler.
Elementary Household Chemistry—Snell.
Nutritional Physiology—Stiles.
Household Bacteriology—Buchanan.
Bacteria, Yeasts, and Molds in the Home—Conn.
Microbiology—Marshall.
Household Physics—Lynde.
Selection and Preparation of Food—Bevier and Van Meter.
Principles of Cookery—Anna M. Barrows.
Technique of Cookery—M. B. Van Arsdale.
Cost of Living—Ellen H. Richards.
Cost of Food—Ellen H. Richards.
Cost of Shelter—Ellen H. Richards.
Cost of Cleanness—Ellen H. Richards.
Standards of Living—Chapin.
The New Housekeeping—Frederick.
Increasing Home Efficiency—Martha B. and Robert W. Bruere.
Household Hygiene—S. Maria Elliott.
Household Management—Bertha E. Terrill.
The New Hostess of Today—Larned.
Laundry Manual—Balderston and Limerick.
Bulletins of the U. S. Department of Agriculture.

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FOODS AND HOUSEHOLD MANAGEMENT

CHAPTER I

FOOD MATERIALS AND FOODSTUFFS

Food problems.—“What shall I plan for the three meals?” is a question as new each day as the day itself. That many women ask it, and are glad for an answer or a suggestion is proved by a glance at the daily or weekly paper or woman’s magazine, whose publishers know that it pays to print menus innumerable. Indeed, the daily press is full of signs that the food problem is an acute one, for the current joke about food prices, the accounts of boycotts by housekeepers, popular articles on nutrition and pure foods, and the records of state and national legislation, all show that as a nation we are awake and seeking a way out of our present difficulties.

Doubtless, the housekeeper has always found the task of supplying food to her family one of the most perplexing, but modern conditions have made the difficulties manifold when contrasted with olden times. A pretty picture of household management in seventeenth

century England is drawn by Sir Walter Scott in “Peveril of the Peak.” The lord of the castle has invited the village people to a great feast in celebration of the restoration of Charles the Second, and Lady Peveril finds her larder rather low. To be sure, there are carp in the pond, and deer in the park, but the beef question is puzzling, for the steward does not wish to kill his choice steer. Then appear in the courtyard two fine oxen, and several wethers, or sheep, gifts from a neighbor, and the menu is complete. Lady Peveril is described as an excellent housekeeper, and doubtless felt burdened by many cares, but how different were her problems from ours, and how simple by comparison! Beef trusts and the high price of beef, tuberculous cattle, unsanitary transportation and markets were not factors in her problem. In her day, and in the time of our grandmothers, less variety in diet was possible, and less expected except on state occasions; food was not transported over great distances, and the cost was not so much out of proportion to the average income. 2

Now every large city, and even the small town, is the market of the world. We have long been accustomed to the importation of oranges and lemons, and dried fruits from distant lands; but now we have peaches and pears from South Africa, melons from Spain, pineapples from the Azores, hothouse grapes from England, and apples from Australia, and in 1913, we read of the shipment of beef from Argentina. In our own country, early fruits and vegetables travel from the south to the north, so that the season of some foods is long extended. The large amount of canned food also does away with the natural limits of the season, and this is further affected by cold storage. Both the quality and the cost of food are modified by these new methods of commerce, and furthermore, modern methods of manufacture have changed the quality. In an ideal community these changes would be for the better, but manufacturers often think more of their own profit than of the quality of their goods, and as a result adulterations have crept in, making necessary the enactment and enforcement of pure food laws. This is by no means so simple a matter as it seems, for we must first understand what pure food really is. 3

Instinct guides somewhat in the selection of food where conditions of living are simple. Under more complex conditions there must be a scientific study of the whole situation in order that the individual may cope with it. Then, too, with such a variety of foods from which to select, it is easy to be tempted beyond our means, and to disregard the simple and the wholesome. We know that it is easy to develop a taste for some one food in excess, as for instance, sweets or dishes rich in fat and too highly flavored, and the physician adds his word here to the plea for a study of food and its functions.

The conclusion is this, that the housekeeper who has the welfare of her family at heart will not confine her interest in food to cooking processes and new recipes. Good cooks we must have, and our standard of cooking could easily be raised. But other facts about food are important to-day, and as we learn to prepare and serve food daintily, we must study such topics as the following:

What food is, its composition and how it nourishes us; how it is manufactured and transported; “pure food”; sanitary and convenient markets; the cost of food and how to buy; principles of food preparation; suitable combinations and amounts of food. These topics are all treated in this volume, and should be considered as important as the actual preparation of food.

Food Materials

What is food?—This would seem to be a difficult question to answer as we look about a modern grocery or market with its bewildering assortment of foods. It seems hardly possible to describe such a variety of articles in a brief sentence, or to find a definition that will apply to all. Yet we seem to know instinctively what food is, although we may not find it easy to give a definition. Even the lower animals are guided in selecting food by some natural instinct and seldom make a mistake. 4

A widely used government bulletin gives this definition: “Food is that which taken into the body builds tissue or yields energy or does both.” Probably we have learned this in our physiology, and admit it to be true, but for practical purposes, we need a more complete statement than this. Let us carefully determine what our foods really are, and what elements they contain, in order that we may select wisely for purposes of nutrition, and also that we may learn how to prepare food materials in a way that will utilize everything in them and waste nothing.

Vegetable and animal foods.—It is easy to divide food materials in a general way into those derived from the vegetable kingdom and those derived from the animal kingdom. In the vegetable group we have first, the different parts of many plants, and second, substances manufactured from plants. While we do not usually eat the whole of any one plant, yet there is not any part of the plant that we have not adopted as food. We use roots

and tubers in beets, carrots, and potatoes, and the onion is a bulb. In celery and asparagus we eat the plant stalk. Plant leaves give us lettuce and other salads, cabbage and the like. Peas and beans and nuts are seeds, and cauliflower is a part of the flower. The fruit as a whole is familiar in many forms. Manufactured vegetable food materials include flour, meals, breakfast cereals, starch, sugar, molasses and sirups. The animal kingdom gives us the flesh of animals, fish and shell fish, and substances derived from animals, like eggs, milk, and the milk products, cream, butter, and cheese.

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These materials vary so much in appearance that they would seem to have nothing in common. If, however, we compare the food of different animals and different races of men, we cannot but conclude that this is a mistaken judgment. We find an animal like the lion feeding entirely upon the flesh of other animals, and a strong creature like the ox, eating nothing but grass and grain. We also note that one race of men includes meat in its diet, and another subsists almost entirely upon vegetable food, such as rice and beans. Yet in both cases, these diverse kinds of food accomplish the same end,—body building and the supplying of energy. Let us study two common foods, from the two kingdoms, and see if through this study we can discover in what ways they are alike.

Comparison of milk and beans.—A moment's thought enables us to see that in milk we have a food that must have all the elements needed in nutrition, since it is the only food taken by many young animals. The baby and the young calf find in it everything that is needed to build the growing body, and to give them energy. If you see a young calf frisking about the field, you can appreciate how well his food supplies his needs.

A simple experiment will help us to find some of the substances contained in milk. Let the milk stand until the cream rises on the top. Skim the cream, warm it slightly and beat it with an egg beater. Butter will soon "come," and butter, we know, is a form of fat. Warm a pint of the skimmed milk, add to it a dissolved rennet tablet, and set it in a warm place. In a short time, the milk becomes solidified to a consistency like that of jelly. If allowed to stand longer, a watery liquid will separate itself from the solid portion. These are the "curds and whey" that result, also, from the souring of milk. The whey can be squeezed out of the curd, leaving it quite dry. We have now found at least three constituents of milk,—water, fat, and curd.

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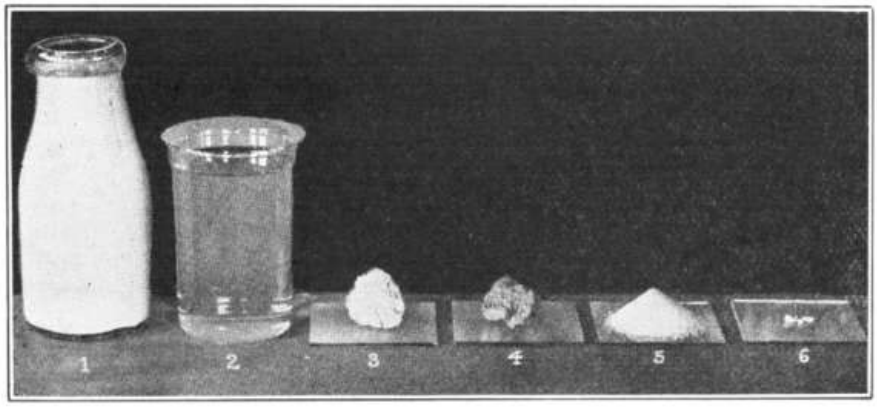

Fig. 1.—Composition of milk.

1. Whole milk.
2. Water.
3. Fat.
4. Protein.
5. Carbohydrate.
6. Mineral matter or ash.

Courtesy of President Gulliver, Rockford College.

You may then surmise from the sweet taste of milk that sugar is present; the chemist knows how to obtain it in pure form as "sugar of milk." The chemist also finds certain mineral substances which remain behind when all the water is evaporated and the curds and sugar burned away. These mineral substances are spoken of by the chemist as "ash," because this is what remains after burning the other portions of a food material, as ashes remain from a wood fire. Figure 1 shows you these substances in the amounts in which each occurs in a pint of milk. The sugar is one of a class of substances to which the chemist gives the name carbohydrate. To the substance in the curd that is different from all the other substances in the milk the name "protein" is given.

We will now turn to the composition of beans, for in beans we find food stored up to

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nourish the young plant, which we, also, appropriate as food. The composition of both the milk and the beans is given in this table. Compare also Figures 35 and 41.

Composition of Milk and Beans

Food Materials	Water Per Cent	Protein Per Cent	Fat Per Cent	Carbohydrate Per Cent	Ash Per Cent
Milk	87.0	3.3	4.0	5.0	0.7
Beans, dried	12.6	22.5	1.8	59.6	3.5

Notice that the substances in the beans are the same in general nature as those in the milk, although the amounts are different. The water that the young plant needs is, of course, supplied from the earth. There is another difference to note although this is not shown in the table; in the beans the carbohydrate is of two kinds, sugar and starch.

Foodstuffs[1]

All the varieties of food with which we are supplied will be found to contain some of these substances: protein, fat, carbohydrate, mineral matter, water; and to these we give the name *foodstuffs*. Some food materials (like the milk and beans just studied) contain all the foodstuffs, some only one, as in the case of sugar. We can now define food as something that contains one or more of the substances known as foodstuffs. But what are the foodstuffs themselves?

Elements in the foodstuffs.—Although we are not chemists, and may not even have taken a course in chemistry, yet through our nature study or physiology lessons, we are familiar with the fact that all the materials about us, including our own bodies and our food, are made up of simple substances that we call “elements.” We know, for instance, that coal is chiefly carbon, and we are familiar with such substances as sulphur, calcium, phosphorus, and iron. We know that the air contains oxygen, which we inhale, and that we breathe out a combination of carbon and oxygen called “carbon dioxide.” Since our bodies are composed of these and other elements, these elements must be supplied by our foods, and therefore, the foodstuffs in turn are composed of these same elements.

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Proteins, fats, and carbohydrates all contain large amounts of carbon, and on this account are called fuel foods. But proteins are distinguished because they contain nitrogen in addition, which is found in no other foodstuff. Sulphur, too, we get only from protein, but we need less of it than of nitrogen, so we think about the nitrogen and let the sulphur take care of itself. The nitrogen that we draw in from the air with every breath, we breathe out again without being able to use it. This element is necessary to every living cell, but we can make it ours only through our protein food. Nitrogen is cheapest when obtained from the grains, from dried beans and peas. We pay a higher price for it in milk, eggs, fish, meat, and nuts. Carbon, which is found in all foodstuffs except water and some kinds of mineral matter, costs much less, especially when we take it in the form of carbohydrates such as starches and sugars. Oxygen is also abundant in our foods, but we get it even more cheaply in water and by breathing it in from the air. Phosphorus, iron, and calcium are very important elements, but we do not need them in very large quantities. We can get them cheaply in whole grains, peas and beans, some fruits and green vegetables, but they are worth paying for in milk and eggs. The elements last mentioned are present in the food partly as constituents of certain proteins and fats, partly as mineral salts. Other elements found as mineral matter are sodium and chlorine (which we take as common salt), potassium, magnesium, and traces of iodine and fluorine. These are all necessary to keep our bodies in good working order. We shall see later how to select our food materials so as to have all the different elements in the foodstuffs present in sufficient amounts.

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Functions of the Foodstuffs

Food for energy.—The first requirement of the body is for fuel, because it has a great deal of work to do. Even when one lies perfectly quiet and appears to be resting, the heart is working to keep up the circulation of the blood, the chest and diaphragm muscles are working to maintain the oxygen supply to the lungs, the alimentary tract is moving food material along, working to digest it and get rid of waste, and the skeletal muscles are being held up to “tone” so as to be ready for further action. All this work that we scarcely realize,

may be called involuntary. To it we may add all sorts of voluntary movements, from simply speaking a word to turning somersaults or lifting heavy weights. All work involves *energy*, which we can obtain only from the fuel foods, proteins, fats, and carbohydrates.

Energy takes different forms. Our supply comes from the sun in the forms of heat and light, and plants store it up in the form of chemical energy when they build carbohydrates, fats, and proteins. This may be changed into the forms of work or of heat when we eat the food. Whenever an attempt is made to change chemical energy to work, some of it will change to heat. So in our bodies, the fuel foods, which enable us to do both involuntary and voluntary work, furnish heat at the same time, to keep our bodies warm. When we are too cold, we can shiver or run or jump, and thus, by doing more work, get more heat too.

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The unit of fuel value.—In our studies of food materials, we must find out just how much energy, or working power, can be obtained from each kind. We must have a measure of energy or fuel value; and just as the inch is a measure of length, and the pound of weight, so the Calorie serves as a measure of fuel value. This unit[2] measures energy as heat, being the amount of heat required to raise 1 kilogram of water 1° C. (or 1 pound of water about 4° F.), but we can express it also as work, being sufficient energy to raise a 1-pound weight 3087 feet into the air (or 1 ton about $1\frac{1}{2}$ feet) if it were possible to convert it into mechanical work without loss. By burning foods in pure oxygen in a vessel placed in water so that all the heat is given off to the water, and then noting the change in temperature of the water, it is possible to find out just how much energy each will yield. Such a device is called a calorimeter. In the body there is usually a small portion of each kind of foodstuff which escapes digestion, and protein is not quite so completely burned as in the calorimeter. When allowance for the probable loss is made, the energy values of the fuel foodstuffs are as follows:

Protein	4 Calories per gram or 1814 per pound.
Fat	9 Calories per gram or 4082 per pound.
Carbohydrate	4 Calories per gram or 1814 per pound.

The standard portion.—Knowing the composition of any food material, it is possible from these figures to calculate the total fuel value, or we can refer to tables in which this has been calculated, and save ourselves labor. For comparison of different foods the Standard, or 100-Calorie, Portion is used, as this corresponds very closely with the amount of food for a single serving in many cases. In the sections treating of different foods the Standard Portion will be stated.

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Food for body building.—Every living cell has a little life history of its own, and constantly demands a certain amount of new material to replace old which it has worn out. Besides this, old cells die, and new ones have to be made to replace them. Hence even a full-grown person needs building material, and much more is required in proportion when the person is growing and perhaps adding several ounces a week to his weight. The foodstuffs which have especial value as building material are protein and mineral matter.

Food for body regulating.—To help in the digestion of food, to keep the blood in proper condition, the muscles supple, and all the processes of the body at their best, ash constituents and water in the diet are necessary. A tabular summary of the functions of the foodstuffs and an outline of the changes which take place in digestion will be found in the appendix.

We are now able to give a more complete answer to our question, “What is Food?”

Food has been said to be that which taken into the body builds tissue or yields energy, or both. The food as a whole must contain all the chemical elements needed by the body, these elements being supplied in substances known as foodstuffs, viz., protein, fat, carbohydrates, mineral matter or ash, water. To be a food, a substance must contain one or all of the foodstuffs.

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It must be noted here that our food materials as bought, contain inedible matter, as in the shells of eggs, the bone of meat, the skins and pods of vegetables. Moreover, the fiber that we eat in vegetable foods is not digested under ordinary circumstances, but seems rather to serve a useful purpose in giving bulk to our foods.

Food adjuncts.—In preparing foods for the table, we have the habit of adding substances to develop or give flavor. With the exception of sugar, which we use largely for its agreeable taste, these substances have no nutritive value. They are not hurtful unless used in excess, although pepper and other spices sometimes disturb digestion. Pepper, too, irritates a delicate throat.

Only a few flavors are really detected by the sense of taste. These are salt, sugar, acids, and bitter flavors; and something in the spices that gives a sensation hard to describe, but is unmistakable in an overdose of mustard or horse-radish. “Pungent” describes such a flavor.

The other flavors are really odors, and are detected by the sense of smell. Have you not

at some time seemed to lose the sense of taste when suffering from a severe cold in the head? Yet even then you could taste sugar, salt, vinegar, and feel the pungency of pepper. These other flavors or odors are due to a volatile oil in the flavoring material, that is, an oil that readily evaporates, especially when heated, as distinguished from the non-volatile oils and fats like olive oil and butter. This is a practical bit of knowledge in our cookery, for whatever passes off as fragrance during the cooking process, is lost as flavor. For instance, to cook vanilla essence in a soft custard is equivalent to throwing most of it away.

Salt.—A mineral substance that develops other flavors. It should not be used in excess. A small amount is desirable even in sweet dishes.

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Acids.—Vinegar, lemon juice, and juices of other sour fruits. These are pleasing in themselves, and in small quantities develop other flavors and give a certain brightness of taste. They are used with meat and fish, and in sweet dishes.

Spices.—Red, black, and white pepper, cinnamon, cloves, allspice, nutmeg, mace, and ginger are examples. They are made from the seeds of certain plants, used whole or ground. Stick cinnamon is a layer of a stem. Ginger is a root.

Herbs.—Thyme, mint, sweet marjoram, summer savory are the leaves of old-fashioned pot herbs, used either fresh or dried. There were many others used in olden days that are not common now, such as sweet basil and pot marigold. A quite complete list will be found nowadays in any good seed catalogue. These herbs are used with meat dishes.

Vegetable flavors.—Celery seeds and stalks, onions, leek and garlick, carrots and turnips, all contain flavoring oils, and we use them for their flavors in small portions, in meat dishes.

Essences.—The oils of vanilla, bitter almonds, lemon and orange peel are dissolved in alcohol, and used in liquid form in cakes and desserts. Violet leaves and violet essence are sometimes used, but are a fad as a flavor. Rose water made from rose leaves is an old-fashioned flavoring, used infrequently now in blancmanges. The fresh leaf of a rose geranium gives a pleasing flavor, for occasional use. Chocolate, coffee, and tea are used for flavorings as well as for beverages.

Coloring substances.—These come of many colors made from aniline dyes, and while probably not often hurtful, they should be used only in sweets and candies, and very seldom, if ever. It is better to depend on natural fruit coloring when color is wanted.

The fine art of cooking is to develop the natural flavor of each foodstuff by the proper application of heat, and never to use these condiments and flavorings in excess. The artist in cookery has a gift for flavoring, somewhat as the painter has for color.

Beverages.—The dictionary defines “beverage” as “drink of any kind.” The word is used in different forms in several languages and is traced back to the Latin *bibere*, to drink. The common beverages will be studied in detail in connection with their preparation. They have slight nutritive value, save for the added milk, cream, and sugar. Cocoa and chocolate contain fat, and so have to be classed as foods. Milk is not a beverage, strictly speaking, but a food, and should be counted as a part of a meal.

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EXERCISES

1. State the important topics in the study of foods.
2. Explain the difference between a “food material” and a “foodstuff.”
3. What are the important elements in protein, fat, and carbohydrates?
4. What food materials are rich in protein? In fat? In carbohydrate? In mineral matter?
5. Explain the meaning and use of the “Calorie.”
6. State the functions of food.
7. What is a food adjunct?
8. What is the waste material in food?

CHAPTER II

15

KITCHEN FURNISHINGS

There is no more attractive room than a well-fitted kitchen, shining with cleanliness; and the kitchen furnishings should have their fair share of the money spent in buying furniture for the house.

A spotless cleanliness is the standard for the kitchen, and all the equipment should be selected with the thought of making cleanliness easily possible. Next in order is forethought in securing the comfort and convenience of the worker.

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Plan of the kitchen.—Here the motto should be “Save steps.” How many weary miles do women walk within their kitchen walls because the sink, the stove, the refrigerator and the closets for food and dishes are put in to fit the spaces allowed by the windows and doors, with no thought of the rapid and easy dispatch of work.

Figure 2 shows the plan of a kitchen, of the “buffet” type, suitable for a small home or apartment. As this plan is drawn it would be necessary to use either electric apparatus, or a small gas stove upon one of the tables. A large gas stove could stand in place of the table at (1), or against the wall at (2), pushing the table at (3) nearer the door. The cupboards at (4) and (5) should be raised, leaving table space at both the right and left of the sink. Notice that the ice box is in the entry, and also that there is a cupboard that could be used for food. The china cupboard is conveniently near in the dining-room.

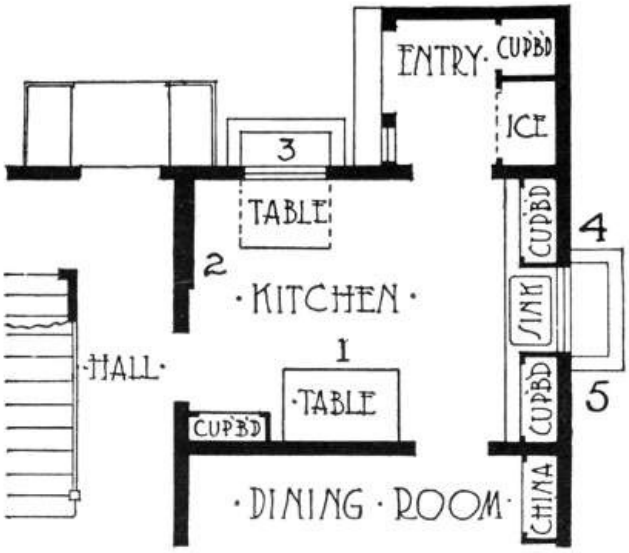

Fig. 2.—Plan of a small kitchen. ***Courtesy of the House Beautiful.***

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Figure 3 shows a larger kitchen, with a serving room between it and the dining-room. The ice box is in the outer wall and is filled from the outside. The cupboard at (1) could hold the cooking utensils, as it stands conveniently between the sink and the range. A kitchen as large as this should have a small table on rollers for carrying food materials and utensils back and forth. If you have ever visited the kitchen in a dining-car you will realize that compactness is one of the advantages of the small kitchen over the large, although the latter may be better ventilated and cooler.

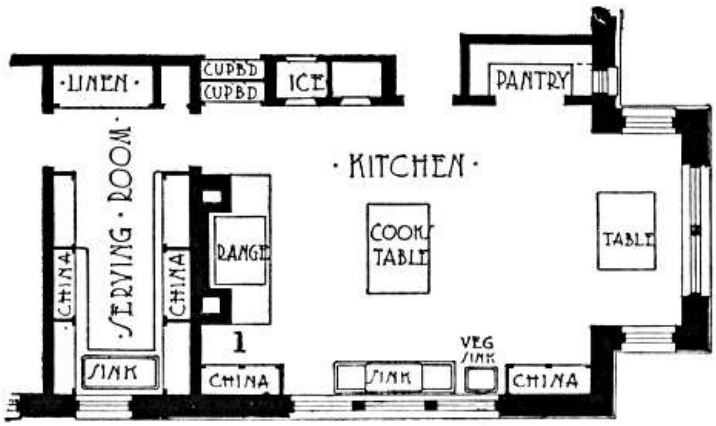

Fig. 3.—Plan of a larger kitchen. ***Courtesy of the House Beautiful.***

Furnishing the kitchen.—The walls and floors, and even the ceiling, should be washable. A tiled wall is as easy to wash as a china dish, but the expense is prohibitive in many cases. Table oilcloth for wall and ceiling is very satisfactory; next to this in desirability is paint, and for the last choice a washable paper. This paper will bear scarcely more than a damp cloth for cleansing purposes, however. Avoid cracks and crevices in the woodwork, having all surfaces as plain as possible.

The best floor is one covered with an inlaid linoleum, which gives warmth and comfort to the foot, is easy to clean, and wears for many years (Fig. 4). It should be cemented down at the edges that no dust may collect. The first cost is rather high, but it pays in the end. A hardwood floor of maple or yellow pine is also satisfactory. Tiling is the cleanest of all floorings, but is very fatiguing to the worker.

Fig. 4.—A kitchen corner. ***Courtesy of the Department of Household Science and Art, Pratt Institute.***

Enamel-paint makes a smooth finish for the woodwork. In the kitchen of the future, which will be fireproof, steel fittings will probably take the place of all wood.

Have harmonious colors in the kitchen. Decide upon a cheerful color scheme, and carry

it out in all the fittings. One most attractive kitchen is furnished in soft brown and buff, with a touch of blue in the linoleum on the floor. Figure 4 shows the interior of a small kitchen, practical for a family of six or eight. The curtain at the window, which gives a touch of daintiness, is of a washable material. Figure 5 shows a much larger kitchen, with two sinks, and a work-table in the center. See how conveniently the refrigerator is placed for serving, and for returning food from the serving room to the refrigerator. The vegetable sink is near the stove, and the utensils, too, are near by. A rolling table is seen at the left.

19

No plan can be drawn that would be perfect in all situations. If you ever have the opportunity to plan your own kitchen, decide just what you want it to contain, and then plan the places for each article. Sometimes there are too many drawers and shelves, and these not of the right size or position.

20

The kitchen table.—The table should have a top with room for food materials and utensils to stand in neat order without crowding. Glass is the cleanest top, painted steel and hard maple coming next in order. Have some arrangement of shelves and drawers that small utensils and some food materials may be always at hand. Figure 6 shows a kitchen “cabinet” of painted steel with such conveniences. Notice the bin for flour, and the inverted jar for sugar, both with an opening at the bottom. Spices and flavorings and materials needed in small quantities are kept in jars on the shelves. The cupboard and drawers beneath will hold small utensils, towels, and whatever proves to be needed close by. Several makes of such cabinets are now on sale. A flat-topped table for a large kitchen, Fig. 5, could have drawers and cupboards below. If the outlay for a cabinet seems too great, the bins for sugar and flour may be purchased separately and fastened on the wall above the table, and one or two shelves screwed on the wall for the jars, with hooks fastened in underneath on which a few small utensils may be hung.

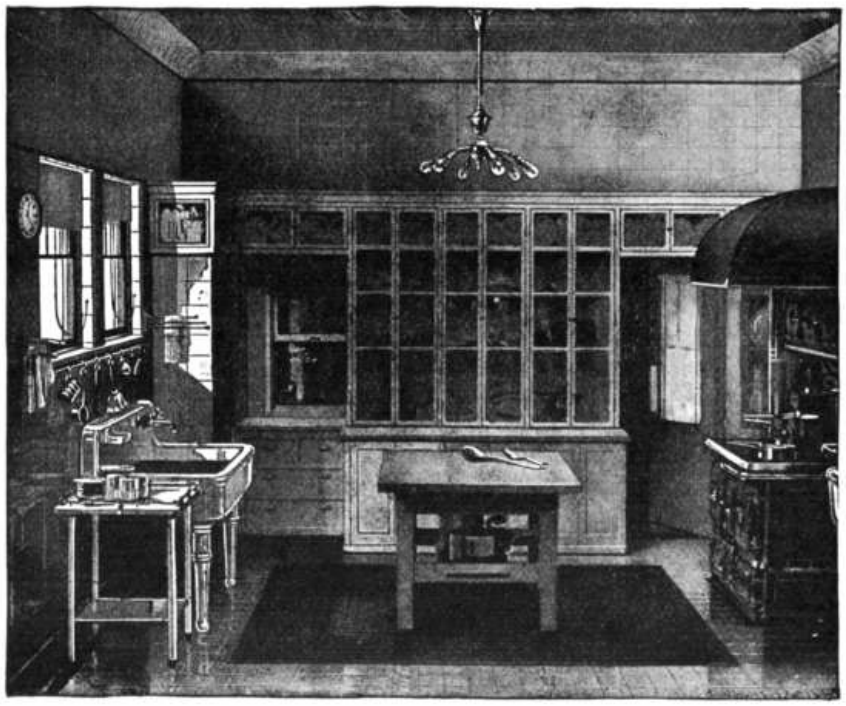

Fig. 5.—A well-equipped kitchen. *Courtesy of the J. L. Mott Co.*

A small *rolling table* may be made inexpensively by putting castors on a light table costing not more than a dollar. Put table oilcloth over the top. This is a great convenience in many ways. The height of the table should be such that the worker is not fatigued by bending over. Thirty-two inches is a good table height for a woman of five feet four or five inches. Blocks hollowed to fit the table legs may be used with a table of ordinary height for a tall person.

Cupboards and shelves.—If you purchase a cupboard see that the shelves are movable, and of varying widths. There are a few large utensils that need a deep shelf, about fifteen inches. If the shelves are to be built in, provide several widths from six to ten inches. Much space is sometimes wasted between shelves. Vary the distances here.

21

Fig. 6.—A kitchen cabinet. ***Courtesy of the Columbia School Supply Co.***

Smooth paint is the best surface for the shelf. Shelf covers of paper or oilcloth look clean when they are fresh, but are less sanitary than uncovered shelves. Drawers should not be too large, for these are heavy to pull and push when full. Cupboard shelves are on the whole more satisfactory than drawers, because this tiresome pulling out and pushing in are avoided. Towels can be piled on the shelves, and small utensils hung on right-angled screw hooks. Do not use curved hooks, except for hanging cups from the bottom of a shelf. 22

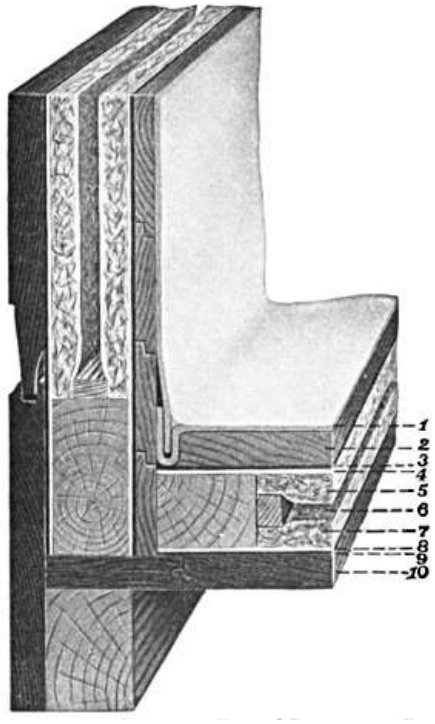

Fig. 7.—Section of a refrigerator wall. ***Courtesy of the White***

The refrigerator.—A good refrigerator is built with double walls, and has several layers of non-conducting material. Figure 7 shows the careful way in which the refrigerator wall is made. 1. Porcelain enamel lining lock joint. 2. Inside wood lining. 3. Three-ply red rope water-proof paper. 4. Wool felt deafening paper. 5. Flaxlinum insulation. 6. Dead air space. 7. Flaxlinum insulation. 8. Wool felt deafening paper. 9. Three-ply red rope water-proof paper. 10. Outside wood case. The ice chamber is arranged to be easily filled, and has a connecting pipe for carrying off the water. If this is connected with the sewerage system of the house, make sure that it is properly trapped (Fig. 8). See “Shelter and Clothing,” page 51, for description of the S trap. The closets for the food should have an enamel or tiled lining. This is non-absorptive, and may be kept perfectly clean. A large refrigerator is more economical of ice than a small one, and in the end more than balances the few dollars extra that must be paid for the larger size. Select the coolest spot that you have for the refrigerator. Figure 9 shows the construction of a good refrigerator. 23

Enamel Refrigerator Co.

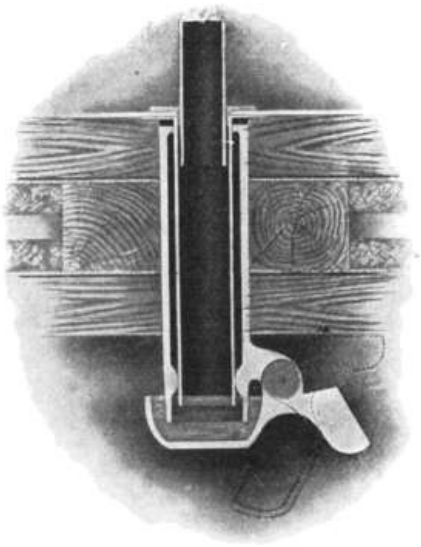

Fig. 8.—A refrigerator trap.
Courtesy of the White Enamel Refrigerator Co.

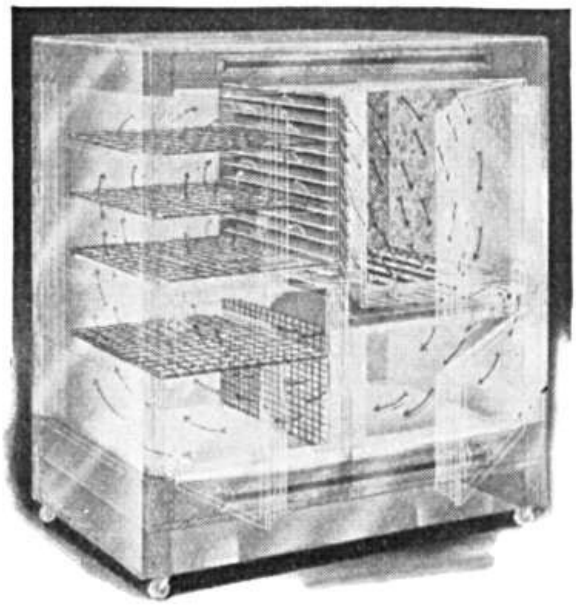

Fig. 9.—A well-constructed refrigerator.
Courtesy of the White Enamel Refrigerator Co.

Artificial ice is cleaner and therefore safer to use than the natural. Always wash off the block before putting it into the ice chamber. Wash out the ice chamber once a week, and pour a solution of washing soda down the waste pipe.

The food chambers should be washed out once a week and dried, and no spilled food allowed to remain a moment. Do not leave the doors open. Have a strong ice pick for breaking ice.

A *window box* fastened outside the window by strong iron brackets provides a convenient place for cooling food, and keeping some semi-perishable foods. It is easily made from a watertight wooden box, painted outside and in, the opening toward the window having a curtain of table oilcloth. A piece of wire netting set in one side of the box permits of a current of air.

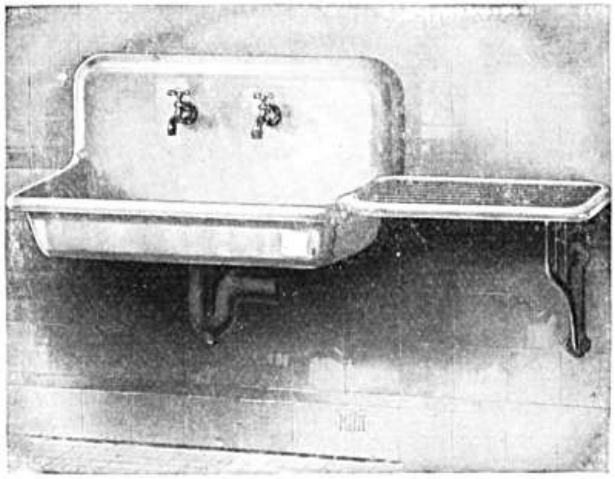

Fig. 10.—A sink of simple construction.
Courtesy of J. L. Mott Co.

The sink.—White enameled iron and porcelain are the most desirable materials for the sink. A simply constructed sink is shown in Fig. 10. Notice that the sink is supported from the wall, leaving a free space underneath. A larger sink is shown in Fig. 11, with the draining board in the sink. The trap below the sink should be a large S trap, and the trap and faucets should be nickel plate.

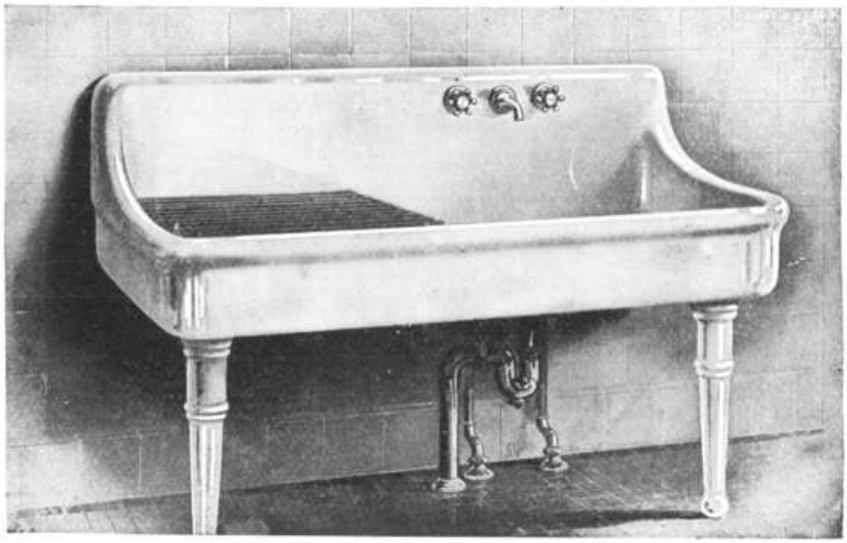

Fig. 11.—A larger sink. ***Courtesy of the J. L. Mott Co.***

An iron sink should be rubbed and polished until it becomes very smooth. Do not attempt to paint it. If it is left perfectly dry, it will not rust.

Hot water supply.—A good supply is essential to rapid and thorough work. The apartment dweller who finds it piped to the sink is most fortunate. The separate house must have a boiler connected with the coal range, or a water tank fastened to the range. If gas is used, have some kind of gas water heater that will give a sufficient flow for dish-washing and cleaning purposes. A boiler may be heated with a kerosene stove. The boiler should be fastened above the floor with space below for a one-burner blue-flame kerosene stove. Have a faucet in the boiler. Wherever a boiler is used it is economy to have it covered with some non-conducting material, just as steam pipes are packed.

25

Utensils.—The expert cook is known by the small number of utensils that she uses. If you watch the expert at work, you will see too, that each utensil is exactly fitted to its use.

The skilled cook is like the carpenter or painter, and her set of tools is individual. The list given on page 28 is a sample one, to be changed to suit the individual preference, and increased as the need arises; it could be smaller, if necessary. When you first furnish a kitchen, avoid an elaborate display of tools, beginning with the few essentials only.

26

No one material is suitable for the construction of all utensils. Those subjected to intense heat must be of material able to resist it. The material for a given utensil must be selected with the purpose of the utensil in mind. The material should be durable, easy to clean, and of such a nature that it does not affect chemically the food material cooked in it.

Aluminium.—A white metal, fairly durable, very light in weight. Discolors easily, and is not easy to clean. Expensive. Used for all kinds of utensils.

Copper.—Endures heat, durable, fairly light to handle. Hard to keep clean. Expensive. Used for kettles. Not desirable for family use.

Earthenware.—Will not endure the highest temperatures without crackling. Easily breakable. Easy to clean, unless crackled. Inexpensive. Useful for slow oven processes, for pitchers and mixing bowls.

Enamel.—A vitrified material upon iron or steel. The English enamel ware upon iron is durable, excellent for preserving, heavy. The German and American enamels are lighter. Avoid the attractive blue, and blue and white except for pitchers, cups, bowls, and plates. They crackle and chip off more easily with heat then the gray enamels. One German make, of a dark mottled gray, is less brittle in the finish than most American makes. All the enamels are easy to keep clean. Used for kettles, saucepans, roasting, and baking. Less durable than steel and iron.

Iron.—Endures intense heat. Durable. Heavy to handle. Becomes smooth with long use, and then is not difficult to clean. Affects the color of acid fruits. Not expensive. Used for frying kettles and pans and kettles for boiling.

Russia iron is a sheet iron of good quality for roasting and bread pans. Expensive.

Steel.—Endures intense heat. Durable. Medium weight. Fairly easy to clean. Affects acid fruits. Medium cost. Same uses as iron, also for roasting and baking pans, and smaller kettles.

27

Tin.—Tin, a "useful metal," is plated on thin sheet iron for utensils. So-called *block* tin is the best quality. Will not endure intense heat. The tin wears and scratches off with use. Not easy to clean. Discolors easily, and colors acid fruit. Poor tin ware is not worth buying. Good quality is not cheap. May be used for measures, and for small saucepans, but is less desirable than other wares.

Wooden ware.—Used for molding boards, meat boards, and spoons.

The patterns of utensils.—Select those made without seams, or flutings, where food particles collect. Bowls, saucepans, and kettles should have a *lip* on the side, for the pouring out of liquids. A pitcher should be of such shape that it can be easily washed, and it should have a lip that will pour well. A pot for boiling coffee should have a lip and not a spout. Select utensils with non-conducting handles.

Study carefully the selection of knives, and do not try to economize in their purchase. Knives must be sharp, and poor quality steel will never take a good edge. A worn table knife of Sheffield steel, when ground down, makes the best of kitchen knives. Buy a good sharpener and use it frequently.

Labor-saving devices.—A good machine saves the wear and tear of human muscle, and also much time. If you have studied the principles of the lever and other mechanical devices, you will understand why this is.[3]

Learn to pay for, use, and clean good machines.

28

A "*Dover*" *egg beater* is built on the principle of the "wheel and axle." The large wheel has five times as many cogs as the small, one revolution of the large wheel giving five of the small, and one turn of the handle five revolutions of the blades. It saves your wrist, and saves time to use the "Dover" in place of a fork. It is more trouble to wash the Dover beater than the fork. Yet a cook may object to a bread mixer and meat chopper, because they are harder to clean than the bowl and spoon and knife.

A *good bread mixer* saves strength and is sanitary. Fig. 12.

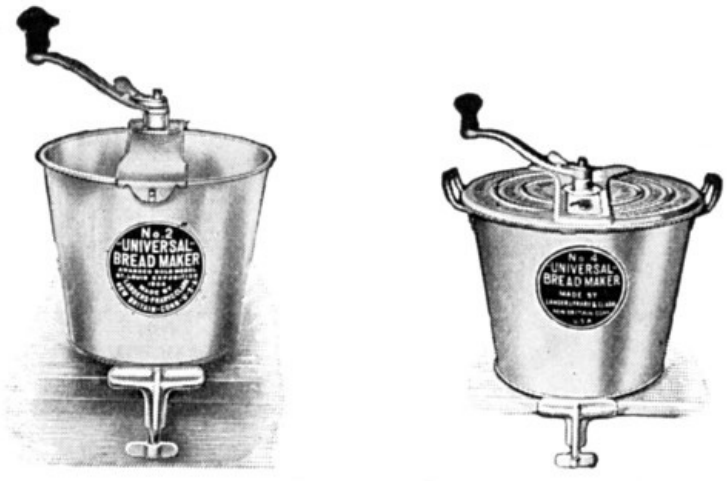

Fig. 12.—An inexpensive bread mixer, cover on and off.
Courtesy of Landers, Frary and Clark.

A *meat chopper* or grinder also saves strength and time, and is cleaner than the wooden chopping bowl.

LIST OF UTENSILS[4]

For preparing and mixing.

1 can opener.
1 corkscrew.
1 vegetable knife, pointed.
1 steel table knife, broad blade.
1 meat knife and fork.
1 bread knife, *or* slicer.
1 small meat axe.
1 knife sharpener.
1 3-bladed chopping knife, *or* meat grinder.
1 apple corer.
2 plated or steel forks, table.
1 long-handled fork, three-pronged.
1 palette knife.
1 pair heavy scissors.
1 set skewers.
1 large mixing spoon, enamel ware.
6 plated tablespoons, or German silver.
6 plated teaspoons, or German silver.
1 saltspoon, bone.
1 wooden spatula.
1 Dover egg beater, large size.
1 wire egg beater.
1 wire potato masher.
1 colander.
1 wire strainer.
1 wire strainer, cup size.
1 flour sifter.
1 flour dredger.
1 salt shaker.
1 coffee mill.
1 grater.
1 nutmeg grater.
1 glass lemon squeezer.
1 large mixing bowl for bread.
1 medium bowl for cake.
2 pint bowls.
1 quart measure.
1 half-pint measuring cup.
1 molding board.
1 rolling pin.
1 meat board.

1 or 2 plates.
1 or 2 china molds.
1 kitchen scales.

Other conveniences.

6 small hand towels.
Towel racks.
1 high stool.
1 or 2 comfortable chairs.
A clock.
Sheets of paper, tissue and heavier.
Heavy linen thread and large needle.
Ball of soft, strong twine.
A shelf for cook books.

For stewing, steaming, and boiling.

(Sizes dependent on number in family.)

1 teakettle, enamel or aluminium.
1 double-boiler, enamel ware.
1 pint saucepan, enamel covered.
1 or 2 stewpans, enamel covered.
1 kettle, covered.
1 steamer.

For broiling, pan broiling, the sauté, and frying.

(Broiler and toaster supplied with gas range.)

1 wire toaster.
1 heavy wire broiler.
1 frying pan, with lip, steel or iron.
1 frying kettle and basket.

For roasting, braising, and baking.

(Roasting pan provided with gas range.)

1 roasting pan, covered, steel or iron.
1 or 2 heavy earthen pots, covered.
1 baking pan for fish, iron, or heavy earthenware.
2 or 3 bread pans (for loaf cake also).
1 shallow pan for cake.
1 muffin pan.
1 flat cooky tin.
3 round pans, for layer cake, enamel.
2 pie pans.
2 or 3 pitchers.
6-12 heavy earthen cups, for popovers and custards.
2 round baking dishes, earthen or enamel.

For holding food materials.

A few cheap saucers, plates, and bowls for food in the refrigerator.
Bins for flour, meals, and sugar.
A dozen glass wide-mouthed preserving jars.
Jelly glasses for spices, etc.
Tin boxes can be kept for such purposes.
(Use gummed labels on these jars and glasses.)

For washing dishes.

1 dishpan, enamel.
1 shallow rinsing pan.
1 soap shaker.
2 soap dishes.
1 shaker for washing powder.
6 glass towels.
6 heavier towels.
6 loose weave dishcloths.

Care of the kitchen.—The daily cleaning must include the care of the sink and traps, the cleaning of the stove, brushing the floor, and washing off of tables. More thorough

cleaning includes the scrubbing of the floor, washing of walls, woodwork, and windows, cleaning of closets and drawers.

31 The stoves should be rubbed often with paper, and washed thoroughly when necessary. Great pains must be taken to keep the ovens clean, by frequent washing out. Gas burners must be taken off and boiled in a solution of sal soda once in a while. The top and bottom of coal ovens should be cleaned out once a month. Kerosene stoves need constant cleaning. Stove blacking makes the stove more attractive.

Dish-washing.—It is not difficult to wash dishes well, although many people make it a very disagreeable process. The necessary apparatus is given in the utensil list. The cleansing materials include a plentiful supply of hot water, a good soap, ammonia or borax to soften the water, a gritty soap or powder. Have a pan for washing and another for rinsing, and a tray for draining if there is no drainer attached to the sink.

Order of work.—Prepare the dishes by scraping and neatly piling articles of a kind together. Rub greasy dishes with soft paper, and put water and ammonia or washing powder into utensils that need soaking. Have clean towels at hand. Make ready a pan of hot soap suds, by using a soap shaker, or soap solution, but do not put the cake of soap in the pan. Have rinsing water ready.

Wash the cleanest dishes first, usually the glasses, next the cups and saucers, and the silver next. Have the soiled dishes near the pan, and put in only one or two articles at a time, washing with mop or dish cloth. To pile in a number means the nicking of china, and scratching of silver. Dip each dish in the rinsing water and then put in the drainer. If there is not room for two pans, the dishes may be piled on the drainer not too many at a time, and the rinsing water poured over. Be careful not to use too hot water for delicate china and glass. Change the soapy water when it becomes in the least greasy.

Wipe the dishes while they are still warm, and use dry towels.

Wash the utensils thoroughly, especially on the bottom. Heavy utensils can be dried without wiping, on or near the stove. Do not put any utensils away until they are perfectly dry.

32 Steel knives should be scoured and thoroughly rinsed and dried. Wash out the towels and dishpan, and leave the sink and drainboard perfectly clean. It does take time and work for this whole process, but spotless cleanliness is our aim.[5]

Home dish-washers are being devised, and should save some of the labor. None as yet has proved very satisfactory.

EXERCISES

1. What is essential to the planning of a convenient kitchen?

2. How may cleanliness be secured through the furnishings?

3. What are the requisites in a good work table?

4. Explain the construction of a refrigerator. Of a good sink.

5. Compare the materials used in utensils.

6. What is the advantage of a machine compared with hand power?

7. Make an estimate of the cost of utensils for the home kitchen from a price list obtained from some standard furnishing shop.

8. Examine the utensils in the school kitchen and at home. Consider the material and shape with reference to durability and convenience.

9. What are the important points in cleaning the kitchen?

10. What are the important points in good dish-washing?

11. What is a good order of work in dish-washing?

33

CHAPTER III

FUEL AND STOVES

The fuels most widely used in this country are coal, gas, and kerosene. Wood is still used for cooking by those who own wood lots, or who live in a district where wood is abundant, but in a sense it is the fuel of the past. Electricity is generated from coal except in the few communities where the electric current is derived through machinery from the energy of falling water but electricity is not in common household use, and is still the method of the future for the average family. Other substances are burned for fuel occasionally or in restricted localities. Corn cobs are used sometimes in the corn belt. Peat is an old-world fuel. It is a vegetable substance taken in blocks from marshes, in reality the first stage of coal formation. It is a slow-burning fuel which is cheap in its own locality.

Economy of fuel is a world problem, for it is evident that the coal supply will be exhausted in course of time, and this is true also of coal oil or petroleum. Scientists are experimenting to discover practical methods, not dependent upon the burning of coal, for generating electricity. Water power is the only practicable method so far, and to make it permanently available we must conserve the forests still remaining to us, and thus safeguard the sources of our rivers.

Another effort toward economy is seen in the use for fuel of waste products treated in some way to make them readily combustible. The briquet is used in Europe where the fuel supply is limited. It is made of sawdust or waste coal, with some petroleum, tar, resin, or other substance, heated together and molded. Good briquets yield a large amount of heat in proportion to bulk and weight. The problem here, as with all waste, is to find a manufacturing process that will make the product cheap enough to be practical for common use.

34

It is a natural impulse to use lavishly whatever is at hand in abundance, and it is only a highly civilized community that takes thought for the economy of the future. Considered only from a selfish point of view, however, with coal and petroleum at the high prices that are likely to prevail, the saving of fuel is one of our most important economies.

The common fuels.—*Coal* is of two kinds, anthracite and bituminous, or hard and soft. Hard coal of good quality has 90 per cent or more of carbon, and burns with little flame. Soft coal contains as much as 18 per cent of flame-making substances, and gives off a heavy smoke. Hard coal is therefore cleaner, but it is more costly than soft coal, because the supply is smaller. The most important anthracite mines are found in the eastern United States, and hard coal is used more in this section than elsewhere. Good hard coal may be recognized by its glossy black color and bright surfaces. It is sold under different names taken often from the locality where it is mined. There are two kinds, one leaving a reddish ash, and the other a white. The red ash coal burns more freely than the white ash and the ash is heavier and therefore cleaner. The price is higher per ton or bag.

Coal is sorted in different sizes, a medium size being best for the ordinary range. Poor coal has slaty pieces in it, that will not burn but break up and mingle with the ashes. You can learn to detect it by the slaty color. *Clinkers* are formed by unburnable minerals, mixed with the coal, that melt and stick together, and even adhere to the lining or the grate. They are not often troublesome in the cooking range.

35

Coal is measured by the ton of two thousand pounds avoirdupois. A common hod of coal holds about thirty pounds. Coal should be bought in large quantity, and stored away in summer, if possible. The retail dealer in the city often charges an exorbitant sum for coal by the bag, so that the buyer of small quantities pays a much higher price for a ton bought in this way. The wholesale price of coal has increased on an average about 13 per cent since 1900.

Coke is the solid substance remaining after gas has been made from certain kinds of coal, and is sometimes sold by gas companies, as a by-product. It is light, and therefore easy to handle and does not smoke, but it burns out quickly, and the fire of coke requires frequent replenishing. It is sold by the bag, or in large quantities by the ton, also sometimes by the chaldron, an old English measure for coal, containing from thirty-two to thirty-six bushels.

Gas was used for illuminating long before it came into common use for heating and cooking. Commercial gas manufactured for both lighting and cooking is really a mixture of various gases. One method produces it from bituminous coal heated in retorts. Another method gives “water gas,” by passing steam through heated coal. The value of gas will depend upon the components of the mixture, and the manufacturer has an opportunity to make an inferior gas unless the law stipulates what the quality shall be.

The small town or country dweller may use a gas machine on the premises, the gas to be stored or generated in some tank in the ground, and piped into the house. Acetylene, a

compound of carbon and hydrogen, is used in this way. Acetylene has a low flashing point, and there is question as to its safety. One firm sends a mixed gas of good quality in metal bottles to the consumer, the bottles being placed in a metal closet above ground outside the house. The firm claims that an explosion has never occurred. 36

Gas is measured by the cubic foot, and its price estimated per 1000 cubic feet. The amount is recorded on a meter as the gas passes into the house. See Fig. 13. It is an easy matter to learn to read a meter, and every one should do so who uses gas. Always compare the gas bill with the amount recorded by the meter. If the gas bill becomes larger than usual, and you feel sure that the consumption has been normal, report the matter to the company. A meter may be out of order, and need repair.

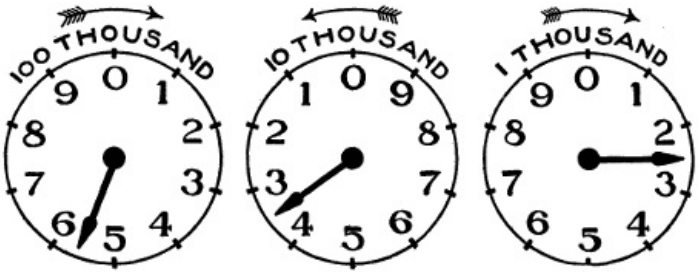

Fig. 13.—Reading the gas meter. ***Courtesy of New York Consolidated Gas Co.***

To read the meter.—Figure 13 shows the three dials found on the face of a gas meter. The arrows show the direction. The dial at the right indicates 100 cubic feet between the numbers, the middle dial 1000 and the left-hand dial 10,000. The dials in this figure record 53,250 cubic feet. The price of gas varies from eighty cents to a dollar and a half per thousand cubic feet. “Eighty-cent gas” is the hope of many a consumer. At a dollar and a half it is not a cheap fuel.

Gas does away with the handling of coal and ashes in the kitchen and is thus a clean and labor-saving fuel. It gives an intense heat the moment the flame is lighted and this heat is easily regulated in a well-made stove. The flame should burn with a clear blue or greenish color. With a properly constructed stove only a small percentage of the heat is lost. In all these points it has the advantage over coal. The comparative cost is studied in the problems on page 53. 37

Natural gas is used in those regions where it occurs, piped to the house from a central source. It is found in limited areas only, and in some places has already been exhausted.

Coal oil, or *petroleum*, sometimes found oozing from crevices in rocks, or even floating on water, is a natural inflammable oil stored in the earth. It was known in ancient Persia, Greece, and Rome, but did not become of great commercial importance until the middle of the nineteenth century. It is now obtained by boring wells, and is found in great quantities in certain regions of the country. The crude oil yields many products valuable in the arts, medicine, and manufacture. *Kerosene* is the substance useful as a fuel and for giving light. When of good quality it is nearly colorless, and the flashing point should be 149° F., or 65° C. This *flashing point* is the temperature at which the vapor from the kerosene explodes or flashes. If the vapor flashes at a point lower than this, it means that the oil has not been sufficiently refined; that is, in the process of manufacture the substances that flash at a low temperature have not been removed, and therefore the oil is less safe.

Kerosene is sold by the gallon or barrel. The price for a good quality is about seventy cents for a five-gallon can. By the barrel a saving is made of several cents a gallon. It is useful as a fuel to those housekeepers who cannot have gas, and who find it a convenient substitute for coal in the summer. With the new blue-flame stoves it gives an intense heat, easily regulated. There is no heavy labor involved in its use, but even the best stove requires constant care and watchfulness. It is not so clean and easy to use as gas. The kerosene supply should be kept in a cool place, and stoves and lamps should never be filled by candle or lamplight. 38

Gasolene is used as a fuel for cooking in some places, but in others the fire insurance companies have such strict rules in regard to it that its use is practically prohibited. It is more volatile than kerosene, and its flashing point is very low. Kerosene is much safer for household use.

Alcohol is used with the chafing dish. Denatured alcohol is so cheap in Germany that it is used in large and especially adapted stoves for cooking purposes. There are denatured alcohol stoves on the market here, but they are little used.

Charcoal, wood partially burnt out, is little used for domestic purposes now.

The relative value of the common fuels is stated in quantities as follows, but this is of course dependent on the quality of the coal and the gas. One thousand feet of gas about equals from fifty to sixty pounds of coal, or four and one half gallons of kerosene; and one half ton of coal approximates a cord of wood.

Those who may be interested will find a fuller discussion of fuels and fuel values in Snell's "Elementary Household Chemistry."

Electricity is not a fuel, but is classed here as a source of heat. It may be supplied for cooking purposes by any company that furnishes electric light, and should be available in the country wherever an electric trolley runs. The energy supplied is measured and paid for by the kilowatt; that is, one thousand watts. The terms used for electrical measurements cannot be really understood until one has studied electricity. It may be said, however, that the *ampere*[6] is the unit of current strength, the *volt* is the unit of electrical pressure or electromotive force, the *watt* is the unit of electrical power and the basis of payment for current supplied for heating or lighting.

39

Voltage, amperage, and watt or kilowatt are the terms in common use. If you read the circulars that advertise electric cooking apparatus, you will find the request to state the voltage of your electric current in ordering a piece of apparatus. Or again, the number of watts used per hour is given, with the catalogue number and the size of an electric stove.

The cost of electricity per kilowatt (usually from ten to fifteen cents) varies in different localities.

The great advantage of electricity is that little heat is lost in radiation, and that the degree of heat is well under control. There are also no products of combustion present, and this is the only source of heat for cooking of which this is true. Both gas and kerosene vitiate the air to some extent.

Cooking apparatus.—The wastefulness of cooking operations, past and present, is due largely to the defects of the apparatus used. The open fireplace for wood, and the open grate for coal, are two arrangements that permit most of the heat to pass up the chimney, and into the room. See Frontispiece and Fig. 14. In Fig. 14 there is illustrated at the right a brick oven with a flue opening into the chimney. This was one of the earliest inventions for saving fuel and heat. This oven was lined with brick or stone, and the fire of wood was built in it, and allowed to remain until it had burned out. The coals and ashes were removed, and when the brick had cooled somewhat cakes and pies were put in to bake. This oven retained its heat for twenty-four hours, and beans put in Saturday afternoon were taken out hot for the Sunday morning breakfast. The method was clumsy, but a good heat saver.

40

Fig. 14.—A colonial fireplace. *Courtesy of the Historical Society, Ipswich, Mass.*

Figure 15 is an American stove, early nineteenth century, wood the fuel; and from this form, modified for using coal, has developed the modern American coal range (Fig. 18). Even the latest types are very wasteful of heat. Stoves like that shown in Fig. 19 have been devised for use with gas. Even with these only a small percentage of the heat generated is available for cooking.

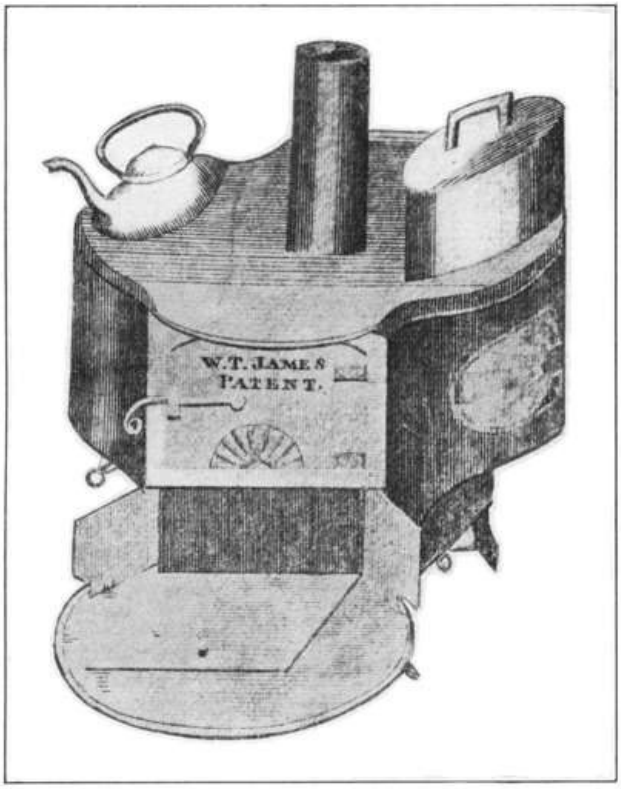

Fig. 15.—An early American stove, 1823.
Courtesy of the Bryson Library.

The ideal system is that which gives the largest possible percentage of its heat for cooking, and puts the degree of heat under quick control with the greatest saving of fuel, and of labor in operating. This does not mean that the stove which gives the most intense heat is the best, although some stoves seem to be constructed with that as the aim. 41

Let us consider some of the methods of saving heat, and study different kinds of apparatus with this knowledge in mind.

We recall the fact, first, that some substances are good conductors of heat, and others poor.[7] If you hold a metal poker in your hand, and place the other end in red hot coals, you will realize that metal is a rapid conductor of heat. If the poker has a wooden handle, the heat of the coals does not readily reach your hand, for the wood is a poor conductor. Moreover, this good conductor is a poor holder of heat, the heat radiating rapidly from it into the surrounding air, but the poor conductor, once thoroughly heated, cools off slowly. 42

> You can think of many illustrations from your daily life. Why do you prefer a woolen blanket on a cool night, rather than a linen sheet, merely? Why do you use a cloth holder in ironing? What is the principle of a hot water bottle? Air is a poor conductor. Can you think of an illustration of this? What is the principle of a thermos bottle?

It is not difficult to see how these facts apply in our cooking apparatus. From an oven with metal sides heat is lost by radiation. In a double oven, with an air space between the inner and outer part, some heat is saved. If the outer cover is of some non-conducting material, even less radiation takes place. This is the principle of the oven devised by Mr. Edward Atkinson. Here the inner oven is of sheet iron, and the outer covering of a non-conducting material, some composition with wood pulp or paper as the basis. If in this way heat can be trapped, as it were, in an oven, it will follow that less heat will have to be supplied, and we can use a smaller amount of fuel. This is the case in the Atkinson oven (Fig. 16), where the source of heat is either a kerosene lamp, or a small Bunsen burner of the rose type, which uses only a small amount of gas.

Another illustration of the conserving of heat by the prevention of radiation is in the *fireless cooker*. This is a method used in Sweden in simple form, and adapted and improved to suit modern needs. Heat is supplied in the first place by gas or kerosene, and the water in the vessel containing the food is raised to the boiling point, and held there in some cases for a few minutes. The vessel is then placed in the “cooker,” which is a box with thick walls of some non-conducting material, and the heat already present is sufficient to finish the cooking process, since the radiation is very slow. In some cookers a heated stone is introduced to raise the temperature slightly. Both of these devices are excellent for the long, slow cooking that seems to mellow the food material and develop the flavors that do not result from rapid cooking. 43

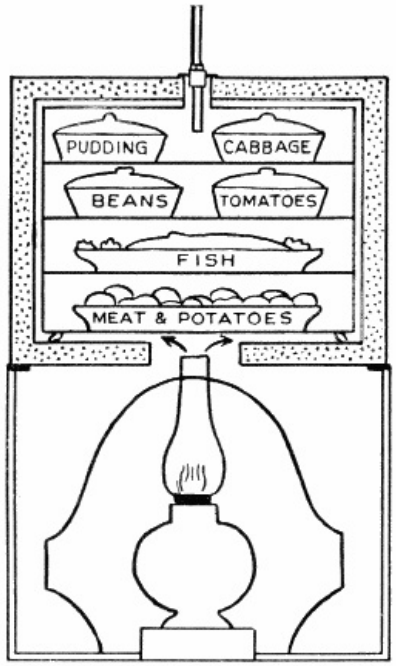

Fig. 16.—The Atkinson cooker.

At the same time, we need rapid processes, such as broiling and toasting, which give characteristic flavors. To meet this double need, a new type of gas stove has been made. See Fig. 17.

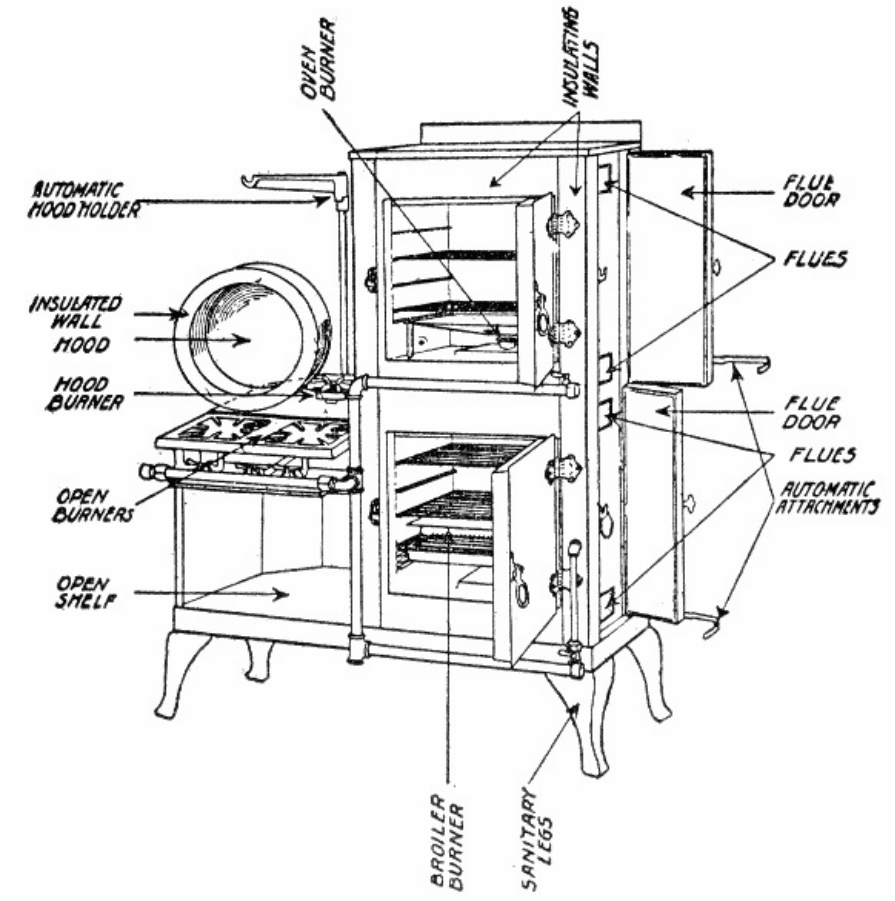

Fig. 17.—Construction of the duplex gas range. ***Courtesy of Domestic Equipment Co.***

This is a gas stove, where the oven has thick walls of a non-conducting material. The oven is heated, for a short time only, the gas flame being cut off when the oven has reached the desired temperature. At the left is an attachment where rapid cooking may be accomplished when desired, and there is a device at (1) with the same principle as the fireless cooker, or the tea "cosey." This cover is dropped over the kettle when the boiling point is reached, the flame is turned out, and the heat in the water finishes the process. There is no good reason why stoves embodying this same principle should not be used with kerosene, and with the electric current. Improved stoves of this type will be constructed, and certainly will tend toward great economy of fuel.

One method of saving fuel is by the use of a *steam cooker*, which consists of a series of compartments, one above another, containing several kinds of food, all to be cooked over the same burner, either gas or kerosene, or on one section of the top of the coal range when

space is being used for the wash boiler or irons.

It requires intelligence to use such devices, and those who lack it cling obstinately to hot fires and violent cooking.

45

The coal range.—Progress is slow, and the coal range will not be abolished at present. Figure 18 is an example of a good range as easy to manage as possible. The coal box at (1) has a lining that prevents the iron from burning out. The air enters at (2) and passes out at (3), when the fire is first made. When it is necessary to heat the oven, a damper is closed at (4), and the heated air then passes around the oven in the direction of the arrows. The coal is put in at (5) and the ashes shaken down at (6). Larger ranges, resting upon the floor, have a "dump" for the ashes directly into the ash box in the cellar, and some makes have a device for operating this with the foot. The coal stove involves the labor of bringing in coal and taking out ashes, and space must be given to the coal bin and ash pit. A range of this size would serve for a family of five or six. It requires from 2 to 3 hods per day. A hood should be placed above a large range, whether coal or gas.

46

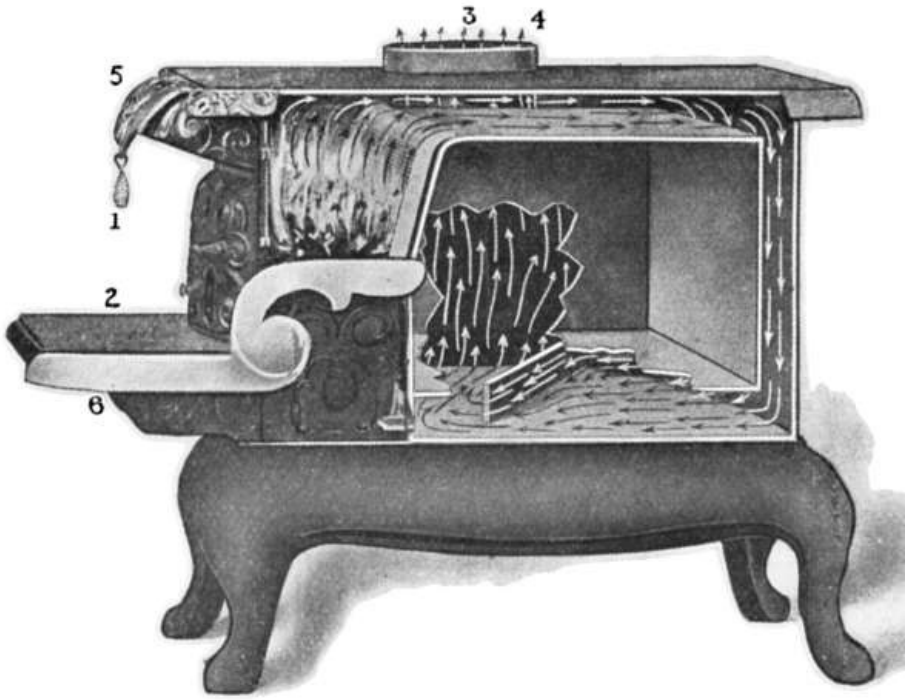

Fig. 18.—A modern coal range. ***Courtesy of Detroit Stove Works.***

To make a coal fire.—See that the grate is clean and that the ashes have been removed. You know that a current of air containing oxygen is needed to make the fire burn. How will you arrange the damper at (2) and (3) when you are starting the fire?

Coal does not begin to burn easily. Therefore we kindle it by materials that have a low kindling temperature, light wood, paper, and matches.

In the bottom of the grate, lay twisted pieces of paper, or very finely split pieces of wood, or shavings, next in order larger pieces of wood laid "crisscross," yet close enough not to let the coal fall through, and on the top a shovelful or two of coal. Why do you not put in flat newspapers, and lay the kindling lengthwise and solid? Put on the stove lids, arrange the dampers properly, and touch the match. Why do you use the match? Why does the match light? Perhaps your nature study lessons will help you to explain this whole kindling process.

What should be the next step in the fire making? How should you finally arrange the dampers?

A coal fire will keep well for a considerable length of time, if the coal is put on and the ash removed regularly, provided the stove is well constructed, and the coal of good quality. Add fresh coal before the fire becomes a dull red, and shows ashes. If it gets too low, wood kindling will be needed, and this is poor management. Be careful not to put in so much coal that you cannot put the lid on firmly. It ruins the top of a stove if the hot coals touch it.

Soot must be removed once in a while from the top and bottom of the oven, and from the stove pipe.

The gas stove.—Figure 19 shows a well-constructed stove of the usual type. Notice the

air space, and asbestos lining around the oven. The burner for heating the oven is at (1). Holes in the sides allow the heated air to pass outside of the oven at (2) and into the oven as indicated by the arrows. The heated current passes out of the oven at the back of the top, and passes out of the stove at (3), where it should be carried away by a pipe into a flue. The heat of the oven burner is also used for toasting and roasting underneath, on the movable rack at (4). The oven burner is lighted by a leader burner at (5). The top burners, five in number, are at (6). Below those is a removable pan at (7). The top of the stove is removable in sections, and the burners are easily removed when cleaning is necessary. 47

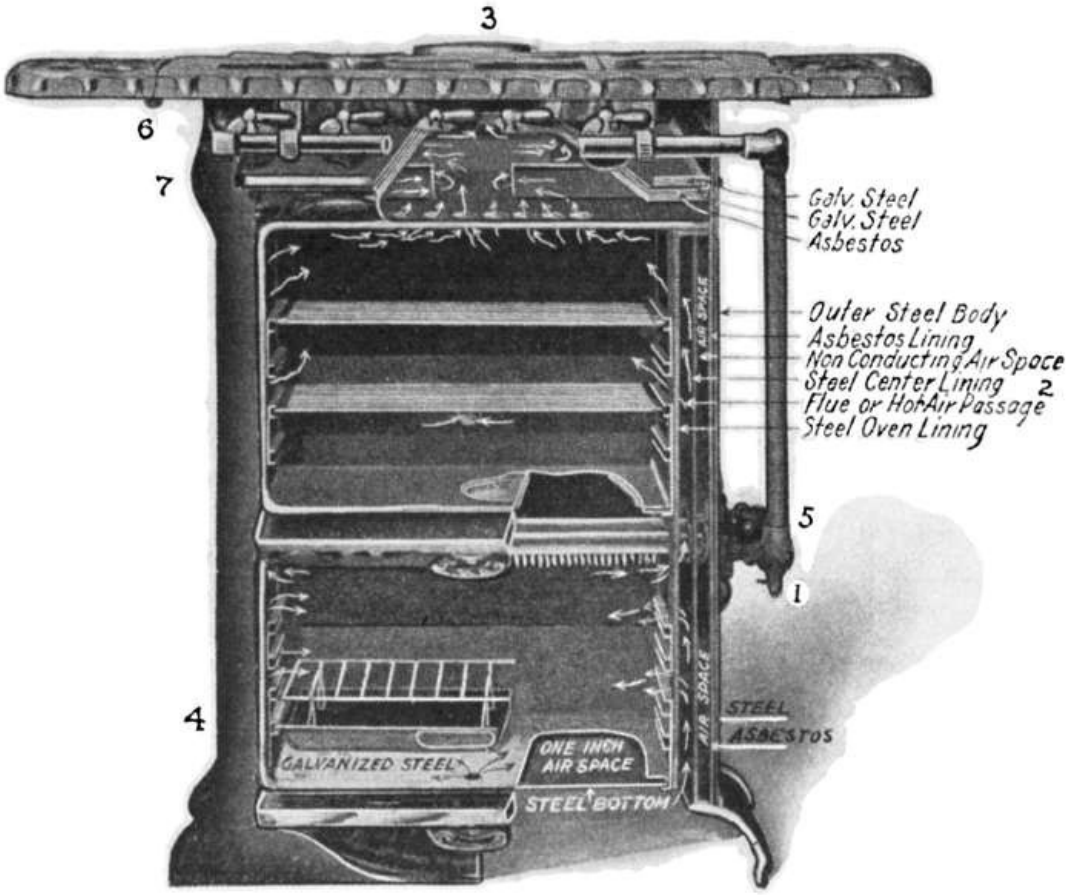

Fig. 19.—A modern gas range. ***Courtesy of Detroit Stove Works.***

The gas burner (Fig. 20) is constructed on the principle of the Bunsen burner, which you may have used in the laboratory. There is an opening in the pipe, near the stopcock, which admits the air, that it may mix with the gas, and give the blue flame. If there is not enough air, the flame burns with a yellow color, and smokes. If there is too much air, there is a roaring sound, and the flame “pulls back” and burns with a smoky yellow flame, and disagreeable odor. There is a valve always to regulate the air supply for each burner. Figure 20 shows a burner removed from the range. (1) is the hollow, star-shaped chamber which gives space for the thorough mixing of the gas with the air. The gas enters from the connecting pipe at (2), the air at (3), and (4) is the valve for regulating the air supply. 48

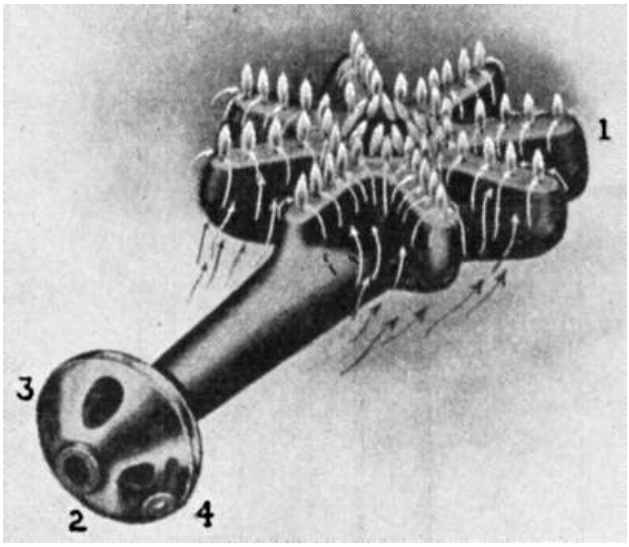

Fig. 20.—A gas stove burner. ***Courtesy of Detroit Stove Works.***

Gas ranges of this type are built in different sizes, and with varying arrangements of ovens and hot-closets. An oven above the stove is convenient. Ranges are built also for using either gas or coal. A range of the size pictured, with four large burners on the top, will serve for a family of five or six, if the work is well planned. The oven burner consumes 30 to 40 cubic feet per hour, the top burners 2 cubic feet each, and the simmering burner somewhat less. This is estimated for a burner turned on full.

To manage a gas stove.—Before lighting the top or oven burners see that the stopcocks are all tight, with no escaping gas. To light the top burners, strike the match, turn on the stopcock, and touch the match to the gas when it is flowing well. A disagreeable "popping" follows if the match is applied to the burner before the gas flows. For lighting the oven, a "leader" burner at the side of the stove acts as a taper. Open the oven doors, and the door below, strike the match, turn on the leader, and light it, turn on the back burner, and then the front burner, and *turn out* the leader. The so-called explosion of a gas stove is due to the sudden lighting of a quantity of gas under the oven that has collected without being lighted.

49

The important point in managing a gas stove is to keep the stopcock turned so that the flame is low. The full flame is needed only when water is being brought to the boiling point, and for the first heating of the oven. The low flame should be protected from draft. Many gas stoves now have a small simmering burner that is more useful than the large burner. Another point in the use of the stove is the prevention of the "boiling over" from some kettle. The low flame helps here, and it is also necessary that the kettles should not be too full. "Boiling over" clogs the burners, and makes necessary the frequent cleaning of the pan underneath the burners.

The oven burner should be lighted from five to ten minutes before the oven is wanted, depending upon the intensity of the flames. After the food has been put in the oven, allow a few minutes, not more than five, for the food to heat through, and then turn the flame as low as possible. Often, one burner can be turned out. This you have to learn by experience. When toasting or broiling is the process, light the oven burner before using, because the work is performed by the heated iron as well as by the gas flame. Leave the lower door open, as bread toasts or meat broils, to hasten the browning process, for it is the oxygen of the air that causes the browning. Some coal ovens have a damper for admitting air for this same purpose and though some flavor is lost in this way by evaporation, the amount is negligible in a quick cooking process. The Atkinson oven is so tightly closed, that food does not acquire a rich brown in it. An opening at the top is available when a delicate brown is wanted. It is true, however, that the slow process with a minimum of evaporation gives a flavor that compensates for the brown color and flavor. All burners should be removed if the holes seem clogged and be boiled out in a solution of washing soda, two tablespoonfuls to a gallon of water. Do not blacken the burners.

50

Kerosene stoves.—The best type is a blue-flame stove with a wick. Kerosene stoves are made with no wick, the kerosene being vaporized just before it reaches the burner, but such a stove requires occasional pumping to force the kerosene into the vaporizing chamber, and on the whole is less satisfactory than the stove with the wick. The heat is intense from this blue flame, and the burner is economical of the fuel. The small kerosene stoves, burning with a yellow flame are always inclined to smoke, and difficult to keep clean. A three- or

four-burner oil stove with a portable oven will do the cooking in summer for a family of five or six. One burner consumes a gallon of oil in 15 hours. Portable double ovens are furnished with such stoves.

The kerosene stove is cheaper to operate than a gas range, even with kerosene at fourteen cents a gallon, but the heat is not under such perfect control, and the stove requires more work to keep it clean.

> The one important point in the management of this blue-flame wick stove is to keep the flame down by having the wick low, and where it belongs. The cylinder around the burner prevents the escape of heat and carries it to the utensil above. A careless person, by raising the wick too high, and producing a yellow smoky flame, makes much trouble for herself. It is important to fill the tank without spilling a drop of kerosene, and to keep every part of the stove well washed off with soap and water. The wick should be rubbed off occasionally, never cut, and if an odor becomes perceptible, the burner should be taken apart and boiled in a solution of washing soda and water. The wick will need to be renewed at intervals, depending upon the amount of use that it has. With care a stove of this kind is clean and odorless.

Electric apparatus.—Figure 21 shows a table arranged for cooking by electricity, each piece of apparatus having its own connection. Compare this with the frontispiece, the method of cooking in the eighteenth century, and you will realize how far we have progressed in the way of convenience, comfort, and heat economy. Figure 22 shows a disk stove four and a half inches in diameter, upon which a saucepan may stand, and which is therefore available for more than one purpose. 51

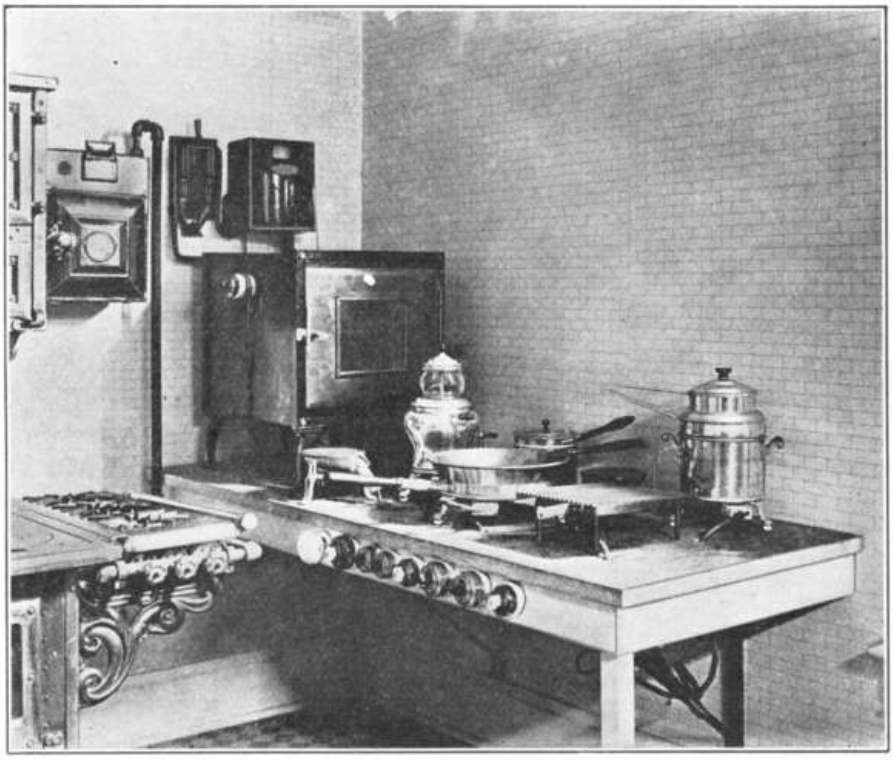

Fig. 21.—An electric cooking outfit. ***Courtesy of Department of Household Science, University of Illinois.***

The advantages of electric cooking are obvious. The heat is directly conducted to each utensil, and a minimum amount is lost in radiation. The degree of heat is perfectly under control, and the manipulation is nothing more than the turning of a knob. When the apparatus is installed, it is adjusted to the voltage, so that no further regulation is necessary. 52 There are no waste products, and no matches to light or throw away. If the wiring is properly done, there is no danger from fire. The one present disadvantage is the cost. Each piece of apparatus is expensive. The cost of running must depend upon the cost of electricity in the neighborhood, and the number of watts per hour used by each piece of apparatus. The larger the utensil, the more watts consumed. The disk stove in Fig. 22 uses 250 watts; a disk of 6 inches diameter, 475 watts; of 8 inches, 650 watts. Some pieces of apparatus are arranged for three different heats, with a different number of watts for each heat. With one disk stove 10 inches in diameter, 3 heats are possible, with 250, 500, and 1000 watts respectively.

Fig. 22.—A disk electric stove. ***Courtesy of Landers, Frary and Clark.***

Oven thermometers.—A thermometer is furnished set in the door of many ranges. While these are guides after one has learned to use the oven, they are not really accurate by scale. For exact work in testing oven temperature, a hole must be bored in the side of the oven, and a chemical thermometer inserted, protected by asbestos and metal.

Simple tests for oven temperature will be found in Chapter XI.

EXERCISES

1. Why is the question of the cost and kind of fuel important?

2. What is the difference between hard and soft coal? Between red and white ash?

3. Why are certain fuels in more common use than others?

4. Explain the advantage of gas over coal. Over kerosene.

5. What are the advantages of electricity as a source of heat?

6. Explain the way in which electricity is measured.

7. Read the gas meter at home and estimate the amount and cost per day. (The ordinary burner consumes about two cubic feet per hour.)

8. Obtain the prices of the fuels used in the neighborhood and work out a comparison of the cost of fuel for preparing a meal.[8]

9. What are the methods of conserving heat in cooking apparatus?

10. Explain the structure and management of a coal stove.

11. Explain the principles involved in making a fire.

12. The structure and management of a gas stove.

13. Why does gas in a burner sometimes “pull back”?

14. State the requirements in a perfect example of cooking apparatus.

CHAPTER IV

FOOD PREPARATION, THE PRINCIPLES AND TECHNIQUE

The principles of cooking.—In science the word “principle” ordinarily means a formulation of some *general* or *constant mode of behavior*—a generalization based on many

observations of fact. In cookery the word is used in the same sense; for example, one may say that an important principle to bear in mind when cooking with any fat is that the fats may be melted without decomposition, but when too strongly heated they begin to decompose with the production of acrid and irritating products. Sometimes, however, we speak of “principles of cookery” in a broader and somewhat less exact sense to indicate the *general purposes* of cooking operations, as when we say that the most important principle of vegetable cookery is to soften the fiber without destroying the flavor or dissolving away the ash constituents of the vegetable.

That is, the change either chemical or physical that takes place in a certain foodstuff by the application of heat or cold or by the use of a fermentation process may be referred to as the underlying, working principle. We shall study in detail these changes as we experiment with and prepare each food material, but a general statement of the effect of heat on various foodstuffs will be helpful here.

Protein.—There are several forms of protein, with differences that we can understand only after a thorough study of chemistry. The most important proteins in meat, fish, eggs, milk, old beans and peas coagulate, or become slightly harder or firmer at a temperature below the boiling point of water. We shall perform an experiment to show this while studying the egg. There is no marked chemical change; that is, the protein is not changed to another substance.

55

Fats.—Solid fats are liquefied by heat, and freed from the tissue that contains them in animal fats like suet.

When a fat begins to smoke with heat, a chemical change is taking place. If intense heat is continued, all the hydrogen and oxygen are driven off and pure carbon remains. When the fat is “brown,” giving the flavor we like, a part of the oxygen and hydrogen have been driven off. The “boiling” of fat in a kettle is ordinarily due to the boiling of the water contained in the fat.

Starch.—Starch occurs in the form of granules. See Fig. 39. In boiling water, the granule expands and finally bursts, and frees the content, the pure starch, and the whole mass thickens.

Boiled with an acid the starch is changed to dextrin, a substance resembling a gum, and the mixture becomes thin; and this process continued changes the dextrin to dextrose.

With intense “dry” heat, as in toasting, the granule expands and opens, and the contents change to dextrin. Continued heat reduces the starch to pure carbon. The brown color and pleasant flavor in toast are a stage on the road to carbon.

Sugar.—Sugar first melts with heat, then begins to decompose, giving off water. This is also a stage on the road to pure carbon. Caramel, a familiar flavor, is sugar in the brown stage, with the water partly driven off.

The art in applying intense heat to fat, starch, and sugar is to know the stopping point,—to reach the “brown taste” and stop short of the “burnt taste.”

56

Mineral matter.—The “ash” remains for the most part unchanged by heat, but may be lost in the water in which vegetables and meat are cooked if the water is thrown away.

Vegetable fiber is softened by heat and moisture, and the protein, starch, fat, and sugar are freed, making them available for our digestion and nutrition.

Meat fiber softens at a low temperature, that is, below the boiling point of water, with moisture; continued intense heat shrinks and hardens it. A tender steak fried with fat in a hot pan will soon resemble sole leather.

The technique of food preparation.—From the moment the food materials enter the kitchen until the unusable portions are destroyed or carried away, there is a best way of working with them at each step, and the sum of these may be said to make a good technique. This technique will include cleanliness first and foremost, then skill in the use of tools, judgment in managing cooking apparatus and in applying heat in cooking processes, and accuracy and rapidity of execution. It will also include or add to itself the æsthetic element, the fine art of flavoring, the dainty garnishing of a dish. Moreover, this technique is the method of putting into practice some basic, scientific principle. To illustrate:

The *principle* that underlies toast-making is threefold,—

Heat evaporates moisture throughout the slice of bread.

Intense heat changes the content of the starch granules on the surface of the slice of bread to dextrin.

Intense heat, long continued, will change first the surface starch, and then all, to carbon (charcoal).

A *good technique* will secure the first two, and avoid the third and includes,—

The selection of bread already partially dry.

The cutting of bread into slices of uniform thickness.

Regulating the source of heat.

57 Placing the slices firmly in a toaster, or on a fork, or evenly on a rack when toasting by gas.

Keeping the toast at a distance from the source of heat that insures a steady but not too rapid change.

Turning the toaster or the slices to cook each surface in turn and thus to make the process slower.

Stopping the process before carbon is formed and the toast "burned." (A good technique does not include scraping the toast!)

The *æsthetic element* in toast-making might be a pretty shape of the slices, say triangular pieces, and a dainty arrangement. In this case and in others it is true that the result of a good technique is æsthetic, in that correct manipulation while securing the desired chemical change also develops the pleasing golden brown that makes the toast so attractive.

The care of food materials.—When food materials are delivered, have receptacles ready for each kind of food. (See kitchen furnishing.) Attend first to perishable foods. Wash and dry milk and cream bottles before putting them in the refrigerator. Treat eggs in the same way. This is also a good plan with lemons and other skin fruit, unless the quantity is too large, in which case they should not be put into the refrigerator. Remove wrappings from meat, poultry, and fish; wipe them with a soft cloth, dipped in salt and water, dry them, and place them in the ice box. Wash the cloth thoroughly and dry it. Fish should be covered that its odor may not affect other food. Vegetables like lettuce, celery, and spinach should be washed and picked over immediately, and the poor portions thrown away. All semi-perishable foods should be put in a cool, dry place, and the non-perishables in their separate receptacles. (See page 20.) Do not keep anything in brown paper bags, but save these bags for other uses.

58 Have a regular time for inspecting and for cleaning all the places and receptacles where food is kept. Do not allow any spilled food material to remain anywhere, and do not tolerate the presence of any material, cooked or uncooked, that shows the least taint. A keen sense of smell is a good servant here.

The processes of food preparation.—With kitchen in order, tools ready, and food materials at hand, we are ready for the actual food preparation. A distinction is to be made between cookery and cooking. Cookery includes all the steps necessary to produce the finished product, while cooking is the actual application of heat, only one step of the whole process, though, indeed, one of the most important and difficult. The order of procedure in food preparation is as follows:

See first that the stove is ready (Chapter IV). Then comes the choice and study of the recipe or the method of cooking. The word "recipe" is from a Latin word meaning "take." Follow this advice and "take" or bring together on the work table whatever materials are needed. Decide upon the necessary utensils, and place them conveniently near. As you gather the materials together you will measure and weigh the exact amounts. Do this before you begin the putting together or mixing. Sometimes instead of mixing, the necessary process is paring, or scraping, or cutting, each with its own best way. Then follows the application of heat. Some foods are then served at once, others must be carefully put away after cooling. Or again, there is no application of heat, for instance, when the freezing temperature is used in ice cream; or in a salad, or fruit preparation where cooling in the refrigerator is the next step. The technique of preparing a meal and serving will be found in Chapter XVI.

How to study a recipe.—Remember that a recipe is a bit of experience handed down for us to make useful. Some one experimented at some time long ago, perhaps failed at first, tried again, finally succeeded, and passed on the result by word of mouth to others. There 59 were doubtless good cooks long before there were printed or written recipes. Some recipes, however, have been handed down from Roman times, and recipes were printed as early as the sixteenth century. Modern recipes are much more accurate than the old, as you may see if you have opportunity to read some old cook book.

At first in using a recipe follow its directions exactly. Notice the proportions, and read carefully the directions for combining the ingredients, noting those points that are most important. Have the whole process well in mind before you begin work. Do not let it be necessary to refer to the printed page at every move you make. This is poor technique.

When the use of a recipe is preceded by some simple experiment that makes the basic principle clear, it is much easier to use the recipe with intelligence.

When you are no longer a novice you may take liberties with a recipe, even a new one, scanning it with a critical eye, and perhaps giving it a cool welcome. It may not be new at all! For this is the secret of recipes,—there are really only a few, and the key to their use is the recognition of the old in the new garb, and the having of a few type recipes clearly in mind. Each kind of prepared dish has one, or two, or three basic forms or mixtures. Learn these, and then with experience you will become inventive, and make your own variations. For example, there are but two kinds of cake,—those made with butter (or other fat) and those without butter (the sponge cake). You will not attempt to memorize many recipes, but you will find that in studying these type recipes you have learned a few proportions so well that you cannot forget them. When you have reached this stage of freedom you will still do exact work, but your ingenuity and taste will have free play and you will not be tied to other people's recipes. But you cannot well begin at this end.

60

Make some plan for recording new recipes that you test and find good. It may be a printed recipe, or one that a friend gives you. The most convenient plan is a recipe box or card file. The guide cards are arranged alphabetically, and each recipe is either pasted upon a card or written upon it. This plan makes it easy to discard an old recipe, or one that has proved unsatisfactory, and to keep new recipes in alphabetical order, which cannot be done in a book. A loose-leaf book is made for recipes, alphabetized at the side, with envelopes for holding cuttings that may be fastened in between the pages. This is a little less easy to use than the card file.

Weighing and measuring.—The system is "Avoirdupois," sixteen ounces to the pound. Learn to read the scales exactly, and when weighing, always allow for the weight of the utensil or paper holding the food. Weighing is more accurate than measuring, but it is slower, and the measuring can be made sufficiently accurate for most daily work. Weighing is necessary in the cookery of large pieces of meat and with poultry in order to estimate correctly the time for cooking; and it is more convenient to weigh than measure when preserving fruit if the quantities are large. Also in studying food values it is usually necessary to weigh the articles of food.

The measures in common use are the saltspoon, teaspoon, and tablespoon, the half-pint measuring cup, the pint, quart, and gallon of liquid measure. The saltspoon is not accurate, and it is better to use some fraction of a teaspoonful. Teaspoons and tablespoons of a standard volume may be found at some furnishing shops. The spoons in common use vary in size, and the only way to approximate accuracy is to use the level spoonful. This is now the common practice. Tin and glass half-pint cups are made gauged in quarters and thirds. Those commonly on sale sometimes measure more than one fourth of the standard quart. Inquire when you buy if the cup measure is standard,—that is, exactly one half standard pint. A quart measure, with four divisions, is necessary for careful work. A pint measure is convenient, but not necessary if you have the quart and half-pint measuring cup.

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It is necessary to know the relation of these different weights and measures to each other. While you may find tables of relative weight and measures in many cookbooks, it is much better for you to work out a few of the most useful for yourself, making careful record in your notebooks.

The following abbreviations are short cuts in reading and writing.

oz. = ounce
lb. = pound
ssp. = saltspoonful
tsp. = teaspoonful
tbsp. = tablespoonful
cp. = cup
pt. = pint
qt. = quart
gall. = gallon

If you wish something quicker even than this for notebook work, you can use,

t = teaspoonful
T = tablespoonful
C = cup
P = pint
Q = quart
G = gallon

Experiments in weighing and measuring.[9]

Answer these questions by performing the experiments. Record in notebook in

orderly form.

62 *Apparatus.* Standard scales, a quart measure, and for each pupil a measuring cup, table knife, teaspoon, and tablespoon.

Materials. Those mentioned below.

1. How many eggs (medium size) to 1 lb.?

2. What is the weight of one egg?

3. Of one pint of flour?

4. Of one cup of flour?

5. Of one cup of granulated sugar?

6. Of one cup of powdered sugar?

7. Of one pint of milk?

8. Average the weight of six potatoes.

9. How many level teaspoonfuls of flour to a level tablespoonful?

10. How many teaspoonfuls of water to a tablespoonful?

11. How many tablespoonfuls of flour to a cup?

12. How many tablespoonfuls of water to a cup?

(These relative measures are convenient for dividing recipes.)

13. Measure a level tablespoonful of flour, by filling the spoon, holding it level, and leveling the flour by running the back of the knife quickly from the base of the bowl of the spoon to the tip.

How can you most accurately divide this in halves? In quarters?

14. How much does a cup of flaked cereal weigh?

15. How much does a cup of granular cereal weigh?

16. Butter is hard to measure in a cup. If a recipe calls for $^1\!/_4$ cup butter, it is easier to measure it by tablespoonfuls. Find out how many make $^1\!/_4$ cup.

17. How much does a cup of butter weigh? If you know this, you can weigh it, instead of measuring, or if your butter is in pound "pats," you will be able to cut off a cupful, instead of weighing it.

18. An old-fashioned recipe for sponge cake reads thus: Take the weight of the eggs in sugar and half their weight in flour. Translate this into measures.

Preparing and mixing.—Food materials that are not to be mixed with others still need special preparation before heat is applied.

63 For fruits and vegetables, *washing* is the first stage, followed by *scraping*, *paring*, *peeling*, *cutting*, or *slicing*. Meats, poultry, and fish must be cleaned by wiping, and *cut* and *trimmed* with a sharp knife.

Cooked meats and fish and vegetables may be *chopped* or *sliced*.

Cooked vegetables are also *mashed* and *beaten*.

Cream is *whipped* or *beaten*, and eggs served raw likewise.

These seem simple processes, but each one needs a good tool and a knack in the muscles. Each method will be taken up in detail, with each food material.

Methods of mixing are important, where several ingredients are combined. We seek for a way that will give the most complete mingling of all the substances with smoothness and lightness, at the same time saving time and strength. We must look always for the "short cut." It is necessary to have the texture of the food such that it can be well masticated and mixed with the digestive fluids, but time is too precious to spend hours on a dessert, or in beating biscuits.

Sifting, or putting materials through a fine mesh, is used to lighten flour that has been packed down, to remove coarse portions, or to mix thoroughly several dry ingredients.

Stirring is done with a spoon, and is a round and round motion, used for mixing a liquid and a dry ingredient.

Rubbing is used for combining a dry ingredient with a semi-solid substance like

butter. *Creaming* is a term used for the rubbing of butter until it becomes soft and creamy. A spoon should be used, not the hand.

"*Cutting in*" with a knife is used for combining butter with flour in biscuit and pastry where the butter should not be softened.

Beating with a spoon, or beater of the spoon type, is a free over and over motion, the spoon being lifted from the mixture for the backward stroke. This is used for increasing the smoothness of the mixture after the first stirring, and for beating in air. It needs a strong free motion of the forearm. Beating is also accomplished by the rotary motion of a mechanical beater like the Dover.

Cutting and folding is the delicate process of mixing lightly beaten egg with a liquid or semi-liquid without losing out the air. The spoon is cut in, sidewise, a rotary motion carries it down and up again, and it folds in the beaten egg as it goes.

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Kneading is a motion used with dough, and is a combination of a rocking and pressing motion, accomplished by the hands. A good result can be obtained by some bread machines, and this is the cleaner method.

Rolling out is just what the term denotes, a rolling of a thick piece of dough by means of a cylindrical wooden "pin" to the thickness proper for cookies and crusts. Dry bread is also rolled to break it into fine crumbs.

Pounding and *grinding* are usually accomplished for us now in factories in breaking of spices and coffee. It is better to have a coffee mill at home.

The order of mixing is important in its effect in batters and doughs and is discussed in that chapter.

Cooking processes.—For the beginnings of cooking we should need to go back to the days when game was roasted by the open fire, built for warmth, or corn parched on hot stones. Perhaps some root was cooked in the hot ashes. This primitive method of roasting we still use in camp fires, and in modified form wherever food is directly exposed to the heat of coal or gas. Water could not be a cooking medium until man advanced at least to the first stage of pottery making, when some rude basket daubed with clay was water-tight and sufficiently heat proof.

Application of heat is the most difficult stage of the whole process of cookery. It is so easy to have the heat too intense, or too low, to expose the food for too long or too short a time to its action. Most of our apparatus fails to give us a uniform heat, the tendency being to an increase or decrease of temperature. Since the boiling temperature of water remains at 212° F., boiling is an easy process to manage, provided the water does not boil out. The presence of water insures a low or moderate temperature always.

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It requires patience and time to learn how to bring this natural force of heat under control. One novice who had allowed a flour paste to boil over and burn while she was looking out of the window remarked: "We may forget, but they never do!"—a pretty way of stating the steady working of nature's forces which we can harness for our use only by the exercise of reason and will and constant watchfulness. The unintelligent cook is impatient of slow processes, and cannot believe that food will finally be "done" unless the water is at a "galloping" boil, and a red-hot fire is keeping the oven at burning temperature.

Look upon the application of heat as a continuation of nature's slow ripening process, a softening of tough fibers and a development of pleasing flavors. For why do we cook at all except for these reasons? Primitive man thought only that the food had a better taste. He may have decided, too, that it was easier to masticate; but we have learned that in some cases we may, with right methods of cooking, make it easier to digest farther on in the alimentary canal. Modern science carries us a step farther and teaches us that cooking destroys lower organisms, such as harmful bacteria that may be present, and even animal parasites in meats.

We cook, therefore, *to improve the appearance of food, to develop flavors, to render some foodstuffs more digestible and to destroy microörganisms*.

We have at our command the following processes:

Heat direct from coal, charcoal, wood, or gas.

Toasting.—Surfaces of food exposed and turned for browning.

Broiling.—Thin portions of meat or fish exposed and turned for searing, browning, and short cooking of the interior.

Roasting.—Thicker cuts of meat exposed and turned frequently for searing, browning, and gradual cooking of the interior. This is an ancient method. It survives in the French "Rôtisserie"; and we use it in the modern gas stove when we

cook directly *under* the gas.

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Heat through an intervening medium.

Water, the medium.

Boiling.—Cooking in boiling water, temperature, 212° F., or 100° C.

Simmering, *stewing*, or "*coddling*."—Cooking in water below the boiling temperature, 180° F. up to 210° F.

Steaming.—Cooking in a receptacle into which steam penetrates, 212° F.—or in a closed receptacle surrounded by steam or boiling water as in a double boiler, or a "steamer," temperature from 200° F. to 210° F.

Fat, the medium.

Deep fat frying, temperature 350°-400° F.

Heated surfaces, the medium.

Pan broiling.—Cooking of chops or steaks in a heated pan, without additional fat.

Sauté.—To cook in a heated pan with a small amount of fat, enough merely to prevent the food from sticking to the pan and to hasten the browning process. "Baking" cakes on a griddle is a modification of this method.

Baking.—Cooking in a heated oven, temperature from 300° F. to 450° F., or higher for rapid browning. Meat and poultry cooked in an oven are baked and not roasted, although we use the word "roast" for this method.

Braising.—Cooking meat in a heated oven in a closed vessel, with a supply of water to keep down the temperature. This might be called an "oven stew."

These methods are sometimes combined in one process. In a brown stew, the meat is first cooked in a pan with a little fat to brown it, and to sear the outside for retaining the juices, before the actual stewing begins. A "pot-roast," is an old-fashioned method of cooking a solid piece of meat with a little water in a pot on top of the stove. The water simmers out, and the meat is browned. What methods does this process unite?

The American Indians in their Squantum, or Clam Bake, heated a layer of stones by means of a fire on top, removing the ashes when the fire died down. A layer of wet seaweed was placed on the stones, and upon this clams, fish, and corn were laid, and covered with another layer of seaweed. We have inherited this method from the Indians, and use it at the shore. What is the cooking process?

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Care of food after cooking.—Bread, cake, cookies, and pastry should be cooled on a rack, or spread out in such a way that they do not steam. They should then be placed in a tin box or stone jar, which has been cleaned by washing and scalding with boiling water, and thoroughly dried. This process destroys any mold that might be lurking about. Keep paraffin paper on hand to cover this class of food in its box or jar. This will prevent too rapid drying out. Do not use cloth. It flavors the bread or cake, no matter how clean it may be.

All food that is to be served cold or reheated should be cooled before placing in the ice box. For what reason? Cool by placing in a draught, or set the vessel containing the food in running cold water from the faucet. It is particularly important to cool soups and broths rapidly. Which of these methods will you use, as being the more rapid?

All meat that is to be served cold should be cooled, especially if it is rare, or underdone. How will you accomplish this?

Care of left overs.—This is one of the tests of food management. It is so easy at the end of a meal either to throw food away, or set it into the refrigerator on the dish in which it has been served. Have a good supply of cheap bowls, plates, and saucers to hold left overs in the refrigerator, thus avoiding one possibility for breakage of the table china.

Keep *slices of bread* for toasting, *pieces of bread*, to dry for crumbs, with special receptacles for each. Return pieces of *cake* to the cake box. *Muffins* may be reheated. *Toast* may be kept to serve under eggs or meat.

All *butter* should be saved. Pieces left on butter plates if clean should be scraped into a wide-mouthed jar and kept for cooking.

Pieces of *meat* should be kept for reheating or "made" dishes, stews or soups or for salads. In hot weather, let your first order of meat be small, and dispose of left overs as rapidly as possible.

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Vegetables may be reheated, or used for flavoring soups and stews, or used cold in salads.

Desserts and *fruits* may be used for a “pick up” luncheon.

Salads do not keep their freshness and flavor well, and should be used very soon.

Milk and *cream* should be returned to proper receptacles in the refrigerator as soon as possible.

Disposal of waste food.—This is the final test of good housekeeping, and many otherwise good housekeepers fail just here. Even at its best the garbage pail is not altogether a pleasing object, and at its worst it is unspeakable. It must not be ignored.

Have a system adapted to your own kitchen, and the municipal method of disposal, if there is such.

Use a covered pail of enamel ware, rather than one of galvanized iron. The surface of the enamel is smooth, and therefore easier to wash, and there is no excuse for putting off the cleansing of the pail. Wash, rinse, and dry the pail and the cover immediately after it is emptied. Do not put a piece of paper in the bottom of the pail. This request is made by the department in New York City, and it is always better not to mix food waste and paper waste. If you live in an apartment house, your name should be painted on the pail.

Never put liquid into the garbage pail with solid refuse. Strain out whatever liquid may be left in coffee or tea, and pour it into the sink drain. If there is a greasy liquid to throw away, add to it a teaspoonful or more of washing powder, and let it stand a time. If you have used enough of the powder, you will find that you have a soapy liquid to pour down the sink.

Coffee, tea, cocoa, or lemonade left in cups should be diluted and poured down the sink and never into the garbage pail.

Empty garbage at evening when possible, to prevent the long standing through the night. Keep the pail closely covered both day and night, to keep out flies, and water bugs, if they are about. Allow the pail to stand outside the kitchen unless the fire escape is the only accessible out-of-doors. Remember that the fire escape is not a back porch, and that you would be fined for using it as such if the inspectors were efficient.

There are two classes of waste: uncooked refuse, like potato skins, egg shells, pea pods, meat trimmings and bones; and table scraps from plates.

Pieces of fat may be “tried out,” but do not accumulate more than you use. A few *egg shells* may be kept for settling coffee, but again do not keep too many.

The *country dweller* has a simple problem. What the farm animals do not eat will serve as fertilizer for plant life. After the bones have been picked, keep them together, in some receptacle, and finally bury or burn them. Have a compost heap properly covered where the uneaten fragments will decompose and make fertilizer, or bury them at once if preferred.

The *city dweller* who uses a coal stove is able to burn some refuse. Strain out whatever liquid is present, dry the refuse *under* the grate, and put it into a *hot* fire. Do not crowd damp refuse into the fire box when the fire is low, for it will smoulder, and this heavy smoke will eventually clog the flues. The odor of this smoke, too, is disagreeable in the neighborhood. A garbage drier, set into the stove pipe, has been devised, but the simpler plan of drying the refuse under the grate is quite as satisfactory.

Where gas or kerosene is the fuel, or where electricity is used, the garbage pail is the only resort, unless one lives in a building equipped with a special stove or “garbage burner” for the disposal of waste.

EXERCISES

1. What is a principle in cooking?

2. What are the effects of heat upon the foodstuffs?

3. What is meant by technique in cookery?

4. What are the essentials in caring for food in the house?

5. What are the steps in the preparation of food?

6. Explain the origin and usefulness of a recipe.

7. What are the standard weights and measures?

8. What is the purpose of stirring ingredients? Of beating?

9. What is the difference between boiling and steaming?

10. The difference between baking and roasting? Roasting and broiling? Broiling and toasting?

11. What is the difference between frying and the sauté?

12. Describe the care of “left overs” and waste.

CHAPTER V

70

WATER AND OTHER BEVERAGES

Although water does not supply energy to the body, it plays an important part in nutrition. As building material, it constitutes about two thirds of the body weight, and as a regulator of body processes it serves as a solvent and carrier of nutritive material and waste, keeps the blood and digestive fluids of proper concentration, and helps to regulate the temperature of the body. It is contained in nearly all food materials and is the basis of all beverages.

Water as a beverage.—Water is being given off all the time from the body through the lungs, skin, and kidneys. The exact amount depends partly upon atmospheric conditions and the amount of exercise, which affect the loss through the lungs and skin, and partly on the amount taken in, for water passes through the body rather quickly. We can endure lack of food for weeks, but can exist only a few days without water.

A drink of water taken the first thing in the morning tends to clean out the digestive tract and put one in good condition for breakfast. Water with meals aids digestion, provided it is not used to wash down food but is taken when the mouth is empty. It should not be extremely cold nor hot. Two glasses at a single meal are usually all that are desirable. When there is much water in the food, as in soups, milk, fruits, and some vegetables, or when other beverages are taken, less will be taken as plain water. When one feels hungry and uncomfortable between meals a drink of water will often relieve the sensation.

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Water is either *soft* or *hard*. Rain water is perfectly soft, but as it passes through the earth after falling, it sometimes becomes laden with mineral substances, that affect its cleansing properties, and that may affect its physiological action. Such water is called *hard*.

Temporary hardness is caused by a soluble lime compound which is precipitated by boiling. If the teakettle is incrusted inside by a layer of lime, the hardness is of this character. Such water should be boiled and cooled for drinking. *Permanent hardness* is due to other compounds of lime and magnesia which are not precipitated by boiling, but which can be counteracted for cleansing purposes by the addition of some substance like ammonia, borax, or soda. If the excess of salts has some undesirable physiological effect, this water should be distilled, or bottled water for drinking brought from elsewhere.

Of much greater importance is the question of the freedom of the water supply from harmful bacteria and organic matter. Never use a well without having the water tested by an expert. This will sometimes be done by the local or state Board of Health or Experiment Station. All water sources should be guarded from contamination. (See “Shelter and Clothing,” Chapter V.) Filters may be used, and are effective in straining out sediment, but the home filter is seldom to be relied upon to remove actual bacterial contamination. If used at all, the filter should be frequently cleaned and sterilized in boiling water. In case the supply is suspected, the water for drinking should be boiled for at least ten minutes, allowed to settle, if necessary, and poured off into bottles for cooling. This is a practice to be commended after a heavy rainfall, and especially in the autumn. These bottles may be placed on the ice.

Ice must be used with caution always in drinking water, and it is the safer way to cool the water beside the ice. The freezing of water in pond and river does not purify or sterilize it. Natural ice is usually questionable. Artificial ice, if properly manufactured, is much safer. 72

Always have a supply of water in covered pitcher or water bottle, with clean glasses at hand, where it may be taken freely when wanted. Remember that the individual cup or glass is an absolute necessity. The dipper or glass in common must not be countenanced. In a large family of many children it would save labor to use paper cups between meals.

Water should be swallowed slowly, and ice-cold water should not be taken when one is overheated. When one is overthirsty, control must be exercised in regard to quantity and rapidity of drinking.

Water in cooking.—Water is necessary to the softening of fiber, and the cooking of starch. It acts as a solvent for sugar and salt and for gelatin, and is the basis of meat soups, certain substances in the meat dissolving in the water. The flavors of tea and coffee are extracted by water.

As a medium in cooking it supplies heat in the steaming, boiling, and stewing processes, and in the form of melting ice with salt it acts as a freezing medium.

It is not necessary to lift the cover of a kettle to see if the water boils, if one is familiar with the action of water nearing and at the boiling point. A simple experiment with the boiling of water in a Florence flask is always interesting, and from it one gains practical knowledge.

Experiments with the boiling temperature of water.

A. Apparatus: A ring stand, a Florence flask, a square of wire net, a chemical thermometer, a Bunsen burner.

Method: Place the Florence flask, half full of water, on the square of wire net upon the large ring of the ring stand over the Bunsen burner. Put the chemical thermometer in the Florence flask, clamping it in such a way that the bulb is covered by the water and yet does not touch the bottom of the flask. 73

Make record in the notebook as follows:

(1) The temperature when the first small bubbles appear on the side of the flask.

(2) Temperature when the first large bubbles appear on the bottom.

(3) Temperature when many bubbles rise rapidly to the top.

(4) Point at which temperature ceases to rise.

(5) Temperature when vapor first appears at the mouth of the flask.

(6) What differences are apparent in the amount and motion of the vapor before and after boiling?

(7) Lift the thermometer above the water and note the temperature just above the surface, when the water is rapidly boiling.

The small bubbles are bubbles of air. The large are bubbles of steam. A complete study of the boiling process should be made in the Physics class. The boiling point is the point at which water becomes steam, and also the point at which steam condenses again to water. The temperature of boiling water and steam are the same. Under pressure steam may be heated to a higher temperature.

B. Boil water in a small saucepan closely covered.

(1) Note the *sounds* of the water just before boiling, and the change in sound as the boiling begins.

(2) Note the difference between the vapor escaping, before boiling, and after. This experiment is best performed in a teakettle.

C. Test the temperature of the inner part of the double boiler, when the water boils rapidly below. To be exact, a hole should be bored in the cover of the boiler, a cork with a hole inserted, the thermometer run through the cork. An approximate result is obtained by putting in the thermometer, setting on the cover tilted, and covering the opening with a cloth.

D. Stir salt into rapidly boiling water in the lower part of the double boiler until no more salt will dissolve (a saturated solution). Test the temperature. 74

E. Put the inner part of the double boiler containing water into this boiling solution of saturated salt, being sure that the inner part is sufficiently deep in the

salt solution. Note the temperature of the water in the inner boiler when it becomes heated.

Boiling at high altitudes.—When the air pressure upon the surface of the water is lessened, the water boils at a lower temperature. As the altitude increases, the air pressure decreases, as many a mountain traveler knows to his cost. The boiling temperature of water is so much lowered that the dwellers in high regions of several thousand feet find it difficult to cook starchy vegetables well. A heavy iron pot is made with clamps for fastening down a tight cover, which increases the temperature somewhat. Experiments *D* and *E* indicate a method that can be used to a small extent. The baking process should be largely used, and boiling avoided. For meat, eggs, and fish the lower temperature is not undesirable. (See the chapters relating to these foods.)

The uses of ice.—Water freezes and ice melts at the same point, 32° F., or 0° C. If ice is mixed with salt, the temperature is reduced far below the freezing point, nearly to 0° F. This process reduces any watery substance which it surrounds to its freezing point, the heat being used in the melting of the ice. This is an interesting topic to discuss in the Physics class.

Ice at its ordinary temperature of 32° F. is used for cooling food agreeably. Its most important function in the refrigerator is as preserver of food for a short time at least. For this it is invaluable, and cheap ice is really necessary in summer to the health of a great city.

Ice substitutes.—Where the supply fails or the price is exorbitant, one property of water makes it a partial aid. The rapid evaporation of water will absorb heat so rapidly as to reduce the temperature of adjacent bodies. In the tropics when ice is lacking, water is hung in porous jars in the breeze, and the temperature of the water in the jar is reduced. 75

To keep milk and butter cool wrap a wet cloth about the containing jar, and set the jar upon the window sill, keeping one end of the towel in a vessel of water; or the cloth may be wrapped directly around the butter. This method is surprisingly effective.

Fruit beverages.—Fruit juices with water and sugar make refreshing beverages and have nutritive value as well. (See the next chapter.)

Cocoa and chocolate, coffee, and tea.—These are the three most important non-alcoholic beverages used by man. They are used because of the agreeable flavor given them by volatile oils, and also because they have a stimulating effect. The stimulating property is due to an alkaloid, a crystallizable substance known in cocoa as theobromine, in coffee as caffeine, and in tea as theine. Chemical investigation indicates that caffeine and theine are the same and theobromine is a closely related substance. These substances have a recognized stimulating effect upon the nervous system, and the beverages containing them should therefore be used with caution by all. In the opinion of the writers, tea and coffee should not be taken by young people under twenty-five years of age. Tea and coffee also contain tannin, an astringent substance giving a disagreeable flavor to coffee and tea when these are improperly made, and having an undesirable effect upon digestion. Chocolate contains a non-volatile fat (cocoa butter) in large amount, and should be classed as a food as well as a beverage.

The plants from which cocoa, coffee, and tea are derived are natives of semi-tropical or tropical Africa, Asia, and America, having been introduced to Europe by early travelers in these lands. 76

> The introduction of these beverages is an interesting bit of history. The Spaniards found cocoa in tropical America, and carried it back to Spain, and it was not used in England until 1657. It was sold in Danvers, Massachusetts, in 1771, the raw material having been brought by Gloucester fishermen from the West Indies. Coffee is said to have originated in Abyssinia, reaching Europe by way of Arabia, and being sold in England in 1650. Coffee-houses were licensed in America in 1715. A Chinese tradition places the discovery of the use of tea at 2700 B.C. It was first used in England in 1657, and was imported into America in 1711. An amusing story is told of the first tea party in a town of western Connecticut, where the tea was boiled violently in a large iron kettle and served on a platter with the leaves, as a form of soup, the leaves themselves being eaten.

Cocoa and chocolate.—Cocoa and chocolate are manufactured from the seed of a tree, *Theobroma cacao*, grown in tropical America. The seeds, when removed from the containing pod, are fermented to improve the flavor, dried, cleaned, roasted, and finally ground. The outer husk is loosened in the roasting, and is then removed, and sold as “cocoa shells.” It is the basis of a cheap beverage with an agreeable flavor. The first crushing of the seeds gives cocoa “nibs,” and these are further ground in a mill, and finally molded into the cake of plain chocolate. The addition of sugar, vanilla, cinnamon, and sometimes other spices gives a variety of sweet chocolates. Powdered cocoa is prepared by the removal of the fat, which is a valuable product in itself, sugar and flavorings are added and sometimes a starch. The Dutch manufacturers use alkalies for removing the crude fiber and improving the color, and

the consequent loss of flavor is balanced by the use of other flavoring matter. The adulterations of cocoa are largely starch in excess. The French and American cocoas are flavored with vanilla, the Dutch manufacturers using cinnamon as well.

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The so-called soluble cocoas are very finely ground, and therefore mix readily with water, remaining in suspension for some time, but the cocoa itself is not dissolved. Powdered cocoa is bought in tin cans, is cheap, and is even more economical if bought in large cans than in small. Chocolate is more expensive always than the cocoa, and may be bought in cakes in pound packages, or in powdered form for immediate use.

Coffee is the inner seed of a berry from a tree, *Coffea arabica*, the process of manufacture consisting of the removal of the outer pulp, fermentation, washing, drying, and roasting. The first stages of the process are carried on at the coffee plantation, the raw berries being imported, and roasted shortly before using. The roasting in cocoa, coffee, and tea is necessary for desirable flavors, the heat developing volatile, aromatic principles, caramelizing the sugar, and causing other chemical changes. The differences in the flavor of coffees are due to the variety, the soil and climate, and methods of production and manufacture. No coffee grown in the western hemisphere has excelled, and scarcely has any equaled, the original Mocha and Java coffees, and these have long been trade names for coffee from other places, because of the popular liking for these brands. Brazil is now the great coffee producing country of the world, and from South and Central America and the West Indies we obtain coffee of excellent flavor.

The adulterations of coffee should be noted, although these are of the kind that gives the buyer something cheaper in place of coffee, rather than a substance that is injurious. Ground chicory root is sometimes mixed with coffee, but cannot be classed strictly as an adulterant, because many people, notably the French, add it openly, preferring its flavor. Among adulterants are rye meal, bran, beans and peas, cocoa shells, and even sawdust. Artificial beans have been made of bran, molasses, and water, sometimes with the addition of chicory and coloring matter. If ground coffee is put into a glass of cold water, it floats on the top and remains hard, while several of the adulterants named soften and sink to the bottom of the glass. Highly roasted coffee, however, will sometimes sink. Coffee beans from which coffee extract has been made are sometimes mixed with other coffee.

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Coffee extracts and crystallized coffee are manufactured to simplify the coffee-making process, but the flavor is not equal to that of coffee infusion made directly from the bean. A preparation of coffee is also offered with the caffeine removed by some chemical process, but it is expensive in this country.

Buy coffee in the bean, and see that it is freshly roasted. Coffee, whole or ground, is sold extensively by the pound in tin cans, with a fancy label and name, and in this form it is usually expensive. Good coffee may be bought for twenty-five cents a pound of many reliable dealers, and may be purchased in five or ten pound packages, or bought in bulk to be kept in a tightly closed can.

Tea is the dried leaf of a shrub, *Camellia thea*, growing in the comparatively high lands of Japan, China, India, and Ceylon. A tea plantation exists in South Carolina, U.S.A., and furnishes a very pleasing grade of tea, somewhat resembling Japan tea in flavor. We are familiar with the fact that there are many kinds and grades of tea, the tea shrub varying as does the coffee tree, and the methods of curing affecting both color and flavor. The teas from the countries named have characteristic flavors, and each country has different varieties and grades. Russian tea is not grown in Russia, but is Chinese tea carried across the continent of Asia.

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In general, tea may be classed as green or black, this difference in color depending upon the age of the leaf, and largely upon differences in the curing process. Green tea is made from the young leaf, and after picking is dried immediately by artificial heat, being constantly stirred for about an hour, in which time the leaves twist and curl. For black tea the leaves are allowed to wilt and ferment, before they are rolled and heated; and sometimes the heating is repeated. These details of the process vary in different localities. The leaves are finally sorted and graded for packing.

Both black and green teas are made in China. “Bohea” is one of the famous black Chinese teas. “English Breakfast Tea” is known as such only in America, and is a blend of black teas. Black tea is not so successfully made in Japan as in China. “Oolong,” from the island of Formosa, has the appearance of a black tea, with the flavor of a green. In Japan and China old-time methods prevail, with much handling of the tea leaves, but in Ceylon and India modern machinery makes the process a much more cleanly one.

Another classification of tea is that depending upon the age and size of the leaf, the young leaf making the finer grade tea. For example, in the black teas of India “flowery pekoe” is made from the youngest leaf, “orange pekoe” from the second, “pekoe” from the third, and “souchong” and “congou” come from the larger leaves.

The adulterations of tea are usually the leaves of other plants, but as a matter of fact

very little adulterated tea is imported. The first grades of teas, however, and those most highly prized by the Chinese and Japanese, seldom find their way to America.

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Other beverages.—Several very acceptable coffee substitutes are on the market, made from roasted and ground grain, and they give an agreeable hot drink for breakfast when served with cream or milk. In some cases they seem to have a laxative effect, which is well for some people and not for others. A pleasant hot drink of the same nature may be made from the browned crusts of bread.

The substitutes for tea are not usually satisfactory. The Indians of the western coast of the United States make a tea from a plant which they call “Buona Yerba,” but for us it has a strong resemblance to the medicinal herb teas formerly used for curative purposes, such as sage, catnip, motherwort, and the like.

GENERAL METHODS AND RECIPES

1. Lemonade and fruit drinks.

Utensils.—Silver knife for paring and slicing, glass lemon squeezer, a grater, a strainer, and a saucepan. Avoid the use of tin and iron utensils.

Materials.—Lemon or other fruits, sugar water.

Proportions.—One half lemon to a glass, or 2 or 3 to a quart of water. Other fruits “according to taste.” Experiment here, using the juice and pulp of any fruit, combining those that are very acid with those that lack acidity,—lemon and raspberry, for example. One third to $^1/_2$ cup sugar to a quart. The proportion cannot be stated with exactness, for fruit varies in acidity, and the final result must always be tested by the taste.

Method.

Plain lemonade.—After deciding upon the proper amounts to be used, dissolve the sugar in a part of the water, brought to the boiling point. When cool, add the lemon juice and remaining water, ice and serve. A small portion of grated rind may be added to the boiling water.

Another method is to use lump sugar, rubbing the peel of the lemon upon each lump before dissolving.

The general method is the same with other fruits, pulpy fruit and berries being mashed, the water added, and strained.

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Cherries, *strawberries*, and pieces of *pulp* are sometimes added before serving, when the fruit drink is ladled from a bowl as fruit punch. Be sure to cut the berries if they are large. A brightness is imparted to the fruit punch by the addition of carbonated water just before serving. A quart of fruit punch, if served in small cups, will suffice for eight people.

2. Cocoa shells.

Principle.—To extract the flavor from the shells, by boiling in water.

Utensil.—A saucepan or coffee boiler.

Proportions.—One half cup shells to 1 quart boiling water. As much as 1 cup of the shells may be used.

Method.

Wash the shells in a strainer under the faucet. Put the shells in the pot, pour on boiling water, and simmer gently for $^1/_2$ hour. Strain off, and serve with cream, or milk, or evaporated milk and sugar.

3. Cocoa.

Principle.—To mix the particles smoothly and evenly with the liquid by stirring and by heating.

Utensils.—A measuring cup, a saucepan, spoon, and beater. A double boiler, if milk only is used.

Ingredients.—Powdered cocoa, sugar, water, or milk, or milk and water. Cocoa made with milk does not agree with some people, in which case it may be made with water only, and served with cream, milk, or evaporated milk.

Proportions.—One teaspoonful of cocoa to $^{1}/_{2}$ measuring cup. More or less as preferred. One teaspoonful of sugar, ditto.

Method.

Heat the liquid. Stir a portion of the liquid cold, with the cocoa, add this to the hot liquid, add the sugar, and beat vigorously for a minute before removing from the fire.

4. Chocolate.

Principle.—To mix the chocolate smoothly with the liquid that the fat may not float on the top. This is accomplished by having all the ingredients either hot or cold. If after the chocolate is dissolved in a hot liquid, cold liquid is added, the oil separates and floats.

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Utensils.—A grater, or sharp knife, a saucepan, mixing spoon, and beater.

A French chocolate maker claims that any metal utensil affects the flavor of the chocolate, and always uses an earthen pot and wooden spoon and heater. An earthenware chocolate pot for this purpose is on the market.

Ingredients.—Chocolate, sugar, milk, or milk and water.

Proportions.—The amount of chocolate may be varied, depending upon the richness desired. Three or 4 ounce squares to 1 quart liquid, 4 teaspoonfuls sugar to 1 quart. The liquid is better half milk and half water, rather than milk only.

Method 1.[10]

The cold method.

Put the liquid and sugar into the saucepan. Break or cut the chocolate into small pieces, add to the liquid, and heat the liquid slowly, stirring occasionally but not constantly. When the liquid is hot, just before it reaches the boiling point, beat vigorously with a wooden spoon, or beater. The Dover beater is convenient. This beating makes a velvety smooth and a foamy mixture.

Method 2.

The hot method.

Heat the liquid with the sugar. Grate the chocolate or shave it with a knife. Protect the chocolate from the warmth of the fingers by a piece of paper. The process is less “sticky” if the chocolate and grater are chilled in the refrigerator. Just as the liquid is reaching the boiling point, pour in the grated chocolate, and beat vigorously.

Beaten chocolate does not need any additional cream when served. Beaten whipped cream is attractive on the top of each cup. But remember that chocolate is already rich in fat, and that additional fat may be indigestible. Such a cup of chocolate taken for luncheon with a roll is sufficient for the meal, and is certainly too rich in fat for serving at an afternoon tea.

5. Coffee.

Principle.—To extract the flavoring oils at the boiling point of water, and to avoid the extraction of the tannin. The tannin is extracted by prolonged boiling, and when the liquid coffee stands upon the grounds.

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Utensils.—Coffee grinder, measuring cup, pot. The kind of pot depends upon the method used. One house furnishing firm displays some seventy different coffee pots, but they may be divided into three classes, the *pot for boiling*, the *drip coffee pot*, and the *percolator* (see Figs. 23 and 24). The coffee boiler should have a lip, and not a spout. A word of warning is needed in regard to the care of the pot. Coffee grounds should be removed from any pot immediately, and the pot washed at once in scalding hot soapsuds, rinsed, dried, and aired. Let the pot stand with cover off. If this is not done, a coat is soon formed on the inside of the pot, which spoils the flavor of the coffee. Where the pot has been neglected, boiling it out with a solution of caustic soda is sometimes a remedy.

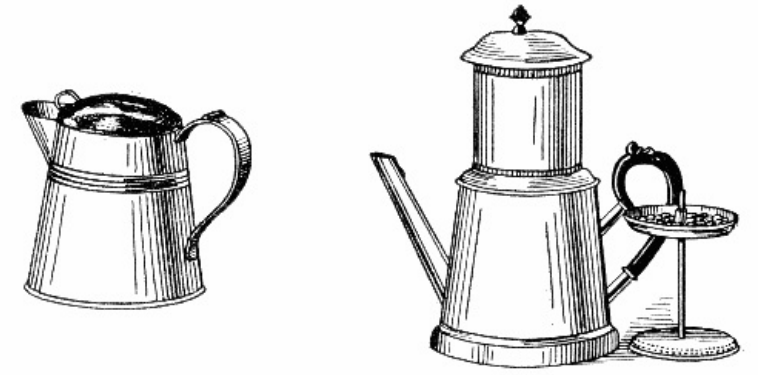

Fig. 23.—A pot for boiling coffee and a pot for drip coffee. *Courtesy of the Brambhall Dean Co.*

Fig. 24.—A coffee percolator. *Courtesy of Landers, Frary and Clark.*

Ingredients.—Ground coffee, water, cold or boiling, white of egg or egg shell for boiled coffee. The coffee should be ground to medium fineness for boiled coffee, to a finer powder for the percolated and drip coffee.

Proportions.—One part of coffee to 5 or 6 of water, depending upon the strength desired. One egg shell, or half the white of an egg to 1 cup of ground coffee.

Method 1.

Boiling.—Measure the coffee and water. Stir the white or the shell of an egg with the coffee, adding a little of the water, put this into the pot, add the remaining water *cold*, stir thoroughly, allow the water to rise slowly to the boiling point, and to boil one minute, remove the pot from the fire, pour in a small amount of cold water, and let the coffee stand for five minutes or until the grounds settle. During the cooking close the lip with clean soft paper if it has no lid. The actual boiling is continued for a brief period only, and coffee made by this method is considered by some people to have a flavor lacking in drip or percolator coffee. The egg is added to clarify the coffee. Pour off the liquid coffee from the grounds, and keep hot until it is time to serve it.

A second method differs from this in that the water is poured on at the boiling temperature, allowed to reach the boiling point in two or three minutes, and boiled for five minutes. The first gives uniformly better results. It is true, however, that different kinds of coffee need different treatment, and there is room here for much experimenting.

Method 2.

Drip coffee.—In this method the coffee is put in a receptacle above, the water passes slowly through, collecting in the pot below, from which it is served. Stand the lower part of the pot in a pan of hot water, or where it will keep hot. Measure the water, and bring it to the boiling point. Heat the ground coffee slightly, put it in the upper section of the pot, and pour on the water very slowly. Of course, the water is not actually boiling when it touches the coffee. If the liquid coffee is not strong enough, pour it from the lower part and pass it through the grounds again.

This is the French method, and is an excellent way to prepare after-dinner coffee.

Method 3.

Percolator coffee.—In the percolator the water boils within the pot, and passes through the coffee at the boiling temperature. The exact method depends upon the pattern of the pot, and directions always accompany a given pot. For those who can use electricity, the electric percolator certainly gives an excellent coffee.

Coffee is served "black," or with cream, milk, or evaporated milk and sugar. If milk is used for breakfast coffee, serve it hot. 85

6. Tea.

Principle.—To extract flavor by allowing the leaves to remain for a few minutes, in water which has been poured on at the boiling temperature, and to avoid the extraction of tannin by making the period of steeping short. Tea must *never* be boiled.

Utensils.—An earthen pot, measuring cup, teaspoon, strainer. Sometimes a tea ball or piece of cheesecloth.

Proportion.—One teaspoonful of tea to about 1 cup of water, the amount depending upon the kind of tea.

Method.—Measure the water and bring it to the boiling point. Heat the tea slightly in the pot, pour on the water rapidly, allow to stand three to five minutes, strain into a heated pot for serving. The length of the steeping depends also upon the kind of tea. If there is an astringent flavor, the tea has stood too long.

The following method was recommended by an expert in India teas. Bring the water to a boil in a saucepan, throw in the tea leaves, lift the saucepan instantly to stop the boiling, steep for 3 or 4 minutes, strain off and keep hot. This expert claimed that by actually having the tea leaves at the boiling temperature for an instant the flavor is improved. Serve with cream or milk, or sliced lemon and sugar.

Where tea is to be served in very large quantities, this last method is very convenient. The water can be brought to the boil in a large kettle, and the tea thrown in, but care must be exercised to see that the steeping does not last too long. The tea, once decanted, can be kept hot for several hours, without losing flavor. Or again, a small amount of extra strong tea may be prepared, to be diluted with boiling water as it is served. The tea ball, or the plan of tying the tea in small pieces of cheesecloth, is convenient for serving at an afternoon tea.

7. Iced cocoa, coffee, and tea.

Cocoa and coffee are agreeable in hot weather served in a glass with ice, and cream and powdered sugar. Make both slightly stronger than for hot drinks, as the ice in melting dilutes the liquid. 86

Iced tea.—Prepare a small amount of strong tea, using 4 teaspoonfuls to 1 cup boiling water, strain off and cool. Dilute with iced water to the proper strength, sweeten with powdered sugar, and serve in glasses with one or two slices of lemon to each glass. For those who do not like the lemon, iced tea may be served with cream.

EXERCISES

1. What are the functions of water in the body?

2. What cautions should be exercised when drinking water?

3. Explain the likenesses and differences of cocoa and chocolate, coffee and tea.

4. Why is it better to serve whipped cream with cocoa, rather than with chocolate?

5. Explain the principles in making each beverage.

Teacher's Note.—The beverages are treated in one chapter for convenience, but need not of necessity come at the beginning of the course. A fruit beverage, or cocoa, may make a convenient first lesson, when the pupils are becoming acquainted with the school kitchen. Coffee and tea may be made during the baking lessons.

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CHAPTER VI

FRUIT AND ITS PRESERVATION

The United States is fortunate in the native fruit supply, including as it does so many degrees of latitude and longitude with the differences in altitude, climate, and soil needed by different varieties. Now that we count Porto Rico among our possessions, a list of our fruits would include most of the varieties known in the temperate and semi-tropical zones. The United States Department of Agriculture experiments with new varieties from foreign lands that may make themselves at home in our soil, and work like that of Luther Burbank produces new species. Scientific methods of fruit growing are becoming more common, and the quality of fruit will doubtless improve in spite of fungous diseases and injurious insects. Our wild fruits are not yet entirely rooted out. The Maine blueberry, for example, is found on hundreds of acres and needs no cultivation beyond burning over every third year.

Fruit is necessary in our diet, and is not an extravagance unless we buy fancy varieties brought from a distance, or native fruits out of season.

Composition and nutritive value.—The chief foodstuffs in fruits are carbohydrates and mineral matter. Fresh fruit contains from 75 to 95 per cent of water, and its presence is apparent in such juicy fruits as the melon and the orange. Figure 25 shows that seemingly dry fruits like the banana and the apple also contain much water. Even fruits which have been artificially dried, like prunes and raisins, contain some water. (Fig. 26.) Although the carbohydrates of fruits are largely in the form of sugars easily digested and valuable as fuel, this kind of food is especially valuable for its rich supply of ash, including the compounds of calcium, magnesium, potassium, phosphorus, and iron. The iron is of great importance, being in a form much more useful to the normal processes of the body than that prescribed medicinally. The bulk given by cellulose, and the laxative property of fruit acids also are safeguards against constipation, especially in a meat diet. Fruit is the best possible dessert after a hearty meat dinner.

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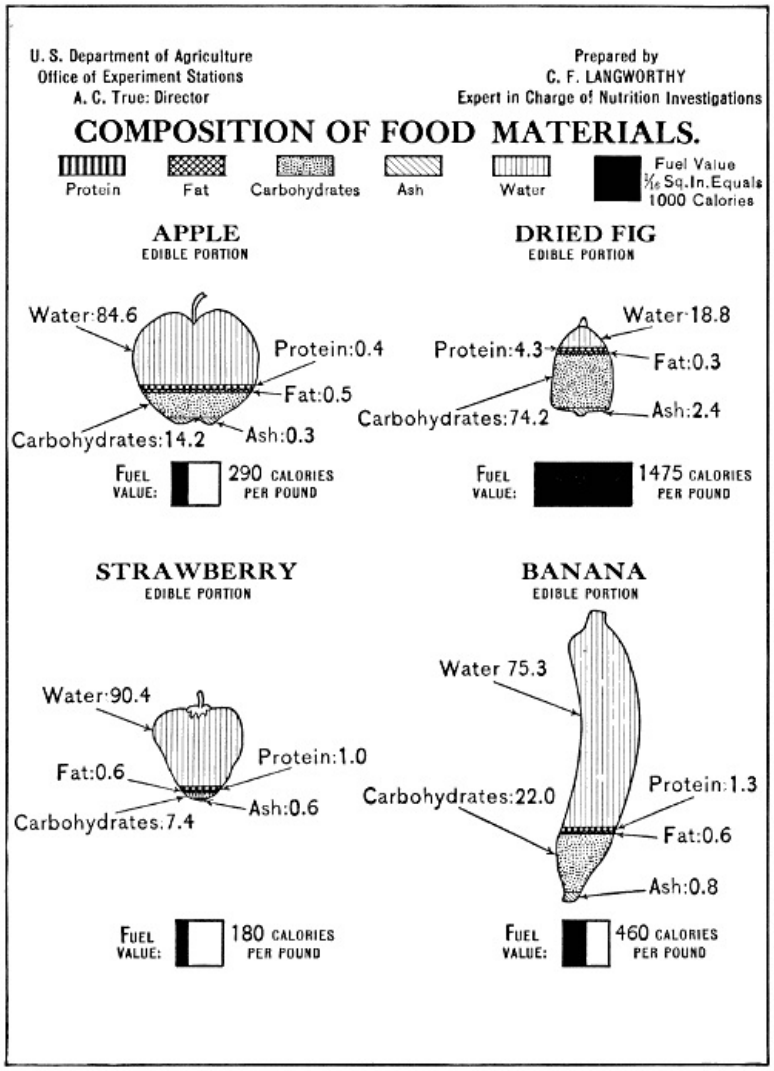

FIG. 25.—Composition of fruit.

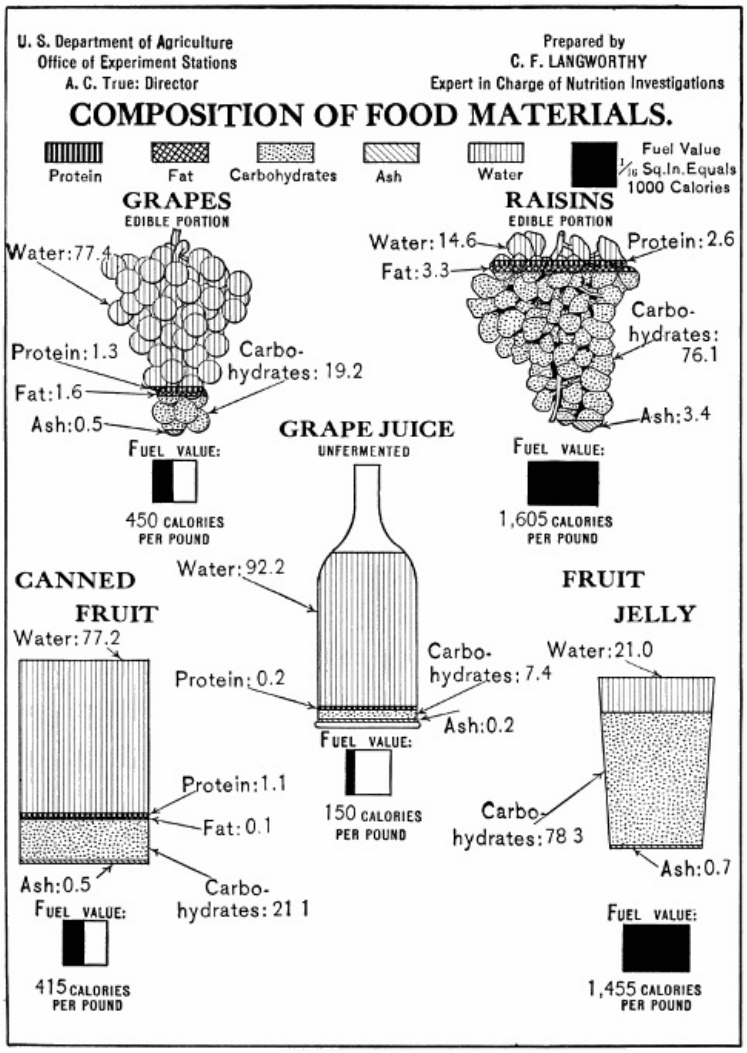

Fig. 26.—Composition of fruit.

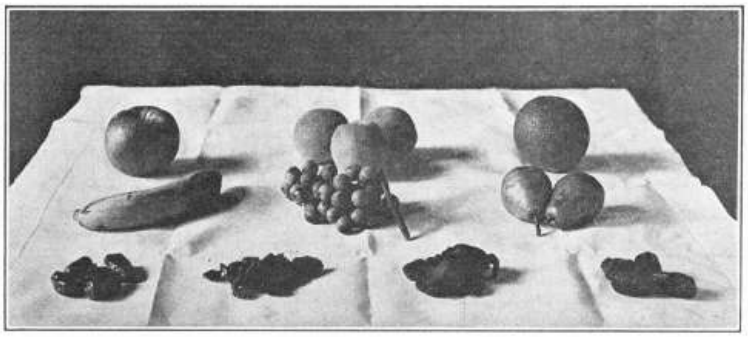

Fig. 27.—100-Calorie portions of fresh and dried fruit.
A. Fowler, Photographer.

KIND	WEIGHT OF PORTION OUNCES
Apple	7.5
Banana	5.5
Grapes	4.9
Orange	9.5
Peaches	10.5
Pears	6.3
Apricots	1.3
Dates	1.1
Prunes	1.4
Raisins	1.1

The digestibility of fruit is increased for some people by cooking. This is probably due to the softening of the fiber, to the destruction of any bacteria present, and in the case of the banana, to the cooking of the starch. Fruit juice can be taken by little children and invalids

who might find the fiber troublesome. Some people cannot eat berries on account of irritation caused by the seeds. In this case, juice may be squeezed from cooked berries and used for beverages and jelly.

How to buy.—Since we should eat fruit daily, and not merely as a "treat," it is important to practice economy in buying it. Fresh fruits in season, and dried fruits are the cheapest. Canned fruit is economical when it is a product of one's own garden, or put up when some fruit has a low market price. Prices are so variable, even with one variety, that no definite sum can be given as a fixed price. Apples vary from fifty cents a bushel near the orchard and in season, to ten cents apiece for a fancy table variety in the winter. When you buy fresh fruit, inquire the prices of the many kinds offered, note which is cheapest, and then observe whether the cheaper kind is such because it is abundant, or because it is of inferior quality. If you chance to want apples for cooking, and the only cheap apples are spotted and bruised, then buy dried apples, or even canned. It is best to decide upon the fruit after you have studied market conditions rather than before.

GENERAL METHODS AND RECIPES

Fresh Fruits

Principles of preparation.

Thorough cleansing in clear water.

Cleanliness, in avoiding use of the fingers.

Making convenient for eating, sometimes by paring or cutting or expressing the juices.

Adjuncts.—Sugar.

The juice of an acid fruit with an insipid fruit.

Tools.—A sharp steel knife for paring and peeling.

A silver-plated knife for cutting.

A glass lemon squeezer.

Methods.

Berries.—Pick over.

Wash in colander with a gentle stream of water, and shake carefully to avoid bruising and breaking.

Chill in the refrigerator.

Sprinkle with sugar when served.

Oranges.—Scrub the peel with a brush.

(1) Cut in two crosswise and serve.

(2) Peel with a sharp knife and remove the pith.

Cut crosswise, remove seeds, and break up the slices. Sprinkle with sugar.

Chill in the refrigerator.

Grapefruit.—The same method as with the orange, but in method (2) the pulp only should be served.

Bananas.—Wash thoroughly.

(1) Cut in two lengthwise, and serve, *or*

Pour a teaspoonful of lemon juice on each half, and sprinkle with sugar.

Chill in the refrigerator.

(2) Pull off the skin, lengthwise.

Cut in slices crosswise.

Chill, and serve with sugar and cream, *or*

Pour on lemon or orange juice, add sugar, and chill.

Peaches.—Wash gently.

Hold the peach on a fork at one end.

Peel with a plated knife, and slice.

Chill in the refrigerator for a short time only before serving, as peaches discolor quickly.

Sprinkle with sugar when served.

Pears and apples.—When very mellow, these are delicious sliced and served with sugar and cream.

Fruit juice.—Cut the fruit in two, and press on the glass squeezer over a cup.

Cooked Fruits

Principles of cooking.

The fiber, and skin when retained, are softened.

Flavors are developed at a low temperature long continued. A high temperature at the end of process, browns, and adds flavor.

Flavors retained by prevention of evaporation through covering tightly.

Bacteria and molds are destroyed.

Adjuncts.—Sugar. Sometimes a bit of butter.

Acid fruit juices, *or*

An acid jelly.

Seeded raisins, with acid fruit, as sour apples.

Nutmeg or cinnamon with some fruits.

Cooking processes.—Stewing and baking.

Utensils.—Knife and corer.

Stew pan, enamel ware, close cover.

Round or square baking pans, enamel ware, covered.

Earthenware pot, covered.

Methods.—If you can cook one fruit, you can cook all. Two common fruits are selected for your experiments, the apple and the prune; both are delicious, and both contain iron, the prune more than the apple.

The apple.—A tart variety is best for cooking. The Greening and the Baldwin are excellent.

Apples are cooked whole, or as a sauce.

Whole, cooked with or without the skin, either stewed or baked.

For cooking whole, select those of uniform size.

For cooking whole, with the skin, select those with fair skins.

For cooking whole without skin, select firm texture, not mellow.

An apple sauce may consist of slices, or may be mashed or strained, and may be either stewed or baked. Less perfect apples may be used than for baking.

First step for all.—Wash, and examine carefully for blemishes, bruises, and insects in the interior.

1. Whole apple baked, with skin.

(1) Remove core.

(2) Place in pan, with enough water to barely cover the bottom of the pan.

(3) Pour sugar into the holes.

(4) A bit of butter may be put on the top of the sugar.

(5) Nutmeg or cinnamon may be mixed with the sugar if the apples are flat

in taste.

(6) Cover the pan, and bake in a moderate oven, until the apples are tender. The length of time depends upon the quality of the apple. (See class experiment.)

Half apples.—This is a modification of (1).

Cut the apples in two crosswise, and proceed as with the whole apple.

2. Whole apples baked, without skin.—A good method when skins are tough.

(1) Remove core and pare.

(2) Place in *earthen* baking dish. The remainder of the process is the same.

(3) Serve in the dish in which they are baked.

(4) Currant jelly, or seeded raisins may be placed in the core holes instead of sugar.

Class experiment.—Bake side by side two apples of uniform size, one with, one without, the skin. Note carefully the length of time for baking each. What difference? Why is this? It may be necessary in the school kitchen to bake in a quick oven, on account of the shortness of the class period. It does not spoil the apple to do this; but the longer process that you can use at home gives a richer color and flavor.

For this experiment, one pupil may bake the apple without the skin, and the next pupil one with the skin in case there is but one apple apiece; or it may be made a class experiment with two apples.

3. Whole, stewed. (Compote.)—This is a more difficult method than method 2, and really no better.

(1) Core and pare five or six apples.

(2) Dissolve $^1/_2$ cup sugar in $^1/_2$ pint water in a saucepan.

(3) Place apples in the sirup. They should be barely covered.

(4) Cover closely and keep just below the boiling point, until the apples are tender.

(5) Cool slightly, remove the apples with care and place in the serving dish. Put a spoonful of jelly in each apple.

(6) Boil down the sirup and pour it over the apples.

(7) Chill, before serving with plain or whipped cream.

4. Apple sauces.—In the cooking of the whole apple you have all the principles and processes of apple cooking. You can now make apple sauce of your own invention, and need no printed directions. Answer these questions before you begin work. After you have made the sauce, record the work exactly in your notebook.

If you want the slices of apple to remain whole, will the method be like 1, 2, or 3?

If you wish a smooth sauce, what utensil will you need?

How will you determine the amount of sugar required? If you are very fond of sugar, your taste may not be the safest guide.

Practical home work.—If you can secure a very slow oven, say a coal oven at night, or a gas oven with a low flame, make an apple sauce in an earthenware pot, as heavy as a bean pot, closely covered, leaving the pot in the oven from six to eight hours. This process is satisfactory in a fireless cooker where a hot stone or iron is used. Remember that water keeps down temperature, and also that it evaporates steadily even in a slow oven. How much water will you put over the apples when the process begins?

If you have never cooked apples in this way you will be surprised at the color and flavor.

Some other fruits.—Pears and *quinces* develop pleasing flavors when baked.

Cook the quinces sliced, as suggested for the apples, in the bean pot, using a

little molasses for sweetening and you will have the delicious old-time “molasses quince.”

Prunes.—We are dealing now with a dried fruit. If you compare the raisins with the grapes in Fig. 26, you will see how much water is lost in the drying process. The same difference would be evident if you had pictures of a fresh plum and a prune, side by side. This water must be supplied in the process of preparation. The best way to accomplish this is by soaking the prunes many hours, say over night. Prunes have a most undeserved reputation, because they are not well cooked, and at some tables are served too often.

With this one new step introduced you may plan the cooking of the prunes, from what you know of apple sauce. The slower and longer the process, the better. The cheaper kinds of prunes will be very satisfactory, with the soaking and slow cooking. What is the sensible thing to do in regard to sugar?

If on some occasion you would like prunes to be unusually nice, remove the stones carefully, and in their places slip in seeded raisins which have also been soaked and gently stewed.

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Other dried fruits may be treated in the same way.

Apricots and peaches yield delightful flavors when carefully prepared; and dried apples are also excellent.

Preservation of Fruit and Other Foods

The preservation of fruit and other foods has been a household industry for generations, and it is now an important commercial industry. The old-time farm had its smokehouse where hams and beef were “cured,” the barrel of brine stood in the cellar for pork and corned beef, apples and corn were dried for winter use, and rows of preserve jars stood upon the shelves. Food was preserved by simple processes long before the reason for the decay and spoiling of food was fully understood, but with larger knowledge and better appliances, we now preserve food more effectively and in quantities larger than were possible in former days.

Fruit is the food material now most commonly preserved in the home kitchen. Vegetables need to be subjected to heat for a much longer time than fruit, and many people prefer to buy canned vegetables rather than to go to the trouble and expense of canning them at home. Where there is an oversupply of vegetables in the home garden, it is sometimes economy to can them, and this may be done if care is exercised. The cost of fuel and labor must be counted in, when studying the question of home preserving versus buying the canned product.

Whatever the food material, and the process, the principles of preservation are the same for all.

Why does food spoil?—The decay and moldiness of fresh fruit are matters of common observation; and the housekeeper knows that mold is liable to cover the top of a jelly glass, and that a can of fruit will ferment at times, even to the point of bursting the can.

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We recognize another kind of deterioration in meat and fish that have become tainted, even when no mold is visible, and there is no opportunity for ordinary fermentation. The microscope has given us eyes to see, and as a result of the patient work of the scientist with this instrument we now know that the difficulties in keeping food are caused by the presence of minute vegetable organisms known as molds, yeasts, and bacteria. It is impossible in some cases to draw a sharp line between these different forms of lower life, yet we are able to distinguish them sufficiently for practical purposes.

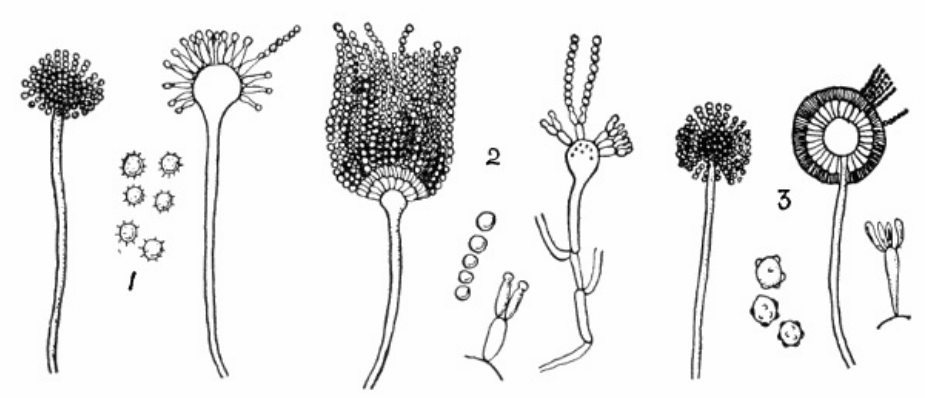

Fig. 28.—Three species of mold. *Buchanan's Household Bacteriology.*

Masses of *mold* that can be seen with the naked eye are distinguished by a feathery appearance and bright color. Figure 28 shows three species of the green mold that affects jam and jellies. Other species are found in Roquefort and Camembert cheese, and give the flavors characteristic in these cheeses.

The presence of *yeast* can be detected by its action, but it cannot itself be seen without the microscope. When canned fruit or homemade fruit juice "works," yeasts cells are present 98
in great number. Figure 29 shows one form of yeast, highly magnified, and Fig. 30 shows a single yeast cell. The yeast cake is a mixture of thousands of such cells with some flour or flour and meal, and the cells lie dormant in the cake, until we are ready to use them in bread. (See Chapter XII.) The actual yeast, however, is what Fig. 30 shows it to be, a tiny, one-celled plant, increasing in number by the division of the single cell, or by the budding out of one cell from another. When conditions are favorable the yeast cells increase in number with great rapidity, and some of the sugar that is present is broken down into carbon dioxide gas and alcohol. It is this gas that causes the familiar bubbling when fermentation is taking place. We put yeast cells into bread and cultivate it for this gas. But how does it occur in canned fruits, when its presence is not desired? *Wild yeast* floats in the air, and lies upon the surface of fruit. All cultivated yeast has been derived from wild yeast. 99
In old-fashioned ways of bread-making no yeast was introduced, a soft dough being left in a warm place to ferment naturally, the yeast cells probably being present in the flour. The yeast that spoils the canned fruit is present in the fruit, in the utensils, or can, and has not been killed as it should be in the canning process.

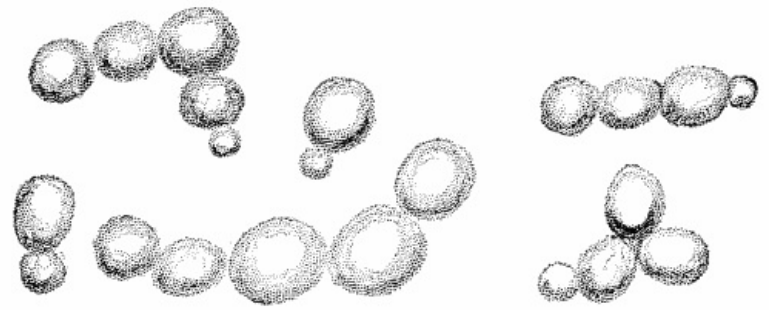

Fig. 29.—One form of yeast. *Buchanan's Household Bacteriology*

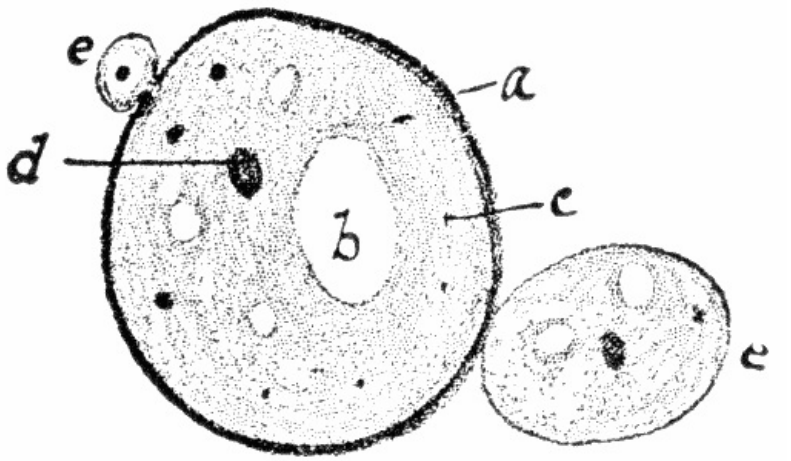

Fig. 30.—A yeast cell. *a*, cell wall. *b*, vacuole. *c*, granules. *d*, nucleus. *e* and *e*, buds. *Buchanan's Household Bacteriology.*

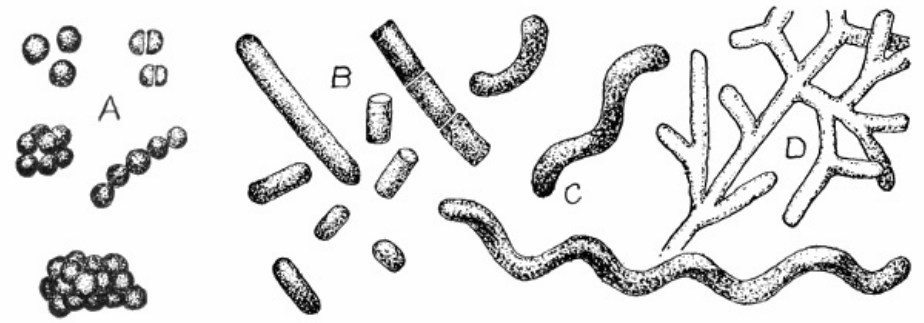

Fig. 31.—The four types of bacterial cells. *A*, cocci. *B*, bacilli. *C*, spirilía. *D*, branched filamentous organism. *Buchanan's Household Bacteriology.*

The *bacteria* are also one-celled microörganisms, smaller than the yeast. Figure 31 shows the four types of bacterial cells. Their size is measured by the unit used in the microscope, called the micron, which is about $^{1}/_{25000}$ of one inch. Bacteria may measure from one to three or four of these microns in length. Some bacteria are reproduced by means of spores which form within the cell. Bacteria, as they develop in some material, produce substances from the material that may or may not be injurious to us. One important truth about the bacteria is this: that many of them are harmless, and may even be made useful, as in the manufacture of fruit vinegar. The pleasant acid of buttermilk and of sour milk is due also to bacteria which are not harmful to us. However, there may be disease producing bacteria present in milk that is not clean, and their presence must not be tolerated. Other bacteria, developing in meat and fish, produce substances known as *ptomaines*, which are dangerous poisons; or, more often, the kinds of bacteria which thrive in meats and fish may themselves be directly injurious to man.

It is evident, therefore, that the problem before us is the control of these lower organisms, that we may increase or destroy them as we will.

The control of microörganisms.—With warmth, water, and food all living things flourish and grow; most organisms require air, but some of the microörganisms do not. Where these conditions are best met, the organism is most active and multiplies most rapidly. To retard growth or to destroy life, the conditions must be the reverse of favorable. While warmth, say a temperature from 70° to 90° F., promotes the life of most microörganisms, intense heat destroys it. The boiling temperature, 212° F., will kill these lower organisms, although this heat has to be continued for some length of time, particularly in the case of spores. The spores of certain bacteria are quite resistant. A temperature of 32° F. and lower retards growth, but it requires extreme cold to destroy bacteria. Since moisture is necessary to all the lower organisms, they do not develop in a dry material or dry place.

We cannot destroy these lower forms of life by removing food from them, since they are ever present, but we can make the food unavailable to them through the introduction in the material of certain substances called preservatives which prevent their growth. The preservatives long familiar are salt, sugar, wood-smoke, spices, vinegar, and alcohol. While a small amount of sugar is necessary in the fermentation process, a large amount acts as a preservative, as in candied fruit. It is an interesting fact that alcohol and vinegar, products

of fermentation processes, tend (when sufficiently concentrated) to stop the growth of the fermentation organisms. 101

To the reader who desires a fuller account of the bacteria, yeast, and molds, especially as related to household affairs, Buchanan's "Household Bacteriology" is recommended as the most recent and satisfactory book in this field.

A word about buying canned goods.—When canned goods are put up in large quantities at the factory, abuses are likely to exist. Poor, even decayed, fruit may be used, the whole process may be unclean from beginning to end, and undesirable preservatives or an excess of sugar or spice may be introduced to cover the use of poor materials or methods. The condition of the worker in the cannery is one of the important industrial problems at the present time. Unhappily, poor conditions do often exist in canneries that turn out a cheap product. On the other hand, there are firms that may well take pride in their system from beginning to end.

Serving canned food.—All canned food should be exposed to the air for a short time before serving, and stirred that the material may be aerated. This partially removes a certain flatness of taste. Canned fruit is improved by reheating, even.

When possible, vegetables bought in a tin can should be washed in the colander before they are heated. This greatly improves the flavor.

Principles of preservation.

Sterilization of food and all apparatus by the boiling temperature, 212° F.

The removal of moisture by some drying process.

The addition of a preservative.

Sealing, to prevent the entrance of air.

Practical methods.

Canning.—Fruit or vegetables sterilized at 212° F. and tightly sealed in jars or cans. 102

Preserving.—Whole fruit, sterilized, large amount of sugar added, and sealed or covered in jars.

Jam making.—Fruit broken up, sterilized, sugar added, and covered.

Jelly making.—Fruit juices, sterilized, sugar added, covered.

Pickling.—Fruit and vegetables sterilized, vinegar, spices, and sugar the preservatives used.

Drying.—Fruits and vegetables protected from dust and insects, and slowly dried by the sun's heat or artificial heat.

Fig. 32.—Preserving kettles in a large factory. ***Courtesy of H. J. Heinz Co.***

Apparatus.—Scales. Quart measure. A preserving kettle of good enamel ware. Plated knives. Large spoon of enamel or wood. Tablespoon and table fork. Pint and quart cans with glass tops fastened by springs. New rubber rings. Jelly glasses with covers. Cloth jelly bag. Stick on which to hang the bag. Large bowl. Boiler, in which to stand the cans. A funnel. A dipper. Old towels, or cheap cloths. Saucer and spoon for testing.

GENERAL METHODS AND RECIPES

General directions.—Thoroughly wash all the utensils, just before using. Sterilize the cans and glasses by placing them in a large kettle or boiler on the stove, covering them with cold water, and allowing the water to reach the boiling point and to boil for half an hour. Covers and rubber rings should be treated in the same way.

Fig. 33.—Picking over strawberries. ***Courtesy of H. J. Heinz Co.***

Prepare the fruit by careful washing, picking over, paring and cutting.

The skins may be loosened on peaches and tomatoes by pouring hot water over them.

Weigh both fruit and sugar, or measure if no scales are available.

See that the cooking apparatus is in good order, that the proper heat may be continued.

Avoid rapid boiling of the fruit.

Place the cans when they are to be filled with hot fruit upon a towel wet in very hot water, or in a pan holding an inch or so of hot water. Never hold the can or glass in the hand.

Use a dipper for putting cooked fruit into the can. A funnel is useful placed in the mouth of the jar.

Put whole fruit and halves compactly in the jar, using tablespoon and fork, or two tablespoons. It requires practice to do this well.

See that all air bubbles are removed, and fill the cans to overflowing, before putting on the glass tops and fastening on the spring. Wipe off the jars, carefully, and stand them on their tops for a day in order to test the tightness of the rubbers and the fastening.

After filling jelly glasses, set them at one side, and cover them all with a piece of cheesecloth, until the jelly becomes firm. Then pour melted paraffin upon the jelly in each glass, and when the paraffin is cooled, put the covers on firmly.

Label the jars with the name of the fruit and the date of the preserving before putting them away.

Canning.

Method 1.—Material cooked before it is put into the can. This is a good method for berries, and for fruit that will be served as a sauce. Proceed in the preparation and finishing according to the general directions. Cook the fruit gently for half an hour. Use as little water as possible. No sugar is *required* in the canning process, but the flavor is better if a small amount is used in the beginning, a half cup of sugar to a pound of fruit.

Method 2.—Material cooked in the can. This is the better method for whole fruit and halves. Select firm, well-shaped fruit for this method, rejecting the mellow and soft fruit. Pack the cans tightly with the fruit, and pour in hot water with sugar dissolved in it, a half cup to the quart can. More sugar can be used, if so desired. Set the jars in a boiler on a rack, and surround them with warm water, to a height that will not allow the water to boil into the cans.

Set the cover on each jar, but do not fasten them. Cover the boiler closely, bring the water to a boil, and allow it to boil for an hour. At the end of this time, test the fruit for tenderness with a fork, pour in more sirup if it is necessary. Remove the jars when the water has cooled sufficiently, and adjust the covers. Cold water is sometimes used at the beginning, but this makes the process longer.

This is a good method also for the canning of whole vegetables like peas and asparagus. The cooking of vegetables should continue for at least two hours, and three hours are better for peas and string beans.

Apparatus is constructed for this method of canning, but the ordinary boiler answers the purpose.

Preserving.

A good method for peaches, apricots, and quinces. Select firm and handsome fruit and prepare it carefully. Allow a pound of sugar to a pound of fruit. (What is the measure of a pound of sugar?) Place enough water in the kettle to cover the fruit, dissolve the sugar in the water, put the fruit into the kettle, and cook very gently until the fruit becomes a clear color. Rapid boiling spoils the shape of the fruit. Do not stir at all, but skim off any scum that rises to the top. When the fruit is done, put it with great care into the jars. If the sirup is thin, boil it down for a short time, and then fill the jar. Close the jar as in canning.

This is a difficult process for beginners.

Jam making, and fruit butter.

This is the most economical of the preserving processes and the easiest for the novice. It is nothing more than a fruit sauce, with a larger amount of sugar than usual to assist in its preservation.

Soft and somewhat imperfect fruit may be used. If in the basket of fruit bought for canning or preserving there are some fully ripe or poorly shaped specimens, these may be used for jam. For jam proper allow a pint of sugar to a pound of fruit. Cook the fruit with enough water to prevent its sticking to the kettle, using as little as possible.

Mash the fruit by stirring it occasionally as it cooks. When the fruit is soft, add the sugar, stir thoroughly, and cook gently for about five minutes. Test by cooling a spoonful on a saucer. The jam should thicken slightly. When ready, pour it into jelly glasses, or somewhat larger earthen jars—"jam pots." Seal, as directed for jelly.

The *fruit butter* is even more like fruit sauce than is the jam, for it is softer than jam, and contains less sugar. A cup or only a half cup of sugar to the pound of fruit is enough. Proceed exactly as in jam-making.

Apple butter may be flavored with spices, with ginger root and lemon juice, and with other fruits. One or two quinces or a slice of pineapple cooked with the apples gives a pleasing variety. Exercise the inventive faculty here.

Jelly making.

There is another principle involved in jelly making in addition to the principle of preservation. Fruit contains a substance known as pectose, one of the carbohydrates, that partially solidifies the fruit juice when the water in the juice is partially evaporated. The addition of sugar helps in this process, but no amount of sugar will set the jelly if the pectose is not present. Some fruits have more than others, and also more when not over-ripe. Currants and firm apples are good jelly makers, and serve as a basis for other fruits that do not jelly well.

Mellow summer apples do not set well. Crab apples are excellent for this purpose.

There is another step in this process, the straining out of the juice from the pulp. For this, prepare a jelly bag from firm cotton cloth which has been boiled and washed. This bag must be hung in such a way that the juice drops from the point of the bag into a bowl below. It may be hung upon a stick between two chairs, or upon the rod of a strong towel rack over a table.

1. **Apple jelly.**

Select tart, red-skinned apples, cut them in small pieces with the skins on, retain the cores, and put them in a kettle with cold water to barely cover. When thoroughly cooked and mashed, put this pulp into the jelly bag, and allow the juice to drip as long as it will. Do not squeeze the bag, nor stir the pulp if you wish clear jelly. This dripping process is a matter of hours, and in the home kitchen may continue all night. Allow a pint of sugar to a pint of juice. Return the juice to the kettle, and allow it to simmer for twenty-five minutes or half an hour, skimming when necessary. In the meantime, heat the sugar, being careful not to melt or burn it. Stir the sugar gently into the juice, and boil five minutes. Test a little upon a saucer. It should show signs of jellying as it cools. Boil longer, if necessary. Finish as directed. Jelly often does not set until twenty-four hours have elapsed.

2. Currant jelly.

The method is the same as with apple jelly. It is not necessary to remove the currants from the stem. Heat just long enough before the straining to make the juices flow well.

Very agreeable flavors are secured by the combining of two or more fruits in a jelly; quince and pineapple with apple;—a leaf of rose geranium or lemon verbena in a glass of apple jelly; raspberry with currant. White apple jelly may be flavored with mint leaves, and used in place of mint sauce with meat.

Pickling.

Pickles are not desirable in the diet. If acid is craved, it is much wiser to secure it by fresh fruits, and by the use of lemon juice.

Drying.

This process should not be discarded if there is a supply of fruit in the orchard or garden. Place thinly sliced apples and peaches upon plates or trays, protect by clean cheesecloth, and dry in the sun. The color may be dark, but the flavor is excellent.

Laboratory management.—The fruit selected for use in the school kitchen depends upon the time of year. The autumn is the season for preserving, but some fruit is available at any time of year: in the winter, apple and peach butter from the dried fruit; in the spring rhubarb jam or jelly; in the late spring or early summer, strawberry jam. If the school program and the equipment permit the serving of meals by the class, fruit may be preserved in the fall for these occasions.

EXERCISES

1. Explain the value of fruit in the diet.

2. Why is cooked fruit sometimes better than raw?

3. Inquire the price of fresh fruit in the market, and compute the cost of a 100-Calorie portion of two of the most common and cheapest.

4. The same with one or two of the dried fruits.

5. What are the important points in the preparation of fresh fruit for the table?

6. What changes are effected in baking an apple?

7. What are the principles of the preservation of food?

8. What is meant by a preservative?

9. What is meant by sterilization?

10. What is mold? Decay? Fermentation?

11. What are the important points in canning?

12. What is the difference between canned fruit and “preserves”?

13. How does jelly making differ from the other processes?

14. What is one of the most important points in cooking dried fruits?

15. Find the cost of a can of peaches at the grocery. Weigh the contents and count the peaches. Compare with the cost of an equal amount of home-canned peaches. What points in the problem must be taken into account?

16. The same problem with jelly bought at the grocery and made at home.

17. Work out the problem of estimating the comparative cost of canned peaches and dried peaches, when calculated to the same food value.

CHAPTER VII

VEGETABLES AND VEGETABLE COOKERY

The distinction between the fruit and the vegetable is purely arbitrary, since both are parts of plants and have the same general composition. Botanically the tomato is as truly a fruit as the apple; but when it is stewed and served with meat, it is classed as a vegetable. Other parts of plants, however, besides the fruit are used as vegetables.

Composition and nutritive value.—Vegetables are much like fruits in composition, being richest usually in carbohydrates and ash, but sometimes containing a large amount of protein. Some have carbohydrates in the form of starch, as the potato, and others in the form of sugar, as the beet; young corn is rich in sugar, old corn in starch. All have more or less cellulose, that in lettuce being very tender, while that in beets is so firm as to be softened only by long cooking. Study carefully Figs. 34 and 35. Notice how the amount of water compares with the amount in fruits. See, too, that beans, both green and dry, are richer in protein than other vegetables. Celery has the highest percentage of water, and is valuable for its ash and the bulk it gives because of the large amount of cellulose.

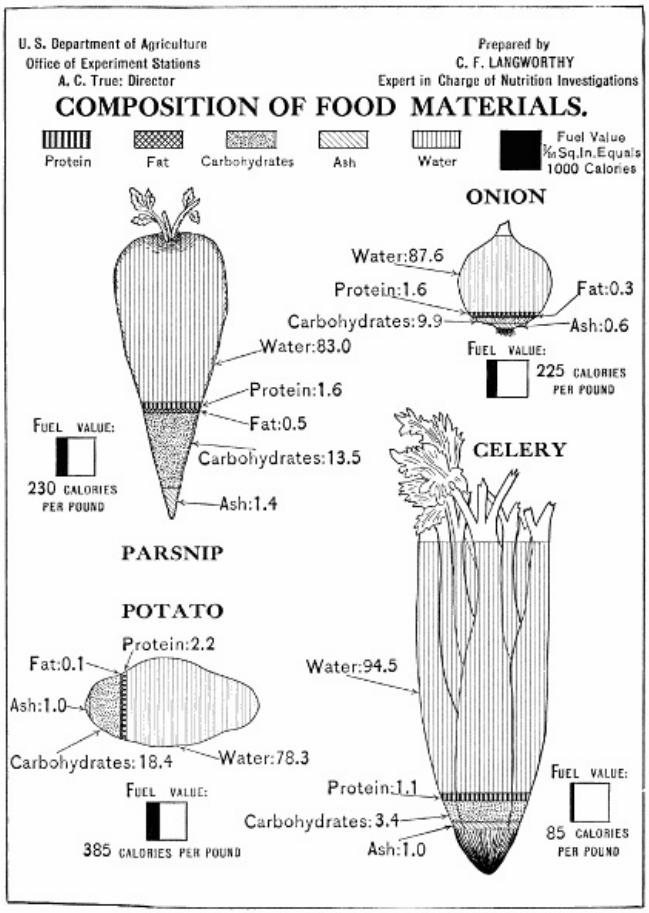

Fig. 34.—Composition of vegetables.

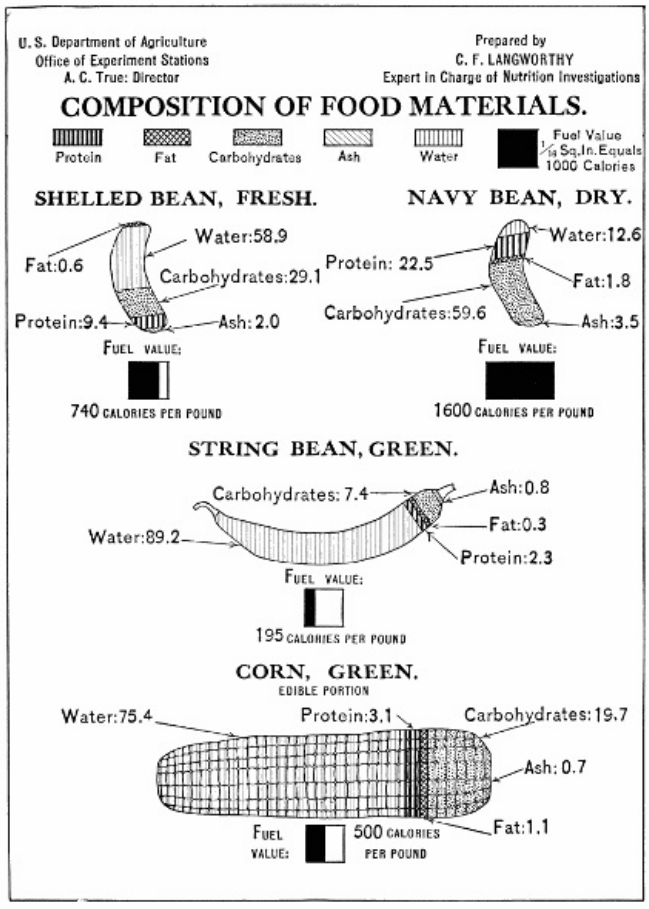

Fig. 35.—Composition of vegetables.

To explain these facts we must understand something of the physiology of the plant. The stem is the carrier of water and nutritive material to other parts of the plant. The onion bulb, the parsnip root, and the potato tuber are the winter storehouses of food for the next year's plant when the leaves first sprout. In the dry bean seed, and also in the pea and lentil, the young plant lies dormant, with a large supply of all the foodstuffs ready for its first growth

when warmth and moisture are supplied in the spring. Classified according to their nutritive value, the vegetables rank as follows. Leaves are grouped with stems.

The seeds	Contain all the foodstuffs. High in protein.
Roots and tubers and the bulb	Contain all the foodstuffs. Low in protein and fat. High in starch or some form of sugar.
Rinds (squash and pumpkin)	Contain all the foodstuffs in small amounts. Mineral content the chief value.
Leaves and stems	Mineral content the chief value.

Certain substances in some vegetables are supposed to have a physiological effect, but we should be cautious in accepting statements that have not been scientifically proved; for instance, that celery is “good for the nerves.” It is doubtless true that the oils which give onions and the cabbage their strong flavors do not agree with some people, and these vegetables should be eaten with caution.

How to buy.—Much interest is added to the study of vegetables by the examination of a seed catalogue easily obtainable from a firm selling seeds and plants. In this way, one may increase one’s knowledge of varieties for planting in the home garden, even if they are not common on the market. City markets offer an increasing variety of vegetables, and the purchaser should not hesitate to buy a vegetable because it is new to her. An inexpensive Italian vegetable, fenucchi, is now sometimes found on sale, and its characteristic flavor is very agreeable.

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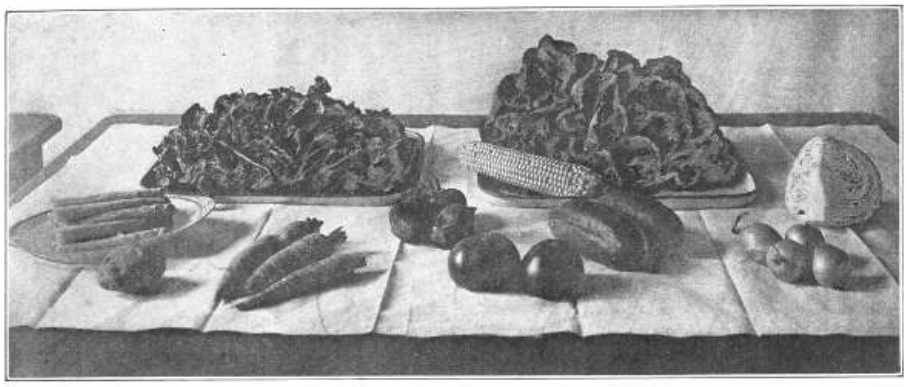

Fig. 36.—100-Calorie portions of vegetables. *A. Fowler, Photographer.*

KIND	WEIGHT OF PORTION, OUNCES
Asparagus	16
Beets	10
Cabbage	13
Carrots	10
Corn	9
Cucumbers	20
Lettuce	22
Onions	8
Potatoes	5
Spinach	15
Tomatoes	15

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The season of vegetables is so extended by canning, by the shipping of vegetables from the South, and by growing under glass that there is always a wide range of choice. There are in winter, however, some tempting delicacies in the way of green vegetables that the buyer with a limited purse should pass by. A cucumber at fifty cents or even at ten cents is not a sensible purchase. Lettuce, grown under glass, at ten cents a head is not an extravagance, if the income allows thirty-five to forty cents per capita per day for food. As a rule, select the less expensive vegetable, provided it is in good condition. The prices are so fluctuating that a definite statement is impossible. (See Chapter XVII.)

Root vegetables should be uniform in size, sound, the skins fair.

Head vegetables should be solid, with but few waste leaves on the outside.

Vegetables with hard rind should be sound and firm.

Asparagus should be even in size, the stalks not bitten by insects.

Cauliflower should be firm and white, not affected by insects or blight.

Celery should be firm and white, free from blemishes, fine in texture.

Peas should have crisp pods well filled, but not too full.

String beans should be crisp and snap easily.

All leaf vegetables should be crisp—not wilted.

GENERAL METHODS AND RECIPES

Uncooked vegetables.—Crisp vegetables with tender fiber are eaten raw. Their preparation includes freshening in cold water, thorough washing to remove grit and insects, thorough drying by shaking in a soft cloth or wire basket, and cooling on the ice. Lettuce should not be served so wet that the water collects on the plate, making it impossible to dress the salad with oil. See salad making, Chapter XV.

Cooked vegetables.—Vegetable cooking is an art much neglected, and in consequence vegetables are sometimes served lacking their proper flavor and their original nutrients. To cook vegetables in boiling salted water, throwing the water away, is not the correct method, except in a few cases. With this method much of the valuable mineral matter and the flavoring substances are lost in the water. With such strong flavored vegetables as the cabbage, old onions and beets, and old potatoes this method is permissible, but even in these cases the nutritive value is decreased.

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Principles of cooking.—Softening of the fiber.

Opening of the starch granules, when starch is present, at a temperature of 212° F. Retaining mineral and flavoring matters.

Cooking processes.—These rank in value as they do or do not retain the mineral and flavoring matters.

Baking.—No nutritive material lost. The best method for potatoes and sweet potatoes. Used also for squash, pumpkin, beets, young onions, dried beans, peas, and lentils.

Steaming. (Cooking in a steamer.)—No nutritive material lost. A good method for all fresh vegetables. Steamed vegetables have less flavor than baked.

Stewing.—Cooking in a stew pan or kettle with so little water that it is almost boiled out at the end of the process, any remaining liquid being served with the vegetable. The best method for spinach, which can be cooked with no additional water, beyond that remaining on the leaves from the washing. The French use this method almost entirely, and with tender peas and carrots they omit water and use butter only. A substitute for this latter is a very small amount of water, with the addition of butterine or some good butter substitute.

Boiling.—Cooking in a large amount of boiling, salted water, the water to be drained off and thrown away. May be used with old beets of rank flavor, strong onions, old potatoes, or potatoes boiled with the skins on. A wasteful method.

Adjuncts.—Salt, pepper, butter, or some other fat, milk, cheese, bread crumbs, parsley, eggs.

Utensils.—A vegetable brush, a sharp knife, a chopper, a potato masher, a strainer, a colander, a stew pan, kettle or steamer, baking pan, baking dish, bean pot, frying pan or kettle.

General directions.—Wash the vegetables, scrubbing the skin vegetables with a brush. Washing in several waters is important with spinach to remove all grit. Scrape off thin skins or pare off the thicker. Thick skins such as those of old beets are more easily removed after cooking. The outer covering must be removed in the case of peas, shell beans, and sweet corn. Pull or cut strings from string beans with great care. Discard all poor portions. Remove and throw away the inner pulp and seeds of old squashes and pumpkins. The whole of a tender summer squash is eatable.

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When boiling salted water is used, allow one tablespoonful of salt to four quarts of water. Steamed and stewed vegetables are salted and dressed with butter or butter substitute before serving. Butter is a better dressing for vegetables than

white sauce. Where cream is available, nothing is so delicious. Use white sauce very sparingly with some escalloped vegetable for variety. Making a sauce adds to the labor of preparation, and the sauce hides the delicious flavor of a well-cooked vegetable. Some vegetables are mashed before serving; potatoes, turnip, squash, either boiled or baked.

Time of cooking.—The following table is a guide, but one must learn from practice, for the time depends upon the quality of the vegetable, whether tender or tough, and upon the size whether large or small. Test by gently inserting a fork.

Allow more time for cooking in a steamer, than for stewing or boiling. It requires more time to bake a potato than to boil one of the same size. Why?

Time-table

(For stewing and boiling unless stated otherwise.)

Fifteen minutes.—Tender cabbage and sweet corn. These are usually cooked too long.

Thirty minutes.—Asparagus; peas; potatoes of medium size; summer squash; tomatoes.

Forty-five minutes.—Young beets and carrots; onions; young parsnips; medium potatoes baked, sweet potatoes boiled.

One hour.—String and shelled beans; cauliflower; oyster plant; winter squash, steamed or baked; young turnips.

Two hours.—Old carrots, beets, and turnips.

Six to eight hours (or more).—Dried beans, lentils, and peas, baked in the oven, with water added.

The potato, a starchy vegetable.—Make it your pride to serve a plain potato, mealy and inviting. Potatoes are “new,” fully ripe, and old. The new potato is in market in July and August, and may be recognized by its very thin skin. The later potatoes have a thicker skin, the color still being fresh. In the spring after its winter storage, the potato is “old.” It seems a little less firm, the color of the exterior is somewhat changed; perhaps the buds in the eyes of the potato are beginning to grow. When cooked it has a stronger flavor, and rather darker color. If the potato has been frozen, a sweet flavor is developed, and the quality is waxy. Potatoes are sometimes inferior in quality when the season is a poor one, or when some potato disease is prevalent. The following classification shows you in how many ways potatoes may be cooked, and also shows you how easy it is to classify recipes in an orderly way.

I. Potatoes cooked whole.

1. Steamed.

a. With skin.

b. Without skin.

2. Boiled.

a. With skin.

b. Without skin.

3. Baked.

a. With skin.

b. Without skin.

II. Potatoes, not whole.

1. From raw potatoes.

a. Sliced and escalloped.

b. Cut in cubes and stewed.

c. Cut in slices or fancy shapes and fried.

2. From cooked potatoes.

a. Mashed.

(*a*) From boiled potatoes, plain or browned on top.

(*b*) From baked potatoes, seasoned and served in shell.

b. Creamed. From either cold-boiled or baked potatoes; the latter are better.

c. Sauté.

(*a*) Sliced and browned.

(*b*) Hashed and browned.

If you know some other method, see if you can fit it into this grouping.

1. Baked potatoes.

Method 1. The best method, for new potatoes. Select those of uniform size. When scrubbed, place them in a shallow pan, or upon the rack of the oven. The oven should be hot, about 450° F. or even a higher temperature. (See oven tests, Chapter IX.) The length of time required depends upon the size of the potato, forty-five minutes being the average time. 118

A potato is largely water. What is the temperature of the interior of the potato during the baking process?

Test by pressing firmly, protecting the fingers by a soft cloth; or insert a fork. When the potato is done, it yields to the pressure of the fingers. If the potatoes cannot be served at once, break the skin that the steam may escape, cover with a cloth, and keep them hot.

For convenience at the table, cut the potatoes in two lengthwise, loosen the content of each half with a fork, sprinkle with salt, and add a bit of butter, as much as one would add at the table.

Potato on the half shell carries serving one step farther. Cut the baked potatoes in two lengthwise, remove the contents, mash lightly, add butter or butterine, milk, and salt, allowing a teaspoonful of butter, a tablespoonful of milk and a shake or two of salt to each potato. These measurements cannot be given with exactness, because potatoes vary in size. Beat this mixture well, replace lightly in each half shell, and brown the tops slightly. This is nothing more than mashed baked potato, prettily served.

Invent other variations of this dish, adding ingredients that are agreeable when mixed with the potato. The beaten white of an egg added, gives greater lightness to the mixture in the potato shell.

Method 2. The same as Method 1, except that the potatoes are pared before baking. A good method when the skins are not fair. A brown crust is formed on the potato, which is crisp and pleasant to eat. Large potatoes may be cut in two before baking, or even sliced.

What difference in length of baking will there be between Methods 1 and 2?

2. Boiled potatoes.

The only way to prevent the loss of nutrients in using this process is to boil the potatoes with the “jackets” on. This is the best way with new potatoes. This method with ripe and old potatoes gives a yellowish color to the surface and indeed throughout. It is a labor-saving method for the busy housewife, as the skin cracks and loosens at the end of the boiling process, and is easily removed. 119

If you choose to have a snow-white potato, it must be pared before boiling, and thus you deliberately waste the valuable mineral matter provided by nature. If your income permits this æsthetic pleasure, the mineral matter can of course be supplied in other vegetables. The woman who can spend but twenty to thirty cents per capita for food per day should boil the potatoes with the skins on and gratify her artistic sense in some other way.

The method of boiling is the same in either case, whether the potato is pared or not.

Have enough boiling water to cover the potatoes. Put the potatoes of uniform size one at a time into the kettle that the boiling may not stop. Allow a gentle boiling to continue until the potatoes are done. Why avoid rapid boiling? Test with a fork at the end of half an hour. When the potatoes are mellow, drain off the water, and set the kettle where the remaining moisture will steam off. Shake gently to hasten this process, and sprinkle the potatoes with salt. If

they must stand before serving will you place a tin cover or a cloth over the kettle? Old potatoes, with a strong flavor, should be pared before boiling, or even soaked in cold water.

3. Mashed potatoes.—Some one devised this convenient method of serving, to save trouble at the table. Mashed potato can be very poor and unappetizing when wet and lumpy. Do not attempt it with new, poor, or old potatoes. See that the boiled potatoes are as dry as can be—every particle of water steamed away. Mash thoroughly with the wire masher, add butter or butterine, salt and milk in about the proportions given for potato in the half shell. Use a tablespoonful or so of cream if it is available. *Beat vigorously.* The mealiness of the potato and the vigorous beating are the secrets of success. The finished product should be light and somewhat moist,—*not wet*. Reheat in the kettle. Pile lightly in a hot dish and serve; or brown the top before serving.

Potato puff. (Soufflé.)—With your knowledge of mashed potato, can you not invent a potato puff?

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4. Escalloped potato.—The name *escalloped* is applied to any baked dish that is arranged in layers. Escalloped potato is a palatable dish and this is one of the most economical of methods.

Wash, pare, and slice the potatoes in $^1/_4$-inch pieces. Slightly grease an earthen or enameled baking dish. Cover the bottom of the dish with a layer of the slices, sprinkle the slices lightly with flour, and put on two teaspoonfuls of butter, or butterine, in small bits. Continue until the dish is nearly full. Pour in milk to barely cover the potatoes, put a cover on the dish and set the dish in an oven of 380° F. Remove the cover in time to allow the top to brown. Allow rather more than half an hour for the baking.

5. Creamed potatoes.—*Method 1*, an *easy way*. Chop cold *baked* potatoes with the chopper. Allow one tablespoonful of butter to 1 pint of chopped potato. Melt the butter in a saucepan. Stir in the potatoes. Shake from the dredger the equivalent of a tablespoonful of flour, stirring the potato with one hand as you shake with the other. Pour in enough milk to barely cover the chopped potato. Set the saucepan in the coolest spot on the range; *or* on the simmering burner of a gas range, upon an asbestos mat; *or* turn all into an earthenware jar, or baking dish, and proceed as with escalloped potato. Allow the mixture to cook until it becomes creamy.

Method 2. Cut the cold potatoes in cubes, and heat in a thin white sauce. See Chapter X.

Boiled potatoes may be used, but baked are better in texture and flavor for creaming.

6. French fried potatoes.—Wash and pare small potatoes, cut in eighths lengthwise, and soak a few minutes in cold water. Take from water, dry between towels, and fry in deep fat. Drain on brown paper and sprinkle with salt.

(1) *Deep fat frying.*—An iron kettle is the best for deep fat, 3 quarts a convenient size. A wire basket is almost necessary for frying soft material.

Fill the kettle $^1/_2$ full of fat and place over fire. When a slight blue smoke or vapor rises from it, it is ready to test. Test with small cubes of bread. If bread browns in 1 minute, the temperature is right for uncooked mixtures. If it browns in 10 seconds, it is right for cooked materials. Care must be taken to keep the temperatures at the right point, for if too cool, the material will soak fat; if too hot, both fat and material to be cooked will burn.

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(2) *To clarify fat.*—Drop several slices raw, pared potato into the fat and let bubble up. Strain all through cheesecloth back into pail from which fat was taken. The potatoes seem to absorb food odors and collect crumbs and leave the fat clear.

7. Stewed celery.—A green vegetable. Stalks of celery, too tough or coarse for serving uncooked, are delicious when stewed. The process is simple. Wash, scrape, and cut the stalks crosswise. Place them in a stewpan, barely cover with hot water, adding a teaspoonful of salt to a pint of celery. Cook gently for half an hour or until the celery is tender. Use the liquid remaining in making a sauce, adding some milk to make the necessary amount of liquid. Three fourths of a cup of sauce is enough for a pint of celery. See Chapter X.

8. Cabbage.—The method given makes cabbage a delicious and attractive vegetable, as delicate as cauliflower, and the odor in the kitchen is not

noticeable.

Select a small cabbage, with the ribs in the leaves not too thick. Prepare the cabbage before washing it by cutting out the stalks from below with a sharp knife. Separate the leaves. Have ready the largest kettle available, nearly full of rapidly boiling water. Drop in one cabbage leaf at a time, pressing each one down with a long-handled spoon or skimmer. Do this so slowly that the water does not stop boiling. Leave the kettle uncovered, and allow the cabbage to cook from 12 to 15 minutes, depending on the thickness of the leaf stalks. Remove the leaves with a long-handled skimmer, putting them into a colander standing on a plate. *Immediately* pour the hot water down the sink drain, turn on the cold water to flush away the odor, and fill the kettle with cold water. While the cabbage is cooking, you have made a pint of white sauce, No. 2 (Ch. X), adding a teaspoonful of salt, and have prepared $^1/_2$ cup of buttered crumbs. Cut the cabbage leaves slightly, place them in a baking dish, pour the white sauce over them, sprinkle the crumbs on the top, and brown the crumbs in the oven or under the gas. If you can, prepare this as a surprise at home, and ask the family to "guess" what it is. If the cabbage is a good one, some of the leaves turn a very pretty green with this method of boiling.

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9. Baked beans.—A nitrogenous vegetable and a meat substitute. A dish known in old days in New England, baked to perfection in the old brick oven. Baked beans seem difficult of digestion for some people. The mustard is supposed to be helpful, and adds something to the flavor. If the molasses is omitted, or but a small amount used, and if butter takes the place of pork or suet, the beans seem more digestible. In different parts of New England the dish is varied. Some people prefer rather dry baked beans, others wish them moist and very sweet.

Utensils.—A kettle. A covered bean pot.

Ingredients.—

1 quart of white beans.

1 teaspoonful of soda.

$^1/_4$ lb. salt pork or more, *or*

4 tablespoonfuls of beef fat or butter substitute.

Molasses, from two tablespoonfuls to $^1/_2$ cup, *or none.*

1 teaspoonful of mustard.

Method.—Wash, and soak the beans in cold water over night. Pour off any water that remains. Put the beans into the kettle, cover with cold water, add the soda, and cook gently until the beans are slightly softened. The soda aids the softening. Pour off the water again, and put the beans into the pot. Mix the molasses and mustard with a pint of water, and pour this over the beans, adding more water if the beans are not covered. Place the pork or other fat upon the beans, and cover the pot. If fat other than pork is used, salt must be added to the beans. The beans should bake slowly, for from 6 to 8 hours, and even longer in a very slow oven. A stove of the type shown in Fig. 17 is good for this purpose. They can be baked in the ordinary gas oven, if only one burner is used, and that is turned very low.

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Laboratory management.—The last experiment is the only one not easily performed in the school kitchen. The process, can begin perhaps on one day, and be finished the next. If there is some apparatus that cooks at a low temperature, the practical difficulties may be overcome.

Vegetable, or "cream" soups.

These are of two classes: the purées (porridge), or thick soups, with vegetable pulp as the thickening material, and the cream soups, which are somewhat thinner, the juices of some vegetable giving the flavor.

Potato purée, or soup, is an example of the first; cream of tomato of the second. The line is not sharply drawn between the two in many cook books. Milk is an important ingredient in these soups, so that they are sometimes known as milk soups. Butter and flour are used in both,—the flour in the purée "binds" the mixture and makes it smoother; in the cream soup the flour is used for thickening as well.

Dried beans, peas, or lentils make a delicious purée, the secret of success being long slow cooking in some low temperature apparatus. They are brought to

perfection in the Atkinson Cooker.

10. Potato Pureé.

Ingredients.

Potato 1 cup
Milk 1 quart
Flour 1 tablespoonful
Butter 1 tablespoonful
Salt 2 teaspoonfuls
Celery stalks, cut small 1 teaspoonful
Onion, chopped 1 tablespoonful
Pepper, Cayenne To taste.

Remarks.—If a thicker purée is desired, use more of the mashed potato. If celery salt is used, omit one teaspoonful of the salt. Less onion may be used, and the pepper omitted.

Utensils.—Make the list yourself, after reading the directions for mixing.

Method of mixing.—Boil and mash the potato, or use cold mashed potato. Heat the milk in the double boiler with the celery and onion. Add the milk gradually to the mashed potato, beating vigorously.

Put this mixture through a strainer into the double boiler, and reheat it. Melt the butter in a small saucepan, or stir in the flour, add *slowly* half a cup of the soup to the butter and flour paste, and then pour this slowly into the mixture in the double boiler, stirring all the time. The soup will be ready to serve in about ten minutes. 124

The *important point* in this recipe is the quality of the mashed potato. It should be dry and light. It may be made from hot, mealy baked potatoes. If cold mashed potato is used, this should be made light again with a fork. An excellent luncheon dish. Will serve four to six people.

11. Cream of tomato soup.

Ingredients.

Tomato juice $^1/_2$ cup
Milk 1 quart
Flour 2 tablespoonfuls
Butter 2 tablespoonfuls
Salt 2 teaspoonfuls
Bicarbonate of soda $^1/_2$ teaspoonful
Pepper, Cayenne To taste.

Remarks.—Celery and onion may be added, but are not necessary. When you become expert, you will be able to use a larger amount of tomato juice, and even omit the soda.

Method of mixing.—This you will be able to work out for yourself. First perform this simple experiment. Stir together a tablespoonful of stewed tomato and a tablespoonful of milk. What happens? Heat this mixture. What further do you notice? How may you best extract the juice from the tomato? You have noticed the effect of the acid tomato upon the milk. The soda is added to partly counteract this effect. Will you stir the soda into the tomato juice or into the milk? Will you stir the tomato juice into the milk, or the milk into the tomato juice? Will you cook the mixture at all? How long before serving will you mix the two? When will you add the butter and flour?

Laboratory management.—An individual portion of soup may be made with $^1/_2$ cup of liquid, but it is better to allow 1 cup when possible to each pupil, or two pupils may work together.

The important point in this soup is to prevent the curdling, so you safeguard the milk at each step. 125

Croutons may be served with any of these soups.

12. Chili sauce.

Ingredients.

Tomatoes 12, medium sized and ripe
Green pepper 1, finely chopped

Vinegar 2 cups
Sugar 3 tablespoonfuls
Salt 1 tablespoonful
Clove 2 teaspoonfuls
Cinnamon 2 teaspoonfuls
Allspice 2 teaspoonfuls
Nutmeg 2 teaspoonfuls grated

Method.—Peel tomatoes and slice into a preserving kettle. Add other ingredients and heat to the boiling point. Cook slowly two and one half hours. Pour into preserve jars and seal.

EXERCISES

1. What is the distinction between fruits and vegetables?

2. How does the composition of apples compare with that of carrots?

3. Contrast the nutritive values of celery, potatoes, and old beans.

4. What other foods must be served with potato to make a meal complete?

5. How may we best retain the mineral matter of vegetables in cooking?

6. Is it allowable to cook a vegetable in boiling water and throw away the water?

7. Why must more time be allowed for baking a potato than for boiling?

8. Why more time for an old beet than for a young?

9. Find the cost of potatoes in your locality. Estimate the cost of a dish of mashed potato for five people.

10. Estimate the cost of 100-Calorie portions of several vegetables. See Fig. 36.

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CHAPTER VIII

CEREAL PRODUCTS

The common grains, sometimes called cereals,[11] yield some of the most important of all the food materials. Those most widely used are wheat, maize, or Indian corn, oats, rice, barley, rye, and millet. In this country wheat and corn are the two great crops upon which our prosperity largely depends, and a shortage in one of these crops is felt in the business world, not only in this country, but abroad. Rice is the important cereal in China, Japan, and India, and a failure of the rice crop may mean famine to millions of people, especially in India. These facts are mentioned to show that the race has learned to depend upon the grains as a staple food, and a study of their composition proves that this common habit is founded in reason. The grains are all members of the grass family, and the edible portion is the seed. From these seeds are manufactured pure starch, breakfast cereals, meal, and flour. Like beans and peas, these seeds are the storehouses of food for the young plants, and we therefore find the high nutritive value depicted in Fig. 37. Notice that the carbohydrate (starch) content is high in all; that all contain protein, oats, wheat, and rye being about equal in this and higher than the others; oats are highest in fat, corn ranking next. The ash contains the same important mineral substances that we found in the fruits, the percentages of each differing somewhat with the different grains and being quite different for the cereals as a class than for the fruits and vegetables as a class. It must be remembered that these percentages are given for the whole grain, and that the amounts of the nutrients in the manufactured product depend upon the process employed.

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Manufacture of cereal food materials.[12]—The primitive method of making the material in the grain available for use was by grinding the grain between two stones, or by pounding one stone upon another, and this method is used by the Mexicans and certain of

the American Indians to this day, human muscle being the power employed. Wind and water were harnessed for grinding grain, and were the only motive powers available until the invention of steam, the grinding being done by stones. In a Connecticut town there still exists a mill stone, one of a pair so small that they were carried into the settlement on horseback, and when placed in a small mill by a brook, they ground a bushel of corn in a day.

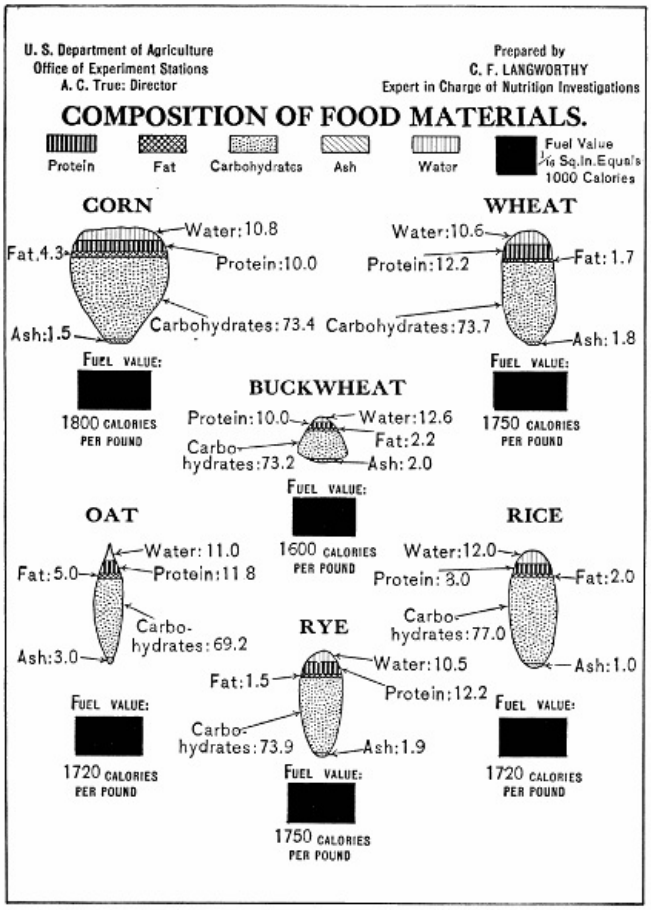

Fig. 37.—Composition of cereals.

Breakfast cereals and meal are now made in the great factories that produce flour; steam is the motive power and the grains are broken, or rolled, between steel rollers. (See Chapter XII.)

Breakfast cereals.—The ready-to-eat breakfast cereal has met the popular demand for a quickly prepared food for the first meal of the day. A few of these are made under known conditions, but they are sometimes manufactured from inferior grain, and the presence of grit at times indicates a possible lack of cleanliness in the process. It is a question, too, whether or not the starch has been subjected to heat for a sufficient length of time, and whether they can be masticated sufficiently to make the grain digestible, and the nutritive material available. Their use for young children is undesirable. For older people, they add variety to the diet, but they are usually more expensive than the home-cooked breakfast foods, even when the cost of fuel is taken into account. See Fig. 38.

Cooked breakfast cereals.—It is an easy task to cook a cereal, especially now that the fireless cooker in some form is present in so many homes. The cereal for breakfast does not necessitate early rising; as it may be prepared the day or evening before and be served in palatable form in the morning.

The most common breakfast cereals are made from oats, wheat, and corn, varying in fineness of grain from those ground like a meal to the coarser cracked wheat and the samp made from corn. It is well to use kinds made from different grains, but when the worth of a few has been proved, it is not wise to try another kind simply because it has a new label. One manufacturer confessed to a visitor that the same cereal was put into boxes of different colors and sold under different names as a means of inviting purchasers. The cereal foods made from whole grains are especially valuable on account of the high mineral content.

It usually pays to buy in boxes, rather than in bulk, in the case of cereals; and always from a reliable grocer. If you purchase a box of cereal as a “bargain,” weigh its contents and compare the weight with the weight of a box bought in the regular way. Also examine such a box for the presence of insects. These may be recognized sometimes by a webby substance,

and again the insects themselves may be detected. Do not buy too large a stock of cereals, since they are better when they are fresh from the factory, and a good firm renews its stock often.

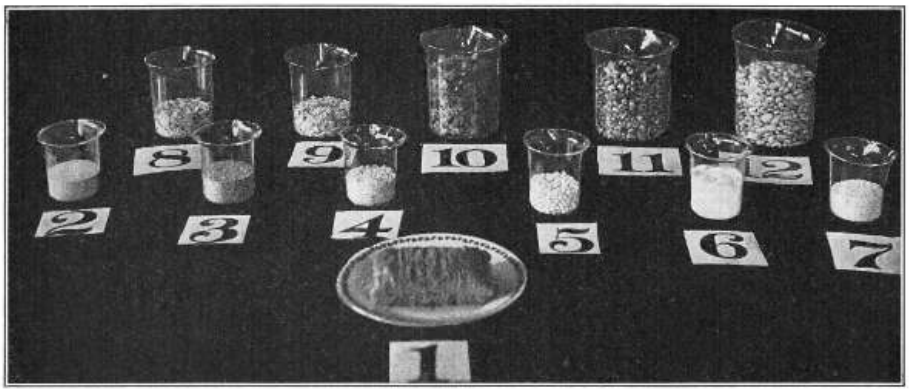

Fig. 38.—100-Calorie portions of starches and cereals. *A. Fowler, Photographer.*

No.	Kind	Weight of Portion Ounces
1.	Shredded Wheat	1.0
2.	Cornmeal	1.0
3.	Farina	1.0
4.	Rice	1.0
5.	Tapioca	1.0
6.	Cornstarch	1.0
7.	Hominy Grits	1.0
8.	Rolled Oats	1.0
9.	Flaked Wheat	1.0
10.	Corn Flakes	1.0
11.	Puffed Wheat	1.0
12.	Puffed Rice	1.0

GENERAL METHODS AND RECIPES

Principles of cooking.—1. Softening of the fiber by long-continued low temperature with a supply of water present.

2. Complete opening of the starch granules by the boiling temperature of water.

3. The protein present presents no special problem. Its digestibility is not especially affected, but the softening of the fiber of the cereal makes the protein available to us.

Methods.—There are two classes into which the cereals may be divided,—the flaked and the granular. The weighing experiments (page 62) show that the granular is the heavier. This means that more water will be absorbed by a given measure of the granular, because it contains more material.

In experimenting with a cereal at home it is well to try the proportion of water and cereal printed on the box the first time, altering the proportion if the first result is not satisfactory. There should be enough water to soften the cereal, and *only* just enough. If the cooked cereal is stiff, the measure of water is short; if so thin that the cereal runs on the plate, too much water was allowed.

1. Preparation of breakfast cereal.

Ingredients.

1 part, by measure, flaked cereal to 2 of water.
1 part granular cereal to 3 to 4 of water.
1 cup of dry cereal will serve three or four people.
Samp, cracked wheat, and coarse corn meal will take from 4 to 6 parts of water.

Salt. A tablespoonful to a quart of water is an average amount.

Utensils: a measuring cup; a double boiler; a fork.

Method.—Measure the cereal and water, put the water into the inner part of the double boiler with the salt. Have the lower part of the boiler ready—about half full of hot water; place the inner boiler directly upon the stove or over the flame. When the water is boiling rapidly, shake the cereal into the water from a cup, *so slowly that the water does not stop boiling*. This is the first secret of a well-cooked cereal. The rapidly boiling water keeps the grains of cereal in motion, and thus they do not stick to the vessel nor to each other, and the heat reaches the starch in the grains equally. If the grains begin to settle, shake the vessel gently, but do not stir, even with a fork. Allow this process to continue for about five minutes, or until you see a thickening of the mass, so much so that the separate grains do not settle. If toward the end of this stage there is danger of sticking, *lift* the mass with the fork, but do not stir it, as this motion will break the grains. This first process opens the starch grains. Place the inner part of the boiler in the outer over boiling water and allow the cooking to continue for *at least* one hour. For this is the second secret of the perfect cereal,—a long-continued process that softens the fiber and develops flavor. One cereal, advertised as being cooked in three minutes, remains unpalatable after that length of time, but is delicious at the end of two hours. If you have a fireless cooker, put the cereal in the double boiler into the cooker overnight for the second stage. Any low temperature apparatus gives the desired result.

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2. The uses of cold cereal.—Never throw away cooked cereals. The cold cereal is useful in many ways.

(*a*) Mold in small cups with dates or other fruit, and serve with sugar and cream for luncheon.

(*b*) Cool corn meal mush in a flat dish, cut it in slices when cold, and brown the slices in a frying pan, with beef fat, or a butter substitute. Serve with sugar, molasses, or sirup for breakfast or luncheon.

(*c*) Rice or hominy may be mixed with a beaten egg, molded into small cakes, and browned either in the frying pan, or in the oven.

(*d*) A small remaining portion of any cereal may be used to thicken soup.

(*e*) Any cooked cereal may be used in muffins or even yeast bread. (See those chapters.)

3. Corn meal "mush."—This is cooked by the same method as the other cereals, except that the amount of water is larger and the first boiling should continue longer. The meal must be scattered slowly into the boiling water, or else be mixed first with cold water, as it lumps very easily. The second stage of the process should continue several hours.

Rice.—Rice varies very much in quality and in the shape of the grain. Louisiana and Chinese rice are among those that have a firm and large grain keeping its shape well when cooked. Inferior varieties become too soft, and the finished product is pasty and poor in color and flavor. Much is said at present about the harmful effect of the polishing process upon the quality of the rice. An unpolished rice may sometimes be found on the market, brownish in color and with a good flavor.

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4. Boiled rice.—Rice may be cooked in the double boiler by the same method as other cereals, allowing 1 part of rice to 3 of water. The rice should be well washed in cold water.

The second stage need not be continued so long, from three quarters of an hour to an hour being sufficient. The flavor is improved by the use of milk in place of half of the water. By this method the nutritive value is much increased.

Another method used by the Chinese continues the boiling throughout the whole process. A very large amount of water is used, several quarts for one cup of rice, and when the water is boiling violently the rice is scattered in very slowly. The boiling continues from twenty minutes to half an hour, or until the grains are tender, and then the water is drained off, through a colander. The rice in the colander should then be placed where the remaining moisture will steam off. By this method nutrients are lost, but the grains of the rice stand out distinctly and are light and dry. It is a difficult method for the novice, because its success depends upon the removal of the rice from the water just at the moment it is tender, but not too soft. The grains should be tested in twenty minutes.

Corn products.—Corn being our most abundant grain, it is the cheapest, and we should promote its use. Hominy and samp and Indian meal, when well cooked, are all most palatable. There is a difference between old and new process corn meal, to be noticed in the flavor and in the behavior of the two kinds in cooking. The new process meal now more largely on the market has been deprived of the germ, which contains a large amount of oil, and although the meal does not deteriorate so soon, there is some loss of flavor. Moreover, when the new process meal is used in an old-time recipe, more wetting must be used than the recipe calls for and a larger amount of fat.

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The old process of grinding between stones is still employed in some localities. Southern and Rhode Island corn meal are ground in this way, and may be found at some groceries. There are also two colors, the yellow and the white, each with a distinctive flavor, and some people who think they dislike corn meal find the white meal agreeable.

Pure starches.—These occur as food materials in several forms. Cornstarch is the starchy portion only removed from the grain of corn. Wheat starch is more largely used for laundry purposes than for food. Rice flour may be treated as starch in cooking. Arrowroot is a fine starch from the roots of a family of plants growing in the West Indies and other warm climates. It is used principally in cooking for invalids. Cassava, manioca, tapioca, and sago are starchy materials in granular form. The first three are made from the pith of the cassava plant, the sago from the sago palm. The pure starches are all easily digested and inexpensive. Corn starch is the most abundant and cheapest pure starch in this country.

The starch granule.—To understand the behavior of materials like cornstarch, rice flour, and arrowroot in cooking, we need to know more of the starch grain. Cornstarch is composed of myriads of tiny granules somewhat like those pictured in Fig. 39, but smaller. The starch granules of different plants differ in size and even in shape, but they all have a covering lying in folds, the pure starch being within. The granule unfolds or bursts when exposed to heat. When these granules are floating in water, and, being heated, open at the same moment, the starch paste is smooth; otherwise, the starch lumps.

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A. Starch experiments.

Starch turns a characteristic blue color in the presence of iodine. This is an unfailing starch test, but must be used in the cold.

1. Grate a piece of potato into a small amount of water, and strain out the pulp. The starch settles from the water in a few minutes. Pour off the water, and add a drop of diluted iodine to the remaining starch. If a microscope is available, dilute this mixture and with a dropper tube place a drop upon a slide. The potato starch granules are comparatively large and easy to see through the microscope.

2. Drop a teaspoonful of dry starch into boiling water.

3. Mix a teaspoonful of starch with a small quantity of cold water, and stir this into boiling water.

4. Mix a teaspoonful of starch with ¼ cup of cold water, and bring the water to the boiling point, stirring the mixture as it heats.

Why are 3 and 4 similar in result, and different from 2?

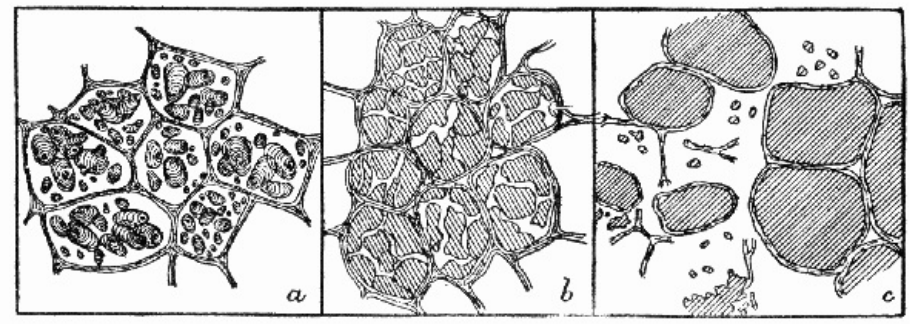

Fig. 39.—Changes of starch cells in cooking: *a*, cells of a raw potato with starch grains in natural condition; *b*, cells of a partially cooked potato; *c*, cells of a thoroughly boiled potato. *Farmers' Bulletin No. 295, U. S. Dept. Agriculture.*

Desserts from the starches.—Cornstarch, in particular, is often disliked, because it is undercooked, and too large a proportion is used. It may be made very palatable, and is too valuable in cooking and too inexpensive to be discarded.

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5. Chocolate cornstarch.

Milk	1 pint
Cornstarch	3 tablespoonfuls, *level*
Cocoa (Baker's)	3 tablespoonfuls, *level*
Sugar	$\frac{1}{2}$ cup
Salt	$\frac{1}{4}$ teaspoonful
Vanilla	1 teaspoonful

What utensils? You should be able to plan the method of mixing. The milk must be heated in a double boiler. Which method of mixing in the cornstarch will you use? How can you best add the cocoa, sugar, and salt? The vanilla?

It is difficult to boil milk directly over the fire or flame, without scorching it. Since the starch cannot well be exposed to the boiling temperature in this case, the process must continue in the double boiler until the mixture has thickened well, for at least half an hour, three quarters being better. When the cooking is finished, pour the mixture into molds which have been wet in cold water. When the mixture is cooled, chill it in the refrigerator. Serve with cream or milk and sugar for those who may want it sweeter. This gives a soft mold, that is much more palatable than one so stiff, that it has a firm shape. This will serve four or five people.

6. Tapioca and sago.—These materials make delicious desserts with fruit. They are also used with eggs and milk. (See Chapter XV.)

Laboratory management.—The undivided portion of cereal may be $\frac{1}{4}$ cup. Cornstarch may be made with $\frac{1}{2}$ cup of liquid.

Macaroni, *spaghetti*, and *vermicelli* are valuable cereal products made from flour, this form of cereal food having originated in Italy. The Italians manufacture the paste in a large variety of forms, and some of the small fancy shapes are also used in soup. The composition of macaroni is shown in Fig. 51. It is a valuable material, and when served or cooked with cheese may well be the main dish of a home luncheon.

7. Boiled macaroni.

Ingredients.

Macaroni	$\frac{3}{4}$ cup, broken in inch pieces
Boiling water	2 quarts
Salt	1 tablespoonful
Cream	$\frac{1}{2}$ cup

Method.—Cook macaroni in boiling salted water twenty minutes or until soft, drain in a strainer, pour cold water over it to remove stickiness. Add cream and reheat. A thin white sauce may be used in place of the cream.

8. Macaroni baked with cheese.—Cover the bottom of a baking dish with plain boiled macaroni. Sprinkle with grated cheese. Add another layer of macaroni and another of cheese. Repeat until the dish is full. Pour a thin sauce over this, almost filling the dish. Cover with buttered crumbs and bake in hot oven until crumbs are brown. Some prefer to omit the crumbs and have a thick layer of the cheese on top which becomes crisp and brown. Boiled macaroni and spaghetti may be served with tomato sauce and a little grated cheese. This is called “Italian style.”

EXERCISES

1. For what reasons are the cereal products so valuable?

2. Compare the composition of the different grains.

3. What changes are effected in the proper cookery of cereals?

4. What are the important points in practice?

5. What are the advantages of a good “ready to serve” breakfast cereal?

6. Ascertain the cost of a box of puffed cereal and an uncooked cereal of the same size. Weigh the contents of the two.

7. Estimate the cost of each one served to a family of six.

8. What is the cost of a 100-Calorie portion?

9. What is the advantage of serving dry toast with a cereal?

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CHAPTER IX

EGGS, MILK, AND CHEESE

Eggs are a specially interesting food because they contain all the elements necessary to the development of the young chick within the shell. The structure of the egg is familiar, with its division into the yolk and white, and it is interesting to note the details of this structure.

Break a fresh egg carefully into a saucer. The shell is porous, allowing water to evaporate from the egg and air to enter. To this porosity is due the fact that other substances may enter the egg, giving it an unnatural flavor and even hastening its deterioration. Within the shell is a fine membrane which protects the white. The yolk is also divided from the white by a more delicate membrane which enables one to separate the yolk from the white of a fresh egg. A careful examination reveals at each end of the yolk a continuation of this membrane in the form of small cords which are fastened at each end of the shell, holding the yolk evenly suspended in the center of the shell. Rough handling or jolting breaks this membrane, and the yolk drops to one side.

Lift the white carefully with a fork, and notice its elasticity. This cohesive property makes it possible to beat air into the white until the whole mass become porous. The yolk is creamy rather than light when beaten, and a bit of the yolk mixed with the white prevents the latter from becoming light and dry.

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Composition of the egg.—Figure 40 gives the composition of the yolk and white taken together, and of the yolk and white separated. The protein content is high, and the fat content as well, the yolk containing a higher percentage of these two foodstuffs than the white. The mineral matter is of high value, iron and phosphorus being found in ideal forms in the yolk. In using the egg as food we are availing ourselves of one of nature’s richest storehouses. A single egg of average size yields about 75 calories, of which 60 come from the yolk and 15 from the white. A *very* large egg, weighing two and two thirds ounces, will yield 100 calories.

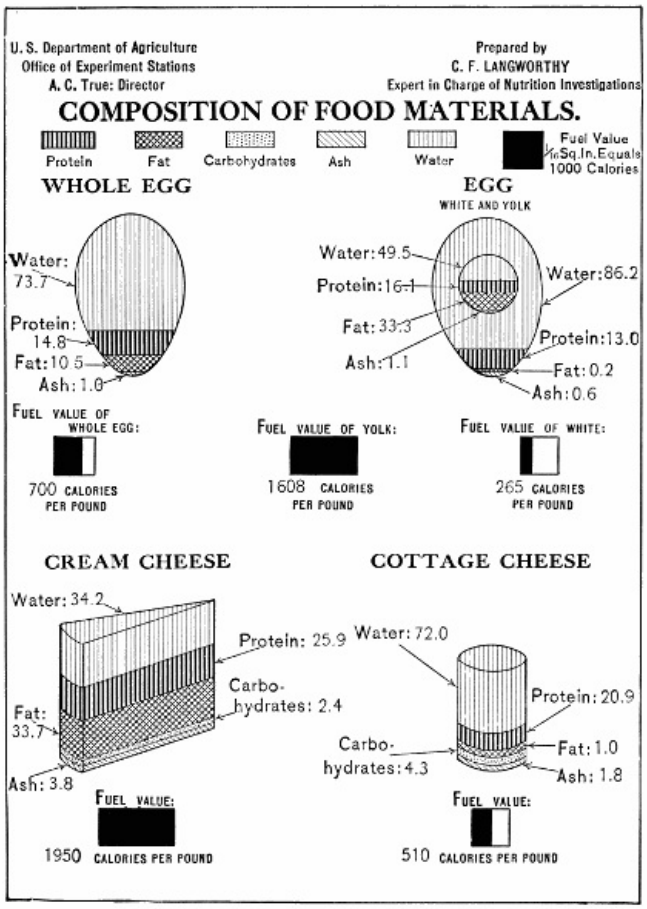

Fig. 40.—Composition of eggs and cheese.

Fresh eggs and cold storage eggs.—The fresh-laid egg is always desired for its delicious flavor, and this flavor changes but little in a week or two if the egg is kept cool. It is desirable to preserve eggs, however, for future use at the season when they are most abundant and cheap. Many methods have been tried, such as laying them away in sawdust, sinking them in water-glass solution, or coating the shell with paraffin or some other substance to prevent evaporation and the entrance of air. The introduction of cold storage on a large scale promises a solution of the problem. If eggs are fresh when placed in storage, it is possible to keep them just above the freezing temperature for months without appreciable deterioration.

Eggs too long in storage may be detected by the musty odor and flavor, the running of the yolk into the white, and the thin quality of the white which prevents beating stiff. Some states have already passed stringent laws in regard to the sale of cold storage eggs.

The cost of eggs and how to buy.—The demand for fresh eggs is great, and so many eggs are exported, that the price is high, even in the summer. Twenty-five cents a dozen is a reasonable price, but this is below the average at the present date. The thirty-five or forty-cent daily allowance for food will permit the moderate use of eggs at thirty-five cents a dozen, but not a liberal use in cakes and desserts. They should be used at such a price and with that allowance as the main dish for breakfast or luncheon at times, and not in sweet dishes calling for three or four eggs. If a recipe for soft custard calls for three eggs to a pint of milk, leave out one egg or even two, and use one or two tablespoonfuls of cornstarch instead. Select eggs with a hard shell, and yolk of rich yellow. If the shell is soft and the yolk pale, these deficiencies should be reported, as they can be corrected by the poultryman. The difference in color of the shells, whether white or brown, is not of great consequence. If you can buy eggs by the crate direct from the poultryman, this is a saving, provided the eggs can be used before they deteriorate. A small crate holds fifteen dozen; the usual size thirty dozen. Some express companies have a special rate for eggs, and parcel post should aid in this method of buying.

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Relative digestibility of soft and hard-cooked eggs.—The fact must be recalled that to digest is to dissolve, and that the digestion of food means a dissolving by the digestive juices, aided by water. When we speak of the digestibility of food we may mean the ease and comfort of digestion, or the length of time taken by the process, or the completeness of the process. If we take the third of these meanings, hard-cooked egg is as digestible as the soft-cooked or the raw egg, because it is completely dissolved in digestion in the course of time. If the second meaning of digestion is taken, the hard-cooked egg may be slightly less digestible, for a slightly longer time is consumed in the process. The latest researches, however, show that the digestive process is longer with any food than was formerly

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supposed, and the difference in this case is not especially important. Indeed, we must accept the conclusions of the scientist and frankly admit that the differences of temperature in cooking of egg do not have any great effect upon its digestibility.

Why then the popular idea that a hard-boiled egg is “absolutely indigestible”? A hard-boiled egg, or more than one, eaten rapidly, without mastication, at a picnic, and with much sweet food at an unusual hour, may interfere with the “ease and comfort in digestion” resulting from such a meal. But if the whites of the hard-boiled eggs are chopped fine, the yolk mashed, and the two served upon toast, thus insuring mastication, a dish is produced that is of average digestibility and that may be used for breakfast or luncheon without hesitation.

If a tender, jellylike consistency is wanted, cook the egg below the boiling point of water. If, however, a firmer egg is preferred, use the old-time method, and cook the egg three or four minutes in boiling water. It is the easier and quicker method.

Moreover, do not hesitate to use an egg “boiled” half an hour, provided it is chopped fine or sliced.

GENERAL METHODS AND RECIPES

1. Eggs used raw.—An egg, swallowed whole, followed by a cracker, is a “quick lunch” that is not harmful, and it is sometimes convenient to be able to take an egg in this way. A sprinkling of salt upon it makes it more agreeable.

2. Beaten eggs.—Beat the yolk and white separately. Add to the yolk a teaspoonful of sugar, a shake of salt, some flavoring, and $^{3}/_{4}$ of a cup of milk. Beat the white gently into this mixture and serve in a glass. The flavoring may be a quarter of a teaspoonful of vanilla, or a tablespoonful of orange juice. This is sometimes served to an invalid who can take milk, and is an agreeable luncheon for any one. If milk does not agree with one, a larger amount of fruit juice may be used with the addition of some water, possibly carbonated. The white alone is given in cases of severe illness, mixed with a small amount of water, and fruit juice if the physician permits the latter. This is sometimes the only food that can be retained by an invalid.

Principles of egg cookery.—Protein in the form of an egg-albumin is the foodstuff to consider in the cooking of eggs. Heat produces in the egg a change in color and in texture or firmness, the firmness or hardness depending upon the degree of heat and the length of time given to the cooking. Coagulation is the term used for this change in the egg-albumin.

1. The white of egg begins to coagulate and to show an opaque white at about 180° F.

2. A temperature somewhat below the boiling point of water for about ten minutes will give the white a jellylike, tender consistency, and slightly cook the yolk. Continued for an hour, the white becomes solid and adheres to the shell.

3. The boiling point of water gives a firmer consistency than a temperature below this point. The white is free from the shell.

4. A high temperature, that of a hot pan, will produce a leathery consistency if long continued.

A. An experiment with the egg.

Apparatus and materials.—A ring stand, wire net, Bunsen burner, glass beaker, test tube, chemical thermometer, white of egg.

Method.—Put the beaker two thirds full of water on the wire net over the flame. Put enough white of egg into the test tube to cover the bulb of the thermometer when this is put into the tube. Clamp the test tube so that it rests in the water in the beaker. The surface of the water should stand above the top of the white of egg. Clamp the thermometer so that it is held in the white of egg in the test tube. The white should be stirred with a fork before it is put into the test tube, and only a small quantity used.

Note:

1. The temperature when the first visible change occurs.

2. The temperature when the whole mass becomes of a jellylike consistency.

3. The temperature when the water reaches the boiling point. Remove; note the consistency.

3. Jellied or coddled eggs.—See that the shells are whole and clean. If the eggs are just taken from the refrigerator, lay them in warm water a few minutes. Make ready a double boiler, the lower part half full of boiling water. Put the required number of eggs into the inner boiler, cover with water that has just stopped boiling, put on the boiler cover, and stand the boiler where the water below will no longer boil. The eggs will be done in from six to eight minutes. 144

Having performed the preceding experiment, you should be able to invent another way of accomplishing this result.

4. Boiled eggs.

Put one egg at a time from a tablespoon into boiling water. Allow the water to boil for three or four minutes, depending upon the preference of those served. Remove the eggs, and serve at once.

The *hard-boiled egg* should remain in the boiling water half an hour.

Bearing in mind the fact that hard-boiled eggs must be chopped or sliced, cannot you invent a way of using them in a luncheon dish?

5. Poached eggs.—Make ready a frying pan by setting muffin rings in it, and filling it about half full of gently simmering water, with a teaspoonful of salt dissolved in it. Break the eggs one at a time into a saucer, and slip each egg carefully into a muffin ring. See that the pan stands where the water is just below the boiling point, for rapidly bubbling water breaks the eggs. When the white begins to set, pour the hot water gently over the tops of the eggs from a spoon. Cook until the white is firm. Slip a griddle cake turner under the egg, lift it gently, and place it upon a piece of buttered toast which you have ready on a hot plate, or platter, and remove the ring.

An easier method resembling the poached egg is to break the egg raw into a small buttered cup or “patty,” standing the cups in a pan of water just below the boiling point, the pan being on the top of the stove or in the oven. Each egg should have a sprinkling of salt, and may have a bit of butter, and a shake of pepper. Cover the pan. This process is longer than the other, and the eggs must be watched to see when the process is complete.

6. Scrambled eggs.

As the name denotes, this is a process needing a quick motion. Allow an egg to each person. Have ready a frying pan heated, a broad bladed knife, and a tablespoonful of butter, or butter substitute, ready to melt in the pan. 145

(1) Melt the butter, break the eggs into the pan, without beating them, and begin to scrape them from the bottom of the pan with the knife, as fast as you can move your hand. This is an old-time method, and gives a mixture of white and yellow color. Stop the process when the eggs are softer than you wish them for serving, as they will stiffen after they are removed from the fire. Sprinkle in salt, before you give the last scramble, and serve at once.

(2) Beat the eggs, adding a tablespoonful of water for each egg, and a shake of salt for each, and proceed as in (1).

7. The omelet.

The novice should see an omelet made, as there is a “knack” in the motion not to be conveyed by words. The omelet is a French dish, and is made to perfection by the French cook. A perfect omelet is rolled or folded over, and is creamy within and a golden brown without. “Omelet pans” are made for the purpose, but a small frying pan may be used. The pan should be perfectly smooth. Do not attempt to make an omelet with more than two eggs until you become expert. This is one method, and others are used by different French cooks. The first stage makes the whole mass creamy, the second browns one surface.

(1) Have the pan *warm* enough to melt two teaspoonfuls of butter, but not hot. Beat two eggs with a fork until they are creamy but not foamy, and add two teaspoonfuls of water, with two shakes of salt.

Put the mixture into the pan, standing the pan where it has a medium heat. If over gas, the flame should be low, and covered with asbestos. Proceed as with the scrambled egg, with great rapidity, and when the mass is creamy, lift the pan, tip it slightly, and push the whole mass toward the handle end of the

pan. Put two teaspoonfuls more of butter in the pan, and set it where the heat is intense. Smooth the mass of egg over the whole surface of the pan that the omelet may become brown underneath. Shake the pan gently back and forth, lift the omelet at the edge with a knife to see if the browning is accomplished, take the pan from the fire, fold or roll the omelet from the handle end of the pan to the front, and turn it out upon a hot plate.

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A method easier for the novice is to accomplish the first stage in a bowl set into a teakettle, beating into the mass as it thickens a teaspoonful of butter, or a tablespoonful of cream. When the mixture is evenly creamy, turn it into the hot buttered pan and proceed as with (1).

(2) *Light omelet.*—This is not a true omelet, but in reality a soufflé cooked in a frying pan. It is somewhat insipid in flavor and is not easier to make *well* than the French omelet. As commonly served it is apt to be underdone or tough.

With the light omelet, the eggs and whites are separated and the whites beaten until light and dry. Beat the yolks until creamy, adding water and salt as in (1). Pour this mixture over the white, and cut and fold the mass. See page 63. Pour this into a buttered baking dish and set in a *moderate* oven. The oven should not be more than 300° F. Serve in the pan.

When gas is used, the soufflé may be set in the oven with the flame low, and browned for a moment under the flame turned high.

Both of these omelets may be varied by the addition of chopped parsley or chopped ham, or grated cheese.

Laboratory management. When the price of eggs is high, some of the experiments can be demonstrated by the teacher. Eggs should be used when the price is at its lowest, even if this interferes with the logical sequence of lessons.

MILK AND MILK PRODUCTS

Milk is the natural food of the young mammal, and contains all the foodstuffs in a form easily assimilable. Starch is not present, the carbohydrate being found in the form of lactose, or milk sugar, a sugar differing somewhat from the sugars found in vegetables and fruit (see Chapter X).

Whole milk and the milk products, cream, butter, and cheese, are all important food materials among the nations of the western world; and the manufacture of milk products, such as condensed milk, butter, and cheese, has developed large industries. While the Chinese and Japanese are two great peoples who have not utilized milk or any of its products as food for grown people to any extent, yet we are fully justified in counting these foods among the necessities. Nothing can fully take the place of milk in the family dietary.

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Figure 41 shows how all the foodstuffs are represented in milk. When milk first comes from the cow the fat is suspended in tiny, invisible particles throughout the water, giving the milk its yellow tint, and the fat rises to the top in the form of cream after a few hours. The protein, sugar, and ash are dissolved in the water. When milk reaches the stomach, the protein separates from the water in the form of curd. This change is brought about by an enzyme (soluble ferment) called rennin, which is present, along with pepsin, in the gastric juice. Curd is also formed by the souring of milk through the action of bacteria, or by adding acid directly to the milk. Milk should never be gulped down, but taken in sips, so that only small portions of curd are formed in the stomach, because these are much easier to digest than large ones. Sometimes milk is soured purposely, as in buttermilk or zoolak or matzoon, that curds may form and be beaten fine before it is drunk. This is very easy to digest, because then no large curds can form. For the same reason, it is often better to take milk with bread or some other food, or to cook it in some dish. Skim milk is a valuable food, for it has everything found in whole milk but the fat. We miss the flavor of the fat in drinking it, hence it is better to use it in pudding or soup or in cooking cereals where we do not care so much about the milk flavor. Study Fig. 41, comparing the percentages of the foodstuffs in whole, skim, and buttermilk, and cream. Notice that the skim milk is higher than the whole milk in protein and sugar, that it has as much ash, and a trace of fat even. It does not tell us, however, that the forms of ash in milk are most valuable, and that it is richer in calcium than any other food material. How these foods compare in fuel value is shown in Fig. 42.

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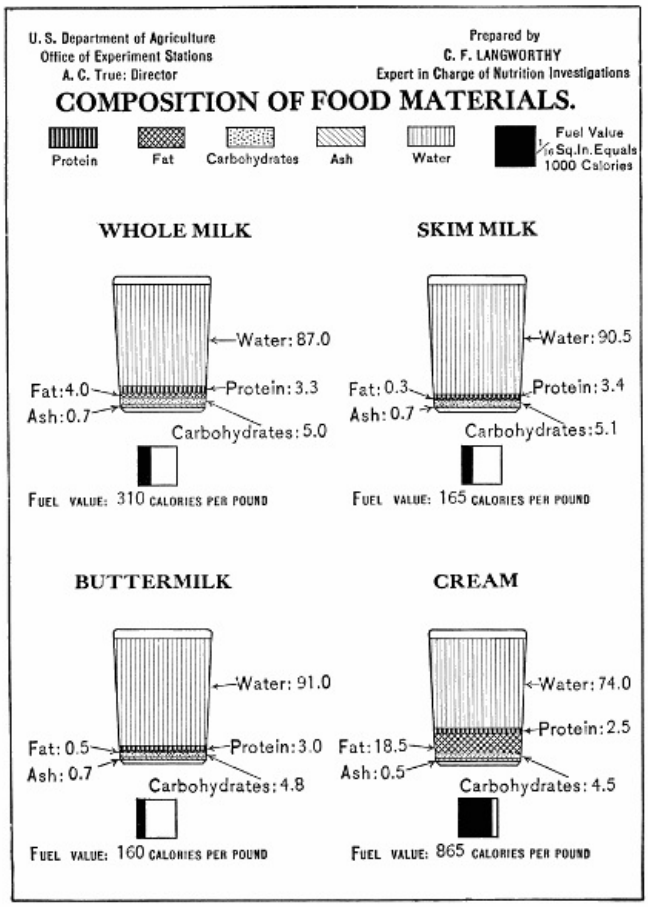

FIG. 41.—Composition of milk and cream.

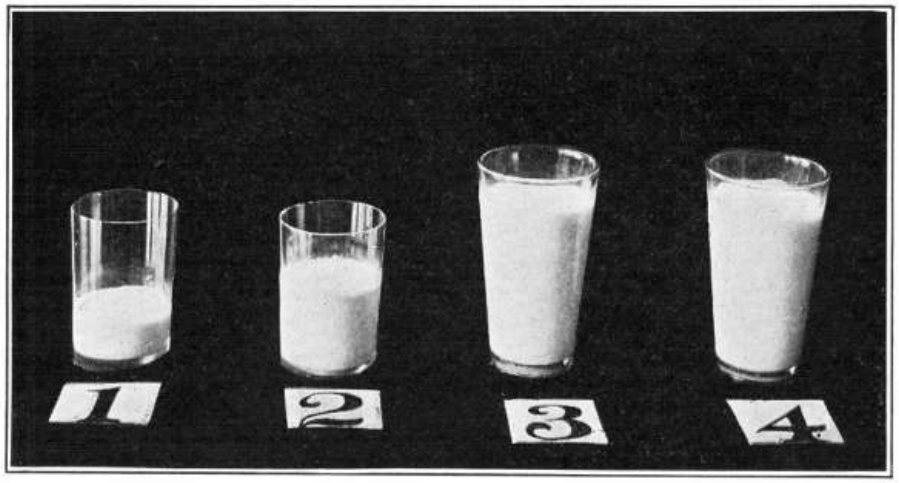

FIG. 42.—100-Calorie portions of milk and cream. *A. Fowler, Photographer.*

NO.	KIND	WEIGHT OF PORTION, OUNCES
1.	Cream (18.5% fat)	1.8
2.	Whole milk	5.1
3.	Skim milk	9.6
4.	Buttermilk	9.9

Wholesome and clean milk.—At present, the milk supply is one of our most pressing community problems, showing how closely the country and the city are united. A case of typhoid fever in one farm family, not properly cared for, may be the seed of a serious epidemic in some town. To insure clean milk to the consumer, and a fair return in money to the producer, is a great sanitary and commercial problem, not to be solved in a day.

Milk is a medium in which bacteria flourish, both the harmless and the disease producing. Typhoid fever and other fatal diseases may be carried by milk from unclean barns and dairies, and tuberculosis is possible from diseased cows. The cows must be in good health, and the stable clean. Figure 43 shows a stable with cement floor and good

drainage. The cows must themselves be clean, and should be curried and washed. The milkers should have clean clothes and hands, and all receptacles should be sterilized. The milk must be rapidly cooled (see Fig. 44), bottled in sterilized bottles, kept cool during transportation, and delivered as promptly as possible to the consumer. “Certified” milk is produced and handled under the best conditions, but costs at least 15 cents a quart. Since a quart of milk is equivalent to a pound of steak or to 8 eggs, milk even at 15 to 20 cents a quart is more economical than meat and eggs at ordinary prices. At the usual price of 8 to 10 cents a quart, milk is very economical as compared with other perishable foods.

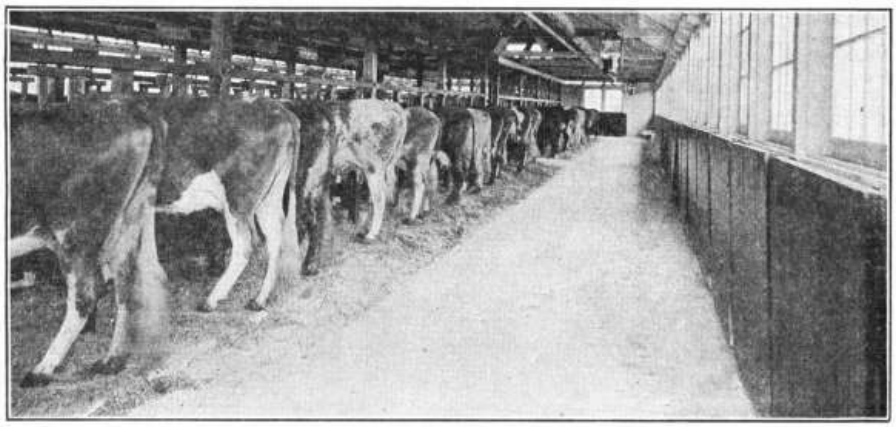

Fig. 43.—A modern cow house. ***Courtesy of the Walker-Gordon Laboratory.***

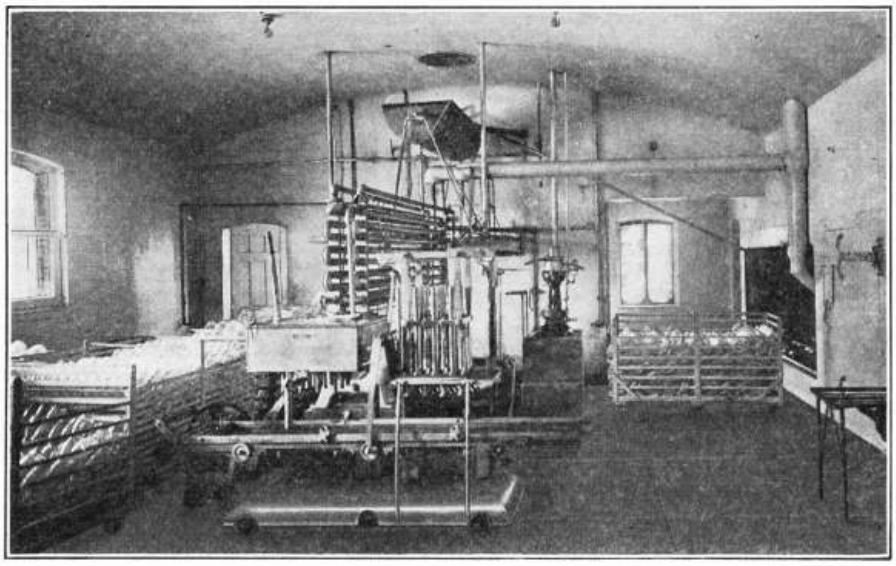

Fig. 44.—Milk bottling room. ***Courtesy of Walker-Gordon Laboratory.***

The question of preservation and pasteurization can be treated here but briefly. Preservatives are forbidden by law in most states. Pasteurization is heating at a temperature sufficiently high to kill any disease germs present, but not high enough to give a cooked taste. This process, while it destroys most of the bacteria, does not kill the spores of all. The chief arguments against pasteurization are (1) that on a commercial scale it is difficult to really accomplish this, and (2) that it is easily used to cover the sale of unclean milk. The argument for it is, that it is impossible to obtain as yet an ideal supply for a large city in hot weather, and that pasteurization, if properly conducted, kills nearly all of the dangerous bacteria and saves the lives of many babies. Clean milk that needs no pasteurization is our ultimate aim, and we must remember that milk pasteurized under unknown conditions needs to be kept cold and treated with even more care than fresh milk, for it “spoils” quite as easily, only we may not know it because it may not taste sour. 151

In the last few years the question of pasteurization has been studied with very great care. It is found best to heat the milk for 20 to 30 minutes at a temperature of 140° to 155° F. If it is certain that this method has been used, one need not hesitate to trust the milk, for the arguments against pasteurization do not properly apply here. 152

How to buy.—Investigate by question and inspection, if possible, the available milk

supply. Be sure to do this in the country in the summer. Always buy bottled milk. Where the income is small, good quality milk should be used for the little children and invalids, and skim milk purchased for cooking. In many places skim milk is supplied in bottles by reliable firms. The usual price for bottled milk in the city is 8 to 10 cents, and this is of good average quality. Keep milk cold. If there is no ice, use an ice substitute (page 74), and in very hot weather pasteurize or scald the milk, cooling afterward as quickly as possible by placing in cold water and stirring the water.

GENERAL METHODS AND RECIPES

Principles of cookery.—Clean, sweet milk is an ideal food, which requires no cooking. Heating milk to 212° F. changes its properties in some way, so that it is not considered an ideal food for babies' regular diet. If it must be used, for reasons of safety, some uncooked food, such as orange juice, should also be given. This is the reason for pasteurizing milk instead of boiling it.

Heating milk in an open vessel causes some of the protein to harden into a thin "skin" on the top. This can be prevented by stirring the milk until it is cool.

1. To pasteurize milk.

This cannot be done accurately without a thermometer. The milk bottle should be placed upon a rack in a kettle of water, with a clean thermometer inserted through the cover of the bottle. Heat the water slowly, and watch the thermometer. When it reaches 155° F., see that the water becomes no hotter. Set the kettle on a rack on the stove top, or use a simmering burner with rack and asbestos mat. It is difficult to keep the temperature even, but it should remain at 140-155° F. half an hour. At the end of half an hour, the bottle should be removed, and cooled as rapidly as possible in running cold water.

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2. Rennet custard.

1 quart milk, two tablespoonfuls of sugar, a shake of salt, flavoring, 1 rennet tablet. The flavoring may be: 1 teaspoonful vanilla, *or* a few tablespoonfuls of orange juice, *or* the vanilla, plus three or four tablespoonfuls of cocoa to suit the taste.

To prepare.—This is a process without cooking. Rennet tablets are made from the stomach of the calf, and contain the digestive enzyme, rennin, which results in the solidifying of the curd of the milk. Rennet custard has passed the first stage of milk digestion.

Put all the flavoring substances into the milk, and warm it slightly, not more than 100° F. The cocoa when used should be "dissolved" in a small amount of hot water. Dissolve the rennet in a tablespoonful of cold water, and stir this very thoroughly into the milk. Pour the milk into the cups in which the custard will be served, and set the cups in a warm but not hot place. A good method is to place them in a pan of warm water (100° F.). The milk becomes firm in a half hour or an hour, and as soon as it is set, should be put in the ice box, otherwise the process continues and the custard becomes watery as the curd shrinks and forces out the whey. Serve very cold with fruit on the top, or whipped cream with the cocoa flavoring; or put grated nutmeg or powdered cinnamon on the top. This is a simple and delicious dessert, and one of the most wholesome. For children it should be flavored with fruit juice or vanilla rather than with cocoa.

3. Uses of sour milk.

Do not throw away any sour milk that is clean and not stale. Milk that has soured enough to set, is a delicious dessert, with cream and sugar. The acid is very pleasant, being the same as that of buttermilk. Sour milk is better for griddlecakes and muffins than sweet milk. (See Chapter XI.) Another excellent use for sour milk is to make it into cottage cheese. (See below.)

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Matzoon and other similar preparations are essentially soured milks, prepared under controlled conditions. These preparations are the common form of milk in certain parts of the Orient, where milk is never used sweet.

Kumyss is milk slightly soured and fermented with one species of yeast. This is a Russian method. These preparations are excellent for invalids and exhausted people, for they can sometimes be assimilated because of the fine curds when sweet milk cannot.

Condensed milk is a practical method of preserving milk. The milk is evaporated under

pressure at a high temperature in apparatus constructed for the purpose. Cane sugar or glucose is sometimes added. A new patent process condenses the milk at low temperature, preserving it for a short period, as compared with the condensed milk in tins, but it keeps well for several days, and bears transportation. Condensed milk may be used in cooking, when clean fresh milk is not available. The unsweetened kinds are most useful, but, like pasteurized milk, must be treated with care after the cans are opened.

Cheese.—Cheese is made from the curd of milk, and contains the most nutritive parts of the milk in highly concentrated form. In the process of manufacture, the milk is first curdled by rennet, and the whey strained out. The curds after preliminary treatment, varying according to the style of cheese to be made, are finally pressed together very slowly in a cheese press, which is screwed down more tightly as the cheese becomes dryer. The cheeses are then covered with cheesecloth and "ripened" slowly, the ripening process giving characteristic consistency and flavor. This ripening is due to the action of bacteria and molds. (See page 97.) Foreign varieties of cheese, made originally in some one locality, have marked colors, quality, and flavors, as Brie, Camembert, Roquefort, and the Swiss cheeses. Parmesan is an Italian cheese, excellent with macaroni and spaghetti. 155

American cheeses vary in color, in strength of flavor, in creaminess, and in degree of hardness. Much the greater part is, however, of the general type known as "American cheddar" or "standard factory" cheese.

Club cheese is an American cheese of good quality, put up in small jars. It is a soft cheese, excellent to serve with crackers, but is too expensive for common use.

Cottage cheese is a home product made from sour milk, and used at once.

Composition and nutritive value.—Cheese is high in protein, and usually in fat. (See Fig. 40.) Note the small amount of water, which makes cheese a very concentrated food. The protein content makes it a meat substitute, for those with whom cheese does not disagree. Being a dense as well as concentrated form of food, it should be eaten in small quantities, and in combination with other food materials in such a way that it will become finely divided, or it will not be easily digested. The ash content is high, the most valuable of the ash constituents of the milk being retained in the cheese. 156

The cost of cheese.—The foreign cheeses are expensive, but American cheeses may be classed among the moderate priced foods and they compare favorably with other protein foods.

Cheese costs more than beans, and less than most cuts of meat. A good American cheese costs about twenty-five cents per pound. Taking account of composition as well as cost per pound, we find that a given amount of money buys about twice as much food value when spent for cheese as it would if spent for beef. See Fig. 45.

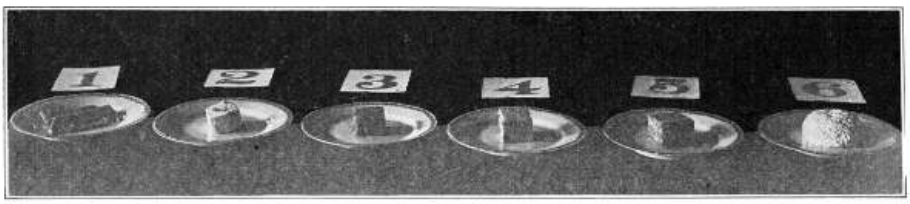

Fig. 45.—100-Calorie portions of cheese. *A. Fowler, Photographer.*

No.	Kind	Weight of Portion, ounces
1.	Swiss	0.8
2.	Cream	0.9
3.	American	0.8
4.	Roquefort	1.0
5.	Parmesan	1.9
6.	Cottage	3.2

Care of cheese in the pantry.—Cheese should be kept dry and covered, that its odor may not be noticeable. Soft cheese should be kept in the ice box. The receptacle for cheese should be thoroughly sterilized before each new purchase is put away.

GENERAL METHODS AND RECIPES

1. Uncooked cheese.—Serve a cream cheese with a salad of lettuce, and the imported cheeses with crackers and fruit for dessert. American cheese may be thinly sliced and used in sandwiches. A small piece of cheese with apple pie or pudding is an old-fashioned combination that is always agreeable, but sometimes difficult of digestion.

2. Cottage cheese.—Use sour milk that has set. Other ingredients: salt to taste, cayenne pepper or paprika, if liked. Quality and flavor are improved by the addition of a tablespoonful of butter or two tablespoonfuls of cream to a pint of the curd, but these are not necessary.

Warm the milk slowly, until the whey begins to separate from the curd. If this process is continued too long, and the milk becomes hot, the curd will be tough. Place a piece of cheesecloth over a bowl, pour in the curds and whey, and lift the cloth carefully, allowing the whey to run through. Squeeze out the remaining whey. Add the seasoning and other ingredients to the curd, shape in balls, and chill before serving. It is delicious served with lettuce and dressing as a salad, or with gingerbread for dessert at luncheon or supper.

Principles of cooking cheese.—The fat in the cheese is melted by heat. The protein is toughened by a high temperature, therefore a low temperature process should be used.

3. Cheese cooked with other food materials.—A creamy cheese should be selected for cooking. Cheese may be grated and sprinkled on the top of potato on the half shell, or any other mashed potato; or it may be sliced and placed with each layer in escalloped potato. Its use is common with macaroni; and a dish of macaroni with milk and cheese is a good meat substitute, and may be used as the main dish of a luncheon or simple dinner. Those to whom cheese is agreeable will find many places for its use. Its flavor harmonizes with celery and with tomato. The Italians serve grated Parmesan cheese with soup, and with spaghetti that has a tomato sauce.

4. Cheese crackers.—Select crackers of a firm quality that will not crumble or flake easily, and of a small size. Spread very thinly with soft butter, put the crackers in a pan, and sprinkle grated cheese upon each one. Set the pan in a moderate oven until the cheese is melted. A sprinkling of paprika may be used. Serve with lettuce, celery, or other green salad.

EXERCISES

1. Compare the composition of eggs, milk, and cheese.
2. How may an egg which has been kept too long in cold storage be detected?
3. What is the effect of the boiling temperature of water upon an egg?
4. Compare a hard- and a soft-cooked egg for digestibility.
5. What are the dangers from unclean milk?
6. How may the milk supply be safeguarded?
7. Why is cheese a meat substitute?
8. What caution should we exercise in using it?
9. What precaution must we take in cooking cheese?

CHAPTER X

THE FATS AND THE SUGARS

Fats are composed of carbon, hydrogen, and oxygen, but have much more carbon than the other kinds of foodstuffs. Notice in Fig. 46 that olive oil and lard are pure fats; the other fat foods containing water, protein, and ash. Fat is available in various forms, with differing flavors and a wide range of prices. To many people it is unpalatable in some of its cheapest forms; yet its use is important, and some kind should be included in the diet. Fluid and emulsified fats are the most easily digested, hence olive oil, cream, and egg yolk are highly desirable. Bacon and butter belong nearly in the same class. A vigorous man at hard labor can digest fat of any kind without difficulty, and needs it because it gives so much fuel in proportion to its bulk.

Fat tends to retard gastric digestion, and delicate persons must be careful about taking with it other foods which are hard to digest, or taking it in the form of fried foods, pastries, rich cakes, and sauces. Persons with delicate appetite, who lose weight because they do not get enough fuel, may be benefited by taking a little more fat in the diet, especially if they do not digest starch and sugar readily, but a very large amount (over 6 or 7 ounces a day) will not be perfectly digested.

Fat as a food.—*Beef fat*, as it occurs with lean, is a digestible fat. If thoroughly browned in the cooking process, it is most palatable, and the taste for it should be cultivated. In gravy, it may be used with potato, instead of butter. Fat tried out from suet, may be used in place of butter as an ingredient in some puddings, and even in batter mixtures. It may also be used with vegetables when the price of butter is prohibitive. See Fig. 47.

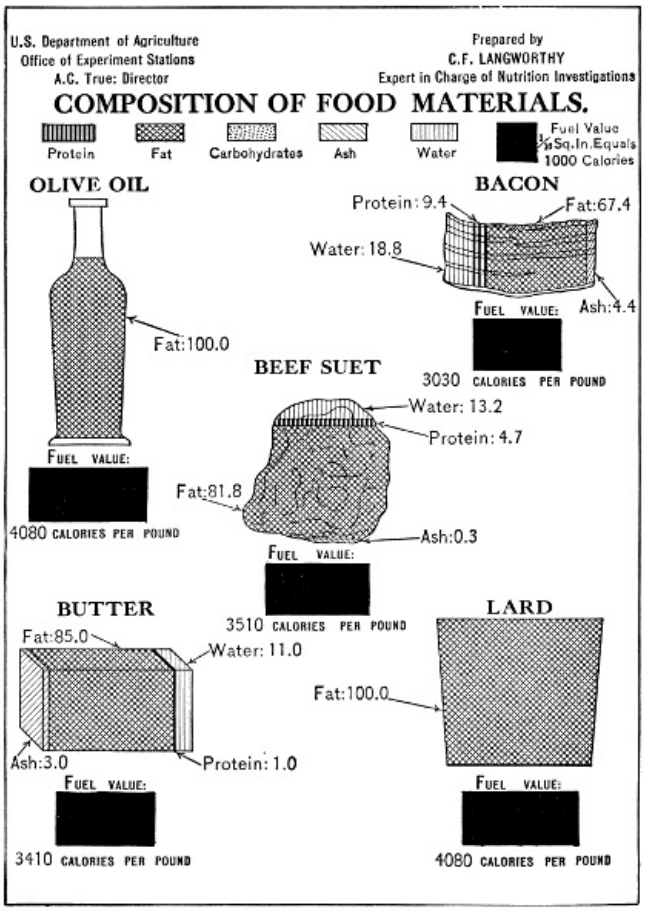

FIG. 46.—Composition of fat foods.

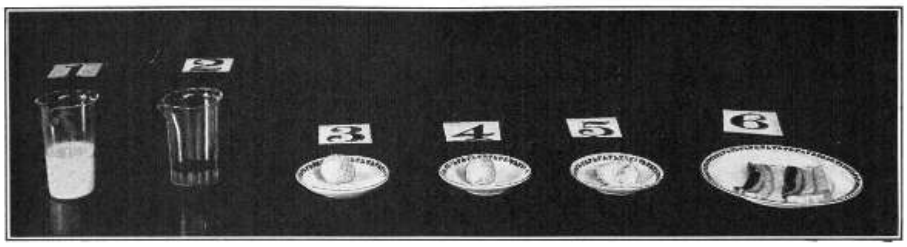

FIG. 47.—100-Calorie portions of fat foods.*A. Fowler, Photographer.*

NO.	KIND	WEIGHT OF PORTION OUNCES

1.	Cream (extra rich, 40% fat)	0.9
2.	Olive oil	0.4
3.	Butter	0.5
4.	Oleomargarine	0.5
5.	Suet	0.5
6.	Bacon	0.6

Bacon is a digestible and agreeable form of fat, but it is not so cheap as beef fat, though cheaper than butter.

Fat pork is lower in price than bacon, and can be assimilated by vigorous people, especially those living out of doors.

Cream is one of the most delicious fatty food materials, and is digestible, but ranks with butter and bacon as to cost. While it is not a cheap food, it is not such an extravagance when moderately used as some people suppose, who have not worked out the problem. Usually the most economical source of cream is to take it from the top of the bottle of milk. The remaining partially skimmed milk may be used at table or in cooking or for making cottage cheese.

Butter is a digestible fat, ranking at present among the more expensive food materials.

Watchfulness is necessary with both cream and milk that cleanliness and quality may be insured.

Butter substitutes.—These are made from beef fat and other edible fats and oils, and are much less expensive than butter. They may be used in cooking with good result. The usual trade names are butterine, or oleomargarine, or some word similar to these. Oleomargarine has the same food value as butter at lower cost, but lacks fine flavor.

Olive or sweet oil.—The fat content of olive oil is one hundred per cent, its fuel value being equal to that of lard. See Fig. 46. It is made in Italy, France, Spain, and California, the oils from the different countries differing somewhat in flavor. The cheaper grades are sometimes adulterated with corn oil or cottonseed oil, which have the same food value but should, of course, be sold under their own names and not at olive oil prices. An American firm is now manufacturing olive oil in Spain; this and the California olive oil are of high grade. Italian oil by the gallon is of good quality, and usually somewhat less expensive than the French. It is a costly food material, but valuable in the dietary. Never buy it in small bottles, as this adds greatly to the cost. The most economical method is to purchase by the gallon in a tin can. If kept cool, it will not deteriorate except very slowly. Always wipe off the mouth of the bottle or can before pouring out the oil.

Fat as a cooking medium.—Fat is necessary for the sauté, and for deep fat frying. For deep fat frying several preparations are made from cottonseed oil that are agreeable to use and of moderate price.

Lard has been the most commonly used, but many people object to the flavor. *Beef drippings* should be saved and kept cool in covered jelly glasses. These drippings are useful for browning vegetables, meatballs, and in pan-broiling if a small amount of additional fat is necessary.

When deep fat frying is used, great pains must be taken to see that the fat is sufficiently hot in order that the food material may not soak fat, and the cooked food must be kept hot when the fat is draining off on absorptive paper. The best fats for this purpose are the vegetable oils. The refined cottonseed oils now on the market are excellent. For details of use see page 120. Keep a box of sand to pour into it, if the kettle of fat takes fire. Never pour water into blazing fat.

GENERAL METHODS AND RECIPES

Principles of cooking.

Fat melts at a low temperature.

At about 350° F. it begins to smoke.

At a higher temperature, a chemical change takes place, and the fat finally "burns," as the hydrogen and oxygen pass off.

It is emulsified by mixing with a substance like egg.

1. To whip cream.—Chill the cream, and set it in a bowl of ice water, or chipped ice. If the cream is warm, the beating will churn the cream to butter.

(1) For a fine, close-whipped cream use a Dover egg beater.

(2) For a lighter whipped cream, use a wire beater.

2. To mold butter.—A pair of wooden butter pats is necessary for this. Dip these first into hot water, then into cold. Cut off a square piece of butter, enough for one person, make it flat or round with two knives, and then roll it into shape between the butter pats. Chill, and serve in a dish on ice; or give one to each person on a butter plate, just at the last moment before serving the meal. Never serve soft butter.

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3. To cook bacon.—Bacon has alternate layers of fat and lean, but it is the fat that has chief consideration in the cooking process. The aim is to brown and crisp the fat without burning it and without causing a volume of smoke in the kitchen. Make ready a frying pan, and have at hand a jar for holding fat standing on a plate. Cut the bacon in thin slices with a sharp knife. Heat the pan, and put in the bacon. The fat will begin to "try out" at the melting point. Pour this melted fat into the jar. Turn the pieces of bacon with a fork. If the smoke is rising in volumes the pan is too hot. The novice should not try this experiment for the first time by herself. The fat may even burst into flame if the pan is too hot. When the bacon is sufficiently cooked to become crisp on cooling, it is ready to serve, by itself, with toast, or with eggs.

The making of sauces and gravies.—Many sauces and gravies are made from a fat, mixed with a starchy substance, the two mingled with a liquid. The fat gives flavor and nutriment, the starch is used for thickening, the liquid also gives flavor. You are now familiar with the cooking of fat and starch, and can readily understand that the combination of all these ingredients is not an easy matter. The fat will float upon the top of the liquid unless the right amount of starch or flour is used, and the flour will have a tendency to lump. There are several good methods in use. The method given for your experiment is one of the simplest, because it uses only a few utensils, and gives uniformly good results. It requires no more watchfulness than the other methods.

These sauces and gravies are not foods for little children and invalids.

4. Foundation recipe for sauces.

Proportions.

(1) Thin sauce (for milk toast)
1 tablespoonful of fat, 1 of flour, $^1/_2$ pint liquid.

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or (2) Medium sauce (for vegetables).
2 tablespoonfuls of fat, 2 of flour, $^1/_2$ pint liquid.

or (3) Thicker sauce, also for vegetables, meats, fish, and macaroni.
3 tablespoonfuls of fat, 3 of flour, $^1/_2$ pint liquid.
Salt is used to taste.

Method.—Melt the fat in a saucepan. Pour in the flour, all at once, and stir the flour and fat together, until the mass thickens slightly. Pour in all the liquid at once, cold. Set the saucepan where the heat is moderate.

Stir steadily with a wooden spoon until the mixture thickens.

5. A white sauce is made with butter, and milk the liquid. Stop the cooking just short of the boiling point.

6. A tomato sauce is made with butter or beef fat, strained tomato juice the liquid. Cook a piece of onion, a sprig of parsley, or a small portion of dried herbs, and a clove with the tomato before straining, if these flavors are liked.

7. A brown sauce or *meat gravy* may be made in the same way, using beef fat, and (as the liquid) water that has been poured into the pan in which the meat is cooked. When you are familiar with cooking there is an easier way for thickened meat gravies, as follows:

Pour off some of the fat from the meat pan. Set the pan upon the stove and stir in the flour,—about two tablespoonfuls for the ordinary roasting pan. When the flour is thoroughly mixed in, add about a pint of water, cold or warm, and stir again. Pour this mixture through a strainer. With practice you can make an excellent gravy in this way. It requires judgment to proportion the flour and liquid to the material in the pan.

Sugars are of common occurrence in the vegetable world in the fruits and juices of many plants. Pure grape juice may contain as high as 25 per cent of glucose though usually it is not so concentrated. Glucose is also found in considerable amount in sweet corn and onions. It is not so sweet as cane sugar (sucrose). Fructose is one of the sweetest of sugars, and helps to give honey its great sweetness.

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Lactose or milk sugar is found chiefly in milk. It is the least sweet of all the sugars. If there were as much cane sugar in milk, we should soon grow tired of it because it would be too sweet. It is sometimes added to milk to make its fuel value higher, especially in case the milk has been diluted, as in the diet of babies and invalids.

Maltose or malt sugar is formed from starch in germinating seeds.

Sucrose or cane sugar is most commonly manufactured from sugar cane and sugar beets. To a much smaller extent it is made commercially from the sugar maple, sorghum cane, and sugar palm, and it is found in considerable amount in some common fruits and vegetables.

Its manufacture forms a great industry, and its consumption is enormous, some ten million tons coming into commerce annually, and this does not represent the total consumption.

Figure 48 shows the composition of several common sugars. Notice that the granulated sugar is a pure foodstuff, being 100 per cent carbohydrate, while all the others contain traces of protein, ash, and water. Sugar is a fuel food, exclusively, like olive oil and other pure fats.

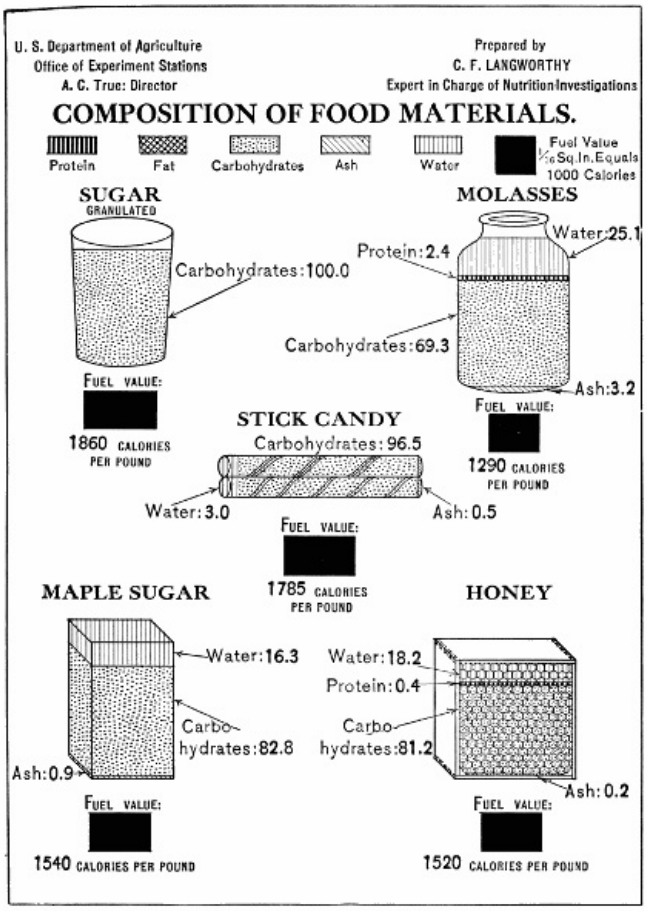

FIG. 48.—Composition of sugars.

Sugar is a valuable food material, but should not be used in excess; the tendency in the United States is rather toward an excessive use of sugar. It is liable to cause an acid fermentation in digestion, when taken in large amounts, and is sure to irritate the stomach. It should be well diluted by other foods. The amount that may be eaten daily varies for most people from two ounces for young children to four ounces for adults, but many people cannot eat these amounts without more or less irritation of the stomach. It is a common practice to oversweeten cakes and desserts, the sweetness of the sugar often disguising other agreeable flavors. The liking for sweets should be well under control, for the eating of

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too much sugar is a habit easy to form, and one which crowds out other valuable foods.

Cane Sugar is sold both brown and white, and is manufactured in powdered, granulated, and solid form, the latter usually cut in cubes or dominoes.

The canes are first crushed, the juices passing from the machine being of a rather dark greenish color. This juice is first clarified and filtered, and then boiled down in order to crystallize the sugar, the liquid sirup forming molasses. In the older methods the sirup was boiled in open pans, and the crystals filtered from the molasses by a slow process. In the modern process the sirup is boiled at a low temperature in vacuum pans, and the sugar is separated from the molasses by a centrifugal machine, built on the same principle as a cream separator. The principles of beet sugar manufacture are essentially the same, with some differences in detail.

The *molasses* manufactured in the older method is richer in cane sugar and is a better table molasses than the new process molasses, the latter being used chiefly for the manufacture of alcohol. Molasses is either dark or light, the darker having a stronger flavor especially suited to gingerbread and Indian meal pudding. Molasses comes in the bulk, and may be slightly acid; or in cans, in which case no acid fermentation should have taken place. Where canned molasses is used in a batter, it is sometimes necessary to use baking powder instead of soda. “New Orleans” is a light-colored molasses, “Porto Rico” dark.

Brown sugar has not passed through the refining processes necessary to the whitening of the sugar. It is softer than the granulated white, has a decided brownish color and a rich flavor.

In *buying sugar* it is economy to purchase granulated in large quantities, a fraction of a cent per pound being saved in this way. The cut sugar comes in convenient boxes, which keep the product clean. Powdered sugar may be bought in small quantities, three or five pounds, since it is not used so much in cooking as the granulated.

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Candy, homemade and purchased.—Candy, if not eaten between meals, is an allowable form of sugar. The best time for eating it is at the end of a meal, one or two pieces. Even in this case, however, it would be better for the body if the craving for sweet were satisfied by fruit rather than candy.

Candy made at home costs less than high grade commercial candy, even counting in the labor. It is superior to cheap grade candy, which may even contain poisonous coloring matter. It is a pleasure to make it at times, and it is always a pleasing gift at the holiday season.

GENERAL METHODS AND RECIPES

Principles of cooking.

A sirup is formed by cooking sugar with water.

The sirup thickens if process is prolonged and water evaporates.

Cane sugar is changed to glucose and fructose by boiling with an acid.

Heated without additional water, the sugar is partially decomposed, giving off water and becoming brown in color. This is “caramel,” used for coloring, and flavoring.

The final stage of heating leaves pure carbon.

8. Peanut brittle.

Ingredients.

Sugar	2 cups
Salt	$\frac{1}{4}$ teaspoonful
Peanuts	1 quart

Method.—Shell the peanuts and chop them in small pieces. Put the sugar in a saucepan and place over a moderate fire. Stir from the bottom until the sugar is entirely melted and of a rich brown color. The sugar will lump badly at first, but these lumps will entirely melt in time. Turn the chopped peanuts and salt into the sirup and stir together and immediately turn out on a buttered pan. When cold, break into pieces.

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9. Fudge.

Ingredients.

Sugar	2	cups
Cream of tartar	1/8	teaspoonful
Chocolate	2	squares
Milk or water	1	cup
Vanilla	1	teaspoonful

Method.—Mix the first four ingredients and place over a hot fire. Stir steadily until the mixture begins to boil. Stir occasionally after this until, when half a teaspoonful is dropped into cold water, it may be rolled to a soft ball with the fingers. Set the saucepan in a cool place and leave until it becomes just lukewarm. Add the vanilla and stir the mixture until it becomes thick and seems very slightly granular. Pour it into a buttered tin and as soon as possible cut into squares. The exact point at which to remove the fudge from the fire and again at which to cease stirring and pour into the pan is a matter which only practice can teach.

10. Penocha.

Ingredients.

Brown sugar	2	cups
Butter	2	tablespoonfuls
Milk, cream, or water	1	cup
Cream of tartar	1/8	teaspoon or less
Vanilla	1	teaspoon

Method.—As with recipe 9. The very dark brown sugar contains some acid and therefore less cream of tartar may be used. Chopped nuts may be added with the vanilla to both fudge and penocha.

11. Fondant for French creams.

Ingredients.

Sugar	2	cups
Cream of tartar	1/8	teaspoonful
Boiling water	2/3	cup

Method.—Mix the sugar and cream of tartar. Add the boiling water and place over a moderate fire, stirring slowly and steadily until the sugar is dissolved. Do not stir after the mixture begins to boil, but let it boil slowly until the sirup will form a soft ball in cold water. Turn out on a platter without scraping the saucepan. The success of the fondant depends upon the complete changing of the cane sugar into fructose and glucose, the crystals of the latter being much finer than those of cane sugar. Stirring the mixture while it boils or before it has cooled sufficiently will result in the formation of cane sugar crystals, and the fondant will be harsh and rough.

When the fondant is barely lukewarm begin to stir it with long steady strokes and continue this until the mixture becomes creamy and thick and begins to break away from the sides of the dish and the spoon. Then gather it all together into a round mass and knead like bread until it becomes pliable. It may then be wrapped in oiled paper or put into a covered bowl or fruit jar and kept until wanted.

Fondant is the foundation for all bonbons and may be made up into a great variety of shapes and with many flavors. It may be mixed with chopped candied fruits or nuts or coated with chocolate.

Laboratory management.—The holiday time is the natural season for the candy-making lesson. It is not worth while to spend much time on this topic, at the sacrifice of others.

EXERCISES

1. What is meant by a fuel food?
2. Why should fat be taken daily?
3. Compare the cost of different kinds of fat.
4. Why is beef fat less expensive than butter?

5. How is fat mixed with other ingredients in a sauce?

6. What is the chief point to consider in the cookery of fat?

7. What is the difference between cane sugar and honey?

8. Compare the cost of a pound of homemade candy with that of good quality bought at a shop.

9. How is fat changed in digestion?

10. How is sugar changed in digestion?

CHAPTER XI

MUFFINS, BISCUIT, CAKE, AND PASTRY

Wheat flour is the important material in this group, but muffins and biscuit may be varied by the use of corn meal, rye, and Graham flour, and cooked cereals may also be utilized. The ingredients are flour, salt, a liquid, sometimes a fat, eggs, and sugar. The flavorings are spices, essences, fruit juice, dried fruits, nuts, chocolate. The mixture must be smooth, but it is also necessary to make it porous or "light." This is accomplished by means of leavening agents, "to leaven" meaning "to make light."

Leavening agents.—The batter, or dough, is leavened by introducing into it air or a gas that expands when heated in the oven, thus making the whole more porous and larger in bulk.

Air.—This is introduced into the batter by beating, or by beating air into the white of egg and stirring the beaten white into the batter.

Steam.—The water in the batter turns to steam in the oven, and as it expands it assists in the leavening of the mass. See Popovers.

Carbon dioxide gas.—This is introduced in three ways.

(1) By using an acid with a carbonate.
(2) By yeast fermentation.
(3) By machinery.

Yeast fermentation is studied in the chapter on bread making (Chapter XII), and the mechanical method is a commercial process exclusively. Only the first method will be treated in this chapter.

When an acid and any alkaline carbonate are dissolved together, a chemical action takes place, a gas is given off (carbon dioxide) and another substance is formed that is neutral, being neither acid nor alkaline, and known as a "salt." In selecting the two substances we must bear in mind this neutral substance that remains in the batter and insure its harmlessness.

The *lactic acid* of sour milk is probably the earliest used, being a domestic product. The lactic acid is neutralized by bicarbonate of sodium, the latter being also called "baking soda." The resulting salt is harmless.

Acid molasses with soda is another old-fashioned method. Here the acid is developed by the fermentation of the molasses.

Cream of tartar (acid potassium tartrate), obtained from crystals deposited in wine vats, came into use later, neutralized by bicarbonate of soda, two parts of cream of tartar to one of soda.

Baking powder.—The first baking powders were made of cream of tartar and bicarbonate of soda, mixed with a starch, to prevent the slight chemical action which would cause the powder to lose strength; and these two substances are now used in the best baking powders. The resulting salt is the Rochelle salt of medicine.

An *acid phosphate* is sometimes used with soda, and this gives a harmless

neutral substance.

Cheaper acids have sometimes been used, especially *alum*. It is best not to use an alum powder. Select a standard kind, avoiding those that offer prizes for a certain number of boxes purchased. Even if these latter do not contain alum, there is probably an excess of starch or flour.

The advantage of baking powder is in the accuracy of the proportions of the two substances by weight. Even though the measuring of the cream of tartar and soda separately is accurate, the proportions may not be correct. There is no great advantage in homemade baking powder. It costs almost as much as the manufactured, and is not as perfect a product.

The proportions of the main ingredients.—Attempts are made to define the degrees of stiffness of batters and doughs, but these distinctions are not very accurate. A "pour batter" is liquid enough to pour, and a "dough batter" soft enough to drop from a spoon; a "soft dough" is next in grade, and "dough" is the stiffest of all.

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To understand proportioning the ingredients, the nature of the ingredients when heated must be taken into account. Butter and other fats melt when heated, and behave like a liquid in the mixture. Therefore, when there is a very large amount of butter, no other wetting is necessary, as in pound cake. We may make a scale, with a thin popover mixture at one extreme, with no butter in it, and the stiff pound cake at the other, with butter the only liquid (except the flavoring). Between these two are the mixtures of medium stiffness, with both butter and liquid. This general rule may be given: As the quantity of butter is increased, the batter must increase in stiffness, and there must be either less liquid or more flour.

A beaten egg looks like a liquid and behaves so during the mixing, but in the oven it stiffens. For this reason we can make a sponge cake with many eggs and no liquid in the mixing, and use no other leavening agent than the air beaten into the egg.

One old-fashioned rule for sponge cake reads: Take the weight of the eggs in sugar and half their weight in flour, with the juice and rind of a lemon for ten eggs. Such a rule was adapted to the days when eggs were cheap. We should now use fewer eggs in sponge cake, and this means that water and baking powder must replace the eggs omitted.

Methods of mixing.—(1) *For popovers, griddlecakes, muffins, and plain cake.*

Sift together the dry ingredients.

Beat the eggs, without separating the yolk and white, and stir the eggs and milk together.

Pour the liquid gradually into the flour, first stirring, then beating.

Melt the butter or other shortening, and beat it into the batter.

(2) *Biscuits and shortcakes.*

Sift together the dry ingredients.

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Cut in or chop in the butter.

Add the wetting slowly.

(3) *A richer, fine-grained butter cake.*

Sift together the dry ingredients.

Cream the butter, and beat in the sugar.

Beat the whites and yolks of the eggs separately.

Beat the yolks into the creamed butter and sugar.

Add the flour and milk alternately; that is, a quarter or third of the flour, then a portion of the milk, and so on. First stir, then beat vigorously.

Fold in the beaten whites lightly and do not beat the mixture again.

(4) *Sponge cake.*

If baking powder is used, sift with the flour.

Beat the whites and yolks of the eggs separately.

Beat the sugar into the yolks, and add the liquid and flavoring.

Add the flour and beaten whites in alternate portions, dividing both into quarters or thirds.

Baking.—This is a science and an art that requires much practice. Do not be

discouraged if you do not succeed at first.

Concerning the utensils for baking, see Chapter II. The cups or pans are prepared by warming and greasing. Use a bit of soft paper or a brush for greasing the pan and ordinarily an inexpensive fat, reserving butter for delicate cake. Flour sprinkled on a pan is sufficient for biscuit and cookies. Line a pan for loaf cake with white paper, and grease the paper.

See that the oven is ready before the mixing begins. We shall not be able to bake accurately until our ovens are equipped with thermometers. In the meantime we must use some simple oven test. The indicators on the doors of some ovens are a guide, although they are not really accurate according to the scale of the thermometer. A glass door is also a convenience.

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A loaf should be baked at a lower temperature than a biscuit or muffin. Why?

For loaves, 380° F. Test by the hand, counting fifteen slowly, fifteen seconds. A piece of white paper will become a delicate brown in five minutes.

For biscuits, muffins, and *small cakes*, 425° to 450° F.—Test by the hand, a count of ten. A piece of paper becomes a deeper golden brown in five minutes.

Any mixture containing baking powder may stand some little time before it is put in the oven, provided it is kept cold. The action of the baking powder is not immediate, and is very slight at a low temperature.

The stages of the baking are first, the rising; second, the crusting over; third, the baking of the interior; and last, a shrinkage of the whole.

Many ovens bake unevenly, and pans must be shifted. This should be done with care and not before the third stage of the baking. It is often well to cool off the oven the latter part of the time. An oven that is too hot may be cooled by a pan of water. Paper may be laid over the top of the cake if the browning has been too rapid. These are all makeshifts, and indicate a poor oven, or poor management of the fire. Do not look into the oven for the first ten minutes of baking, and always close the oven door gently.

When we are privileged to have electric ovens, with glass doors, and an accurate thermometer, baking will be an easy and accurate process.

EXPERIMENTS AND RECIPES

A. Experiments with baking powder.

1. Dissolve half a teaspoonful of baking powder in two tablespoonfuls of water and heat in a test tube, or saucepan, over a flame; notice the effervescence when the bubbling is at its height, and hold a lighted match in the mouth of the tube. This is a simple test for carbon dioxide.

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2. Dissolve 2 teaspoonfuls of cream of tartar in $^1/_2$ cup water in a glass.

Dissolve 1 teaspoonful of bicarbonate of soda in $^1/_2$ cup water in a glass.

Taste both of these.

Test both with litmus paper, noting the change of color. There are several vegetable coloring matters that change color in this way, in the presence of an acid or an alkaline substance.

Turn the two solutions together, and test with both blue and pink litmus paper, after the solution has stood for several minutes. What results?

Taste this mixed solution to see if you can detect any difference.

To prove that there is a substance still left, evaporate the water.

3. A pretty form of this experiment is to use, instead of litmus, the water in which red cabbage has previously been boiled and which therefore contains some of the coloring matter of the cabbage. The changes in color are very striking, and prove conclusively that neither the cream of tartar nor the soda remains such.

B. Oven experiments.

If one oven in the school kitchen can be equipped with a chemical thermometer inserted in the oven, the following experiments are helpful.

1. Let each pupil test the oven by feeling, when it has reached 380° F., 400° F., 425° F., 450° F., 475° F.-500° F.

2. Place pieces of white paper, one for each pupil, in the oven for five minutes at the various temperatures. These may be pasted in the notebook for future reference.

1. Popovers, puffovers, or mahogany cakes.

Ingredients for 12.

Flour	1	pint
Milk	1	pint
Eggs	3	
Salt	½	teaspoonful

Some rules give two eggs only.

For baking, heavy earthen cups, hot and greased.

Method of mixing is No. 1.

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Special points.—The liquid must be poured *very* slowly into the flour to prevent lumping. A large Dover egg beater is convenient for beating out lumps, if any occur.

The leavening of the popover is effected by steam, and it is not necessary therefore to spend time and strength in the long beating sometimes recommended. This has been conclusively proved by experiment. Neither is it necessary to put the batter into the oven immediately, as sometimes directed. It may stand all day or even over night.

Pour the batter in the hot cups, having each cup two thirds full. The baking of the popovers is unique, in that they should be put into an intensely hot oven for the first stage of the baking—as hot as 475° F., or even more—then the oven must be cooled. This first stage crusts the top; then the expansive force of the steam pushes up the top; and the muffin "pops" or "puffs" over. The more moderate heat cooks the sides and the bottom, and makes an agreeable crust. The perfect puffover is hollow. Three quarters of an hour is the average time of baking. If at the end of that time the oven door is set ajar, and the popovers allowed to remain longer, they are improved, coming from the oven stiff and crisp with a rich brown color, rather than soft and underdone. In an old family cookbook, one recipe, sixty years old, calls popovers "Mahogany Cakes."

They may be eaten as a muffin, or served with a pudding sauce as a dessert.

2. Plain muffins.

Ingredients for 12.

Flour	1	pint
Baking powder	3	teaspoonfuls
Salt	½	teaspoonful
Eggs	2	or 1
Milk	1¼	cup
Butter, *or* butter substitute	1	tablespoonful
Sugar, if desired	1	tablespoonful

For baking, greased muffin pan. Bake about half an hour.

Method of mixing is No. 1.

This recipe may be varied in many ways.

(*a*) Use ½ cup cooked cereal in place of an equal quantity of flour. Will you change the amount of wetting?

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(*b*) One cup fine white corn meal, or ½ cup yellow meal in place of equal quantities of flour. Corn meal absorbs more water than white flour.

What change in the wetting?

The oven should be the temperature for bread, and the baking at least ¾ of an hour.

(*c*) One cup Graham or rye meal in place of an equal quantity of flour.

3. Baking-powder biscuit.

Ingredients.

Flour	1	pint
Baking powder	3	teaspoonfuls
Salt	½	teaspoonful
Butter, *or* butter substitute	1 or 2	tablespoonfuls
Milk	1	scant cup

For shaping, molding board, rolling pin, and biscuit cutter.

For baking, an iron sheet or pan sprinkled with flour. Oven about 425° F., a ten-second test, or golden brown paper. Bake twenty minutes to half an hour.

Method of mixing is No. 2.

To shape. Dust the board with flour, turn out the dough, dredge with flour, pat into a firm mass, and then pat or lightly roll out to ½ inch thickness. Cut out with a cutter dipped in flour. (A small glass or the top of a round tin can may be used.)

Variations.—Add 1 egg. This makes a delicious biscuit. Sprinkle the top with granulated sugar, and spice. Dried currants washed, and dredged with flour, may be laid on the top.

Increase the butter to two or three tablespoonfuls, and decrease the wetting and the mixture becomes *shortcake*. This is the mixture to use for the true strawberry shortcake. Many other fruits may be used, both uncooked and cooked.

4. Sour milk griddlecakes.

Ingredients.

Flour	2½	cups
Salt	½	teaspoonful
Melted butter	2	tablespoonfuls
Sour milk	2	cups
Soda	1¼	teaspoonfuls
Egg	1	

Method.—Mix dry ingredients. Add sour milk, egg well beaten, and melted butter in order given. Beat thoroughly. Drop by spoonfuls on a greased griddle and let cook until the edges are cooked and the cake full of bubbles. Turn with a cake turner or spatula knife and cook on the other side. Serve with butter and sirup or scraped maple sugar.

5. Sweet milk griddlecakes.

Ingredients.

Flour	3	cups
Baking powder	4	teaspoonfuls
Salt	1	teaspoonful
Sugar	¼	cup
Milk	2	cups
Egg	1	
Melted butter	2	tablespoonfuls

Method.—Mix dry ingredients. Beat egg and mix with it the milk. Pour liquid ingredients into the dry ingredients and stir altogether until smooth. Add the melted butter and cook the cakes the same as with sour milk griddlecakes.

6. Cookies.—Cookies may be plain, or rich in butter; crisp and thin, or soft and thick. They may be sweetened with sugar, or molasses, and spiced in various ways. It would be an interesting exercise to tabulate all the possible forms of cookies.

Ingredients.

Butter	1	cup
Sugar	1½	cups
Eggs	2	
Milk	3	tablespoonfuls
Flour		about 3 cups
Baking powder	1	teaspoonful

Salt	$1\frac{1}{2}$ teaspoonfuls

The flavoring may be two teaspoonfuls of vanilla, or lemon essence, one or two tablespoonfuls of ground spice, or caraway seeds.

For baking, a floured iron sheet or flat pan. Temperature 425° F., or even more. The baking requires from 15 to 20 minutes, depending on the thickness of the cooky.

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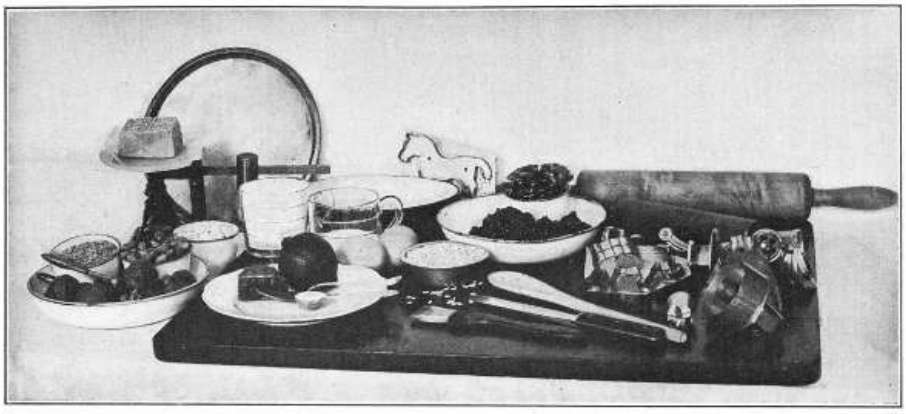

Fig. 49.—Materials and utensils for fancy cookies. *Courtesy of Miss Anna M. Barrows.*

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The method of mixing is No. 3. Notice that this is a stiff dough. The amount of flour depends somewhat upon the expertness of the cooky maker. The flour used in rolling out must be accounted for, as the expert can manage a softer dough than the novice. Mix the baking powder and salt with one cup of the flour.

Shaping the cookies.—Figure 49 shows you the apparatus. The dough is turned out upon the floured board, gently rolled out to a quarter of an inch, cut and placed in a floured pan; or cut off a small piece, roll in the flour, until it forms a ball, set the ball in the pan, and pat it down to a round. This may seem to take longer, but it is easier, and there is no board to clean afterward.

A plainer cooky is made with $\frac{1}{2}$ cup butter, and $\frac{1}{2}$ cup water or milk, with somewhat more flour.

7. Butter cake.—A foundation recipe. Learn to make one cake well, and vary it by changing the forms and flavors.

Ingredients.

Butter	$\frac{1}{3}$ cup
Sugar	1 cup
Eggs	2
Milk	$\frac{2}{3}$ cup
Flour	$1\frac{3}{4}$ cup
Baking powder	$2\frac{1}{2}$ teaspoonfuls
Salt	$\frac{1}{4}$ teaspoonful

The flavoring may be 1 teaspoonful of vanilla or lemon essence, or $\frac{1}{2}$ teaspoonful of almond, or two teaspoonfuls of spices. Raisins, $\frac{1}{2}$ cup, citron $\frac{1}{4}$ lb., nuts, $\frac{1}{2}$ cup. The rind of $\frac{1}{2}$ orange is delicious with the vanilla flavor. With the vanilla use 4 tablespoonfuls of cocoa, for a chocolate flavor.

To make a plainer cake, omit one egg, use $\frac{1}{4}$ cup butter, and $\frac{3}{4}$ cup of milk.

If you use $\frac{1}{2}$ cup butter, making a richer cake, what other changes should be made?

Bake in deep or shallow pan, jelly cake tins, or small tin cups.

The mixing is Method 3.

As layer cake, it may be used with a variety of fillings and icings,—jelly, cream filling, soft icing with nuts, raisins, or dates.

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A chocolate filling.—One half cup milk, 2 ounces unsweetened chocolate, 1

cup of sugar, yolk of one egg, 1 teaspoonful vanilla extract. Break up the chocolate, melt it in a bowl over hot water or in a double boiler, with the sugar and the milk. When the mixture is smooth add the beaten yolk, cook for one or two minutes, add the vanilla, and remove from the fire.

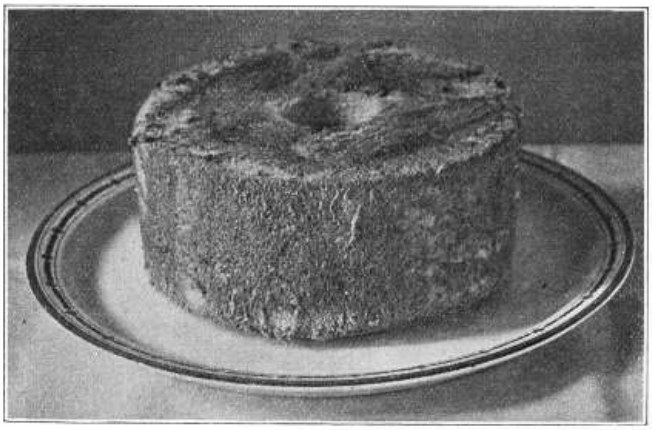

Fig. 50.—A loaf of sponge cake. ***Courtesy of Dept. of Foods and Cookery, Teachers College.***

8. Sponge cake.—The old-time sponge cake is given on page 173. Sponge cakes should be baked in a very moderate oven, below 380° F., the bread temperature. (See Fig. 50.)

9. Hot water sponge cake.

Ingredients.

Eggs	2
Sugar	1 cup
Hot water *or* Milk	3/8 cup
Flour	1 cup
Baking powder	1 1/2 teaspoonfuls
Salt	1/4 teaspoonful
Lemon *or*	1/4 teaspoonful
Vanilla extract	1/2 teaspoonful

Method.—Separate eggs and beat yolks and whites thoroughly. Mix and sift the dry ingredients. Add the sugar gradually to beaten yolks alternately with water until well blended. Next add the flavoring and then fold in the stiffly beaten whites together with the dry ingredients until blended. Bake in a buttered shallow pan in a moderate oven for twenty-five minutes or until cake shrinks from the side of the pan.

10. Plain gingerbread.

Ingredients.

Molasses	1 cup
Boiling water	1/2 cup
Flour	2 1/2 cups
Soda	1 teaspoonful
Ginger	1 1/2 teaspoonfuls
Salt	1/2 teaspoonful
Butter	4 tablespoonfuls

Method.—Melt butter in boiling water. Mix dry ingredients. Add the molasses to the water and butter and stir this mixture into the dry ingredients, beating vigorously. Pour into a buttered shallow pan and bake twenty minutes in a moderate oven. If the molasses is taken from a freshly opened can, no acid will be present and the soda should be omitted and 3 teaspoonfuls of baking powder used instead.

Laboratory management.—Effective work in batters cannot be accomplished with less than 1/2 cup liquid, though a smaller portion is sometimes used. It is well to have some group work, so that the pupils may learn to beat larger quantities. If there is a school lunch room, large quantities may be utilized there.

Pastry.—Pastry is a stiff dough with a large proportion of shortening, and is flaky when baked rather than porous. Pastry and pies should not be used as a staple food, but when well made and properly masticated, pies may be eaten occasionally by people in good health. The crust should be flaky, and thoroughly baked.

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11. Foundation recipes for pastry.

1. Proportions.

(1) *Plain crust.*

This crust is more digestible and more economical than the “short” or rich crust and may be used for English deep apple pie, or meat or chicken pies.

Flour	2 cups
Baking powder	2 teaspoonfuls
Salt	1/2 teaspoonful
Fat (butter or lard, or half of each)	1/2 cup (measured solid)
Ice water	1/4 cup

(2) *Short crust.*

Flour	2 cups
Salt	1/2 teaspoonful
Fat (equal parts butter and lard)	2/3 cup
Ice water	1/2 cup

(3) *Rich flaky crust.*

Same as (2) (more fat is to be added later)

2. Method of mixing for all.

Have all the ingredients and utensils icy cold. Mix the dry ingredients and cut in the fat with two knives. Stir in the ice water until the dough will just hold together. Toss upon a floured board and roll to 1/4 inch or less in thickness. Roll this up. If not ready to be used, this pie crust may be covered with moist cheesecloth and put on the ice until wanted. This amount of crust will make two medium-sized pies with two crusts each.

3. Method of shaping.

For plain crust.—Cut off 1/2 of the roll of crust. Roll out to about 1/8 inch thickness. Have a deep dish ready containing either the apple or meat fillings (see recipes below) and with the edge of dish buttered. Invert a small cup in the center of the dish to hold up the crust if apples are used. Lay the rolled-out crust over the top, having rolled it a little larger than the dish. Turn under the edges of the crust and crimp them down on the dish. Make several small cuts in the top of the crust to let the steam escape. Bake in a moderate oven until the filling (if apples) is cooked and the crust brown.

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For short crust.—Cut off 1/4 of the roll of crust and roll very thin, keeping the shape round. Line a buttered pie plate with the crust. Fill this with the desired filling, moisten the edge of bottom crust with water, and cover with another round of crust rolled as before. Crimp down the edges of the top crust and make cuts in the top as before. Bake until the filling is cooked and the crust is brown.

For rich crust.—Roll the crust to 1/2 inch thickness. Have ready 1/3 cup ice-cold fat. Cut off small bits of this and spread it in dabs over the rolled-out crust. Roll this again and then proceed as for the “short” crust (2).

12. Apple pie filling.

Use juicy, tart apples. Pare, cut in quarters, core, and slice apples into pie dish, filling it heaping full. Add 1/4 cup water and 1/2 cup sugar. Any flavor desired may be used, lemon rind, or spices. A little butter gives an agreeable flavor.

13. Lemon pie filling.

Ingredients.

1 heaping tablespoonful cornstarch mixed with a little cold water
1 egg whole, or yolks of 2 eggs

Large cup hot water	Juice and rind of 1 lemon
Piece butter the size of walnut	A very little salt
1 cup sugar	Whites of 2 eggs
	Powdered sugar, 1 tablespoonful

Method.

Mix the starch with the cold water, add the boiling water and cook until it thickens, and add the butter and sugar. Beat the egg (or yolks) and add the other ingredients. Add the lemon last. When the pie is done, if two yolks were used, beat the whites with a tablespoonful of powdered sugar, place on the top, and brown in a moderate oven.

14. Meat or chicken pie.

Use left-over, cooked meat. Cut the meat into dice or small bits and fill the dish. Sprinkle with salt and moisten with gravy, if possible. If not, add 1 cup hot water and dredge lightly with flour. Have top crust only.

How would the time for cooking this pie compare with that for deep apple pie?

EXERCISES

1. What are the chief ingredients of batter mixtures and doughs?
2. Explain leavening by air.
3. Why is steam a leavening agent?
4. How is gas formed for leavening purposes?
5. How does the presence of butter or other fat affect the stiffness of a mixture?
6. What are the important points to remember in mixing ingredients?
7. Why are baking-powder biscuits mixed differently from popovers?
8. What are the most practical oven tests?
9. Why is a loaf cake baked longer than cookies?
10. How many muffins, average size, can be made from a pint of flour?
11. Compare the cost of homemade cake with bakers’ cake.
12. What are the advantages of the homemade over the bakers’, or the bakers’ over the homemade?

CHAPTER XII

YEAST BREAD

Yeast bread when well made is a food of which the palate never tires, and it is usually recognized as a part of every well-planned meal. The quick breads are a convenient substitute at times, but they are not the staff of life in the same sense, and are, on the whole, less widely used.

The making of a perfect loaf of bread is the goal of all those who aspire to excel in cookery; and the art of bread making requires not only a clear understanding of the underlying principles, but patience and persistence in experimentation and practice until a uniformly perfect product is achieved. The fact that in yeast we have a living organism with which to deal makes the whole process a delicate one, in which every detail is of importance, whether it be a matter of ingredients, proportions, methods of mixing, or temperature.

The standard of good bread.—There will always be some difference of opinion in regard to a desirable quality in bread, and individual preference will control the final result, whether the crumb of the bread shall be dry and porous or somewhat more moist and finer in grain. French bread is of the former type, the English preferring a close grain and solid loaf. Allowing for these differences, it is still possible to standardize bread, and to state in percentages the different points to be considered in judging a loaf.

We must consider the *size* and *symmetry* of the loaf, in order that the interior of the bread may be baked to the very center, without overbaking or burning the crust, and therefore very large loaves should be avoided. The *crust* should be uniform in color, the shade ranging from a light golden to a darker brown, and the quality may be soft or crisp, but never tough. The *crumb* should be light, the cavities evenly distributed throughout the loaf and of uniform size. It should also be elastic, tender, and yet not pasty, evenly baked without streaks and heavy portions near the crust, and the color should be creamy rather than a snowy white. (Fig. 55.)

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The following score cards will be useful in judging loaves, and in the bread contests which are interesting and helpful.

BREAD SCORE CARD 1

I. General Appearance		15%
1. Shape	2.5%	
2. Size	2.5%	
3. Crust	10.0%	
(*a*) Color		
(*b*) Smoothness		
II. Internal Appearance		55%
1. Depth of crust	10%	
2. Texture (lightness)	15%	
3. Crumb	30%	
(*a*) Moisture, Elasticity (25%)		
(*b*) Color (5%)		
III. Flavor		30%
		100%

BREAD SCORE CARD 2

I. External Appearance		20%
1. Shape	5%	
2. Size	5%	
3. Crust	10%	
(*a*) Color		
(*b*) Smoothness		
II. Internal Factors		50%
1. Depth of crust	10%	
2. Texture	20%	
3. Crumb	20%	
(*a*) Moisture (15%)		
(*b*) Color (5%)		
III. Flavor		30%
		100%

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NOTE.—These two score cards are the average of the work of sixty students in judging bread in experimental cookery, Department of Foods and Cookery, Teachers College, Columbia University. See also Bulletin 25, University of Illinois.

Digestibility and nutritive value.—Bread of the standard described is readily digestible when at least twelve hours old and stands high in nutritive value. Figure 51 compares the composition of several varieties.

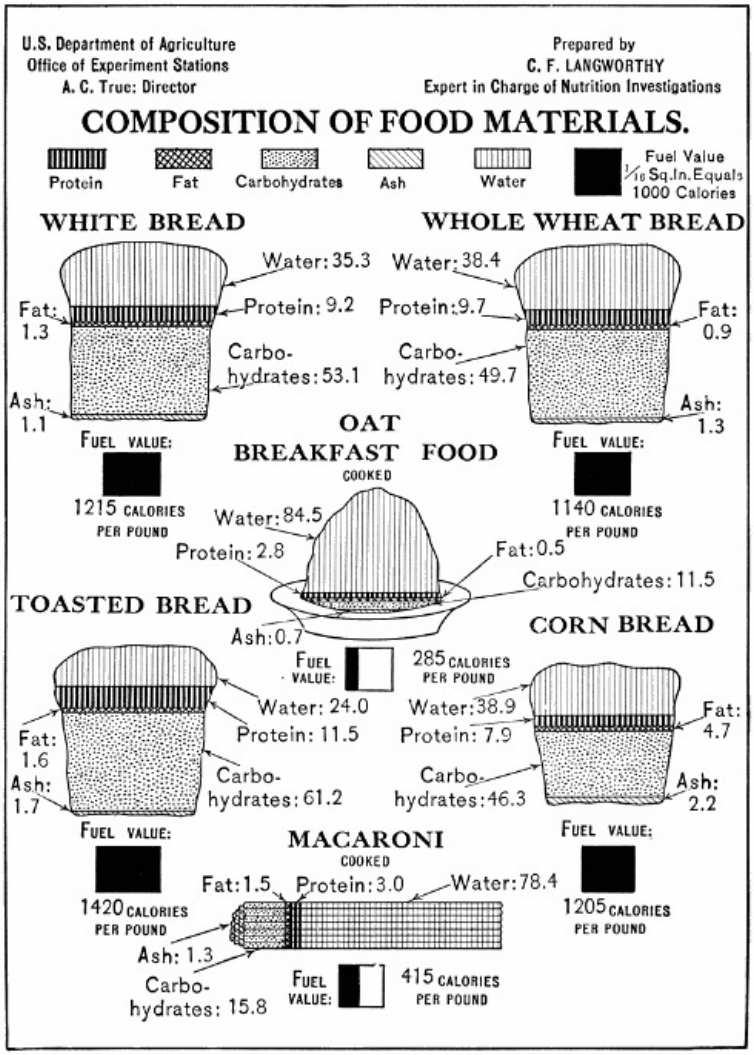

Fig. 51.—Composition of bread.

Like the cereals, it has considerable protein, and some fat, but is highest in starch. The white bread, unless made with milk, has very little ash. A slice almost one inch thick weighing 1.38 ounces, from a baker's five-cent loaf, will yield 100 Calories.

The cost of bread.—The table in Chapter XVII states the amount of protein and energy obtained for ten cents from bread as compared with other common foods, and makes the fact clear that bread is essentially one of the cheapest foods, remaining relatively so whatever the general fluctuations in food prices may be.

A pound loaf of bread at the bakery should cost five cents, the cost being slightly less when the bread is made at home, even taking the fuel into account. It is an open question, however, whether bread should be made at home or bought at the bakery, all the circumstances being weighed in the balance by the individual. (See Chapter XVII.) In America, we need to learn to dictate and control the methods in the public bakeries because bakers' bread is being used more and more, although it is said that 50 per cent is still made at home. If bread is to be bought, it is necessary for the housekeeper to understand the bread-making process and the standard of good bread that she may criticize intelligently, and force the public bakeries to furnish bread made under ideal conditions. Such bread is supplied in France, where the housekeepers in the city, though noted for their thrift, do not think of bread making at home as a practical or economical procedure. It must be understood that the baker's oven is fitted to do better work than the small oven of the average kitchen, and if the public through laws and inspection will control the quality of the materials used and the cleanliness of the process, baker's bread will be a useful "ready-cooked" food.

The ingredients of bread.—The essential ingredients are flour, water, and yeast. The liquid may be milk, or milk and water, the milk changing the flavor slightly and increasing the nutritive value, while the cream in the milk increases the tenderness of the crumb and crust. The non-essentials include salt to develop flavor, sugar sometimes added to hasten fermentation and also for flavor, and a fat to increase tenderness, as, for instance, butter or some cheaper fat. Spices and dried fruits are used in sweet breads, and when eggs are added sweet bread becomes a plain cake having a delicious and characteristic flavor.

The characteristics of good flour.—The average composition of flour is as follows:

Protein	11.4	per cent
Fat	1.0	per cent
Carbohydrate	75.1	per cent
Fuel value	1610	Cal. per pound
100-Calorie portion	28	grams (1 ounce)

192 The protein occurs in the form of gluten, which has the property of stretching and expanding, and which makes the framework of the loaf of bread, since it retains the air and carbon dioxide, and hardens when baked. The protein of oats and corn lacks this property, and therefore oatmeal and corn meal give a very different type of bread. Rye flour contains gluten, and the rye loaf therefore resembles the wheat loaf. Wheat and flour differ largely on account of the difference in the amount of gluten, and the gluten itself varies in quality with the variety of wheat.

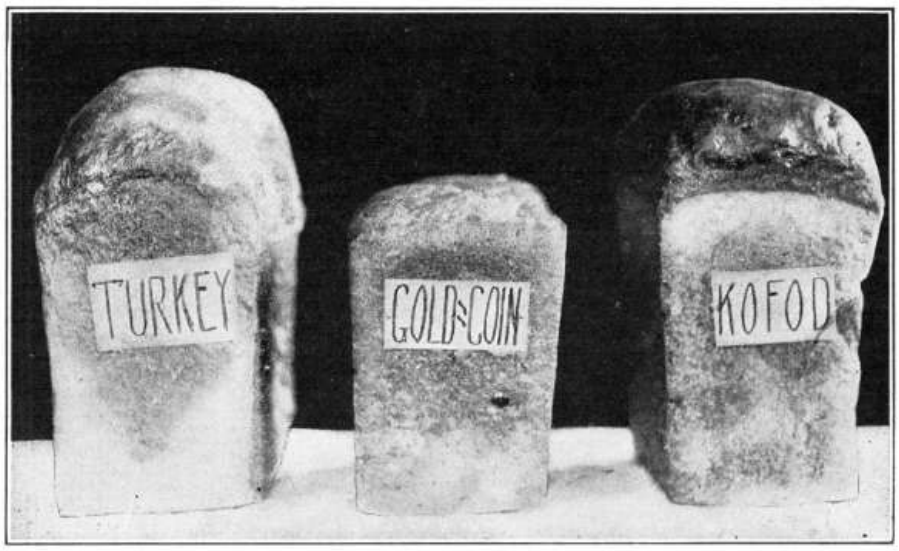

Fig. 52.—Experiment illustrating the effect of the kind of wheat upon the size of the loaf. ***Courtesy of Utah Agricultural College.***

193 Figure 52 shows the result of an experiment with flour made from different kinds of wheat, all the other factors in the bread making being identical. This effect of the difference in the composition of the flour is very striking. Again, the same variety of wheat will differ from season to season, and the time of planting, also, affects the quality of the grain. The time of planting and reaping gives us two classes of wheat and flour, the winter and spring. Winter wheat is sown in the fall and obtains its first growth before winter, living through the winter in those latitudes where the climate is sufficiently mild, being harvested in early summer. Spring wheat is sown in the spring and harvested late and it is the wheat of the great flour-producing state, Minnesota. The difference in the composition of the two wheats is shown in this table.[13]

	Water	Protein	Fat	Carbo-hydrate	Ash
Wheat					
Spring varieties	10.4	12.5	2.2	73.	1.9
Winter varieties	10.5	11.8	2.1	73.8	1.8

Note that the spring wheat contains more protein and therefore more gluten. The flour from spring wheat is creamy in color, granular to the touch, has more gluten, and is known as a *strong* flour. Flour from winter wheat is somewhat whiter in color and smoother to the touch, feeling more like cornstarch, and if a portion is squeezed in the hand, it retains the imprint of the fingers. It has less gluten, more starch, and is known as a *soft* flour. This type of flour is sometimes called “pastry flour,” the smaller percentage of gluten making it more desirable for pastry or cake than the stronger flour.

194 Flour manufacturers and bakers are constantly experimenting to find the best possible varieties and combinations of varieties for bread flour. Some difference of opinion exists, but a combination of winter and spring wheat in flour is considered the best for bread by some authorities.

We must learn to like a creamy color in bread, for this means the presence of more gluten. To summarize: a good bread flour contains a large percentage of gluten, is creamy in color, and granular to the touch.

Manufacture of flour.—Modern machinery has taken the place of the old-time stones in the grinding of flour, although the two main divisions of the process remain the same, these being the crushing of the grain and the sifting out of the coarse portion. Milling now includes many stages in the process not possible with the cruder machinery of former times, and the present effects a greater number of separations and permits the miller to make a greater variety of products.

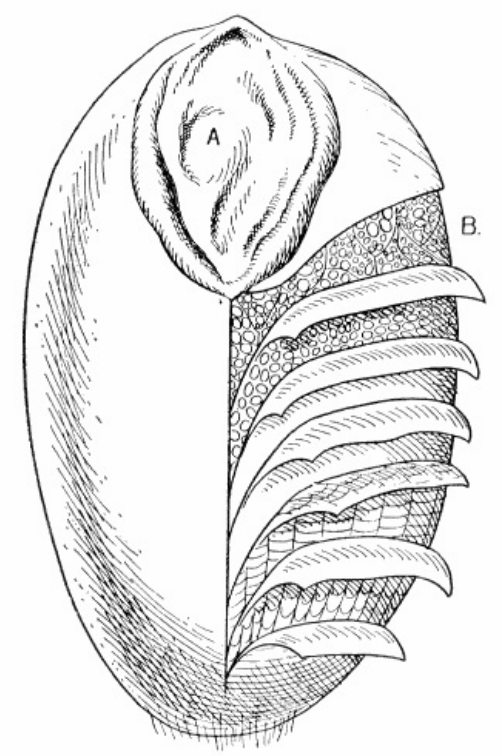

Fig. 53.—A dissected grain of wheat.
Courtesy of Washburn Crosby Co.

Figure 53 shows a dissected kernel of wheat, with its five layers of bran. Within these at *B* is a shell of glutinous matter, yellowish and of flinty hardness, and within this, but not sharply divided from it, lie the starch granules in a network of woody fiber, the germ lying at *A*. The milling process must remove the bran coats and the germ, and crush and roll the remaining portions to the necessary fineness. The germ if allowed to remain affects the color and keeping properties. The breaking and rolling are accomplished by steel machinery, and the final sifting is done through silk bolting cloth. By the new machinery about 70 per cent of the wheat is saved for food, 30 per cent being bran, "shorts," and other by-products used chiefly for cattle feeding.

Figure 54 shows the vertical section of a mill, simplified in the drawing that all the steps of the process may be clear. The diagram does not, of course, show the actual arrangement of the mill.[14]

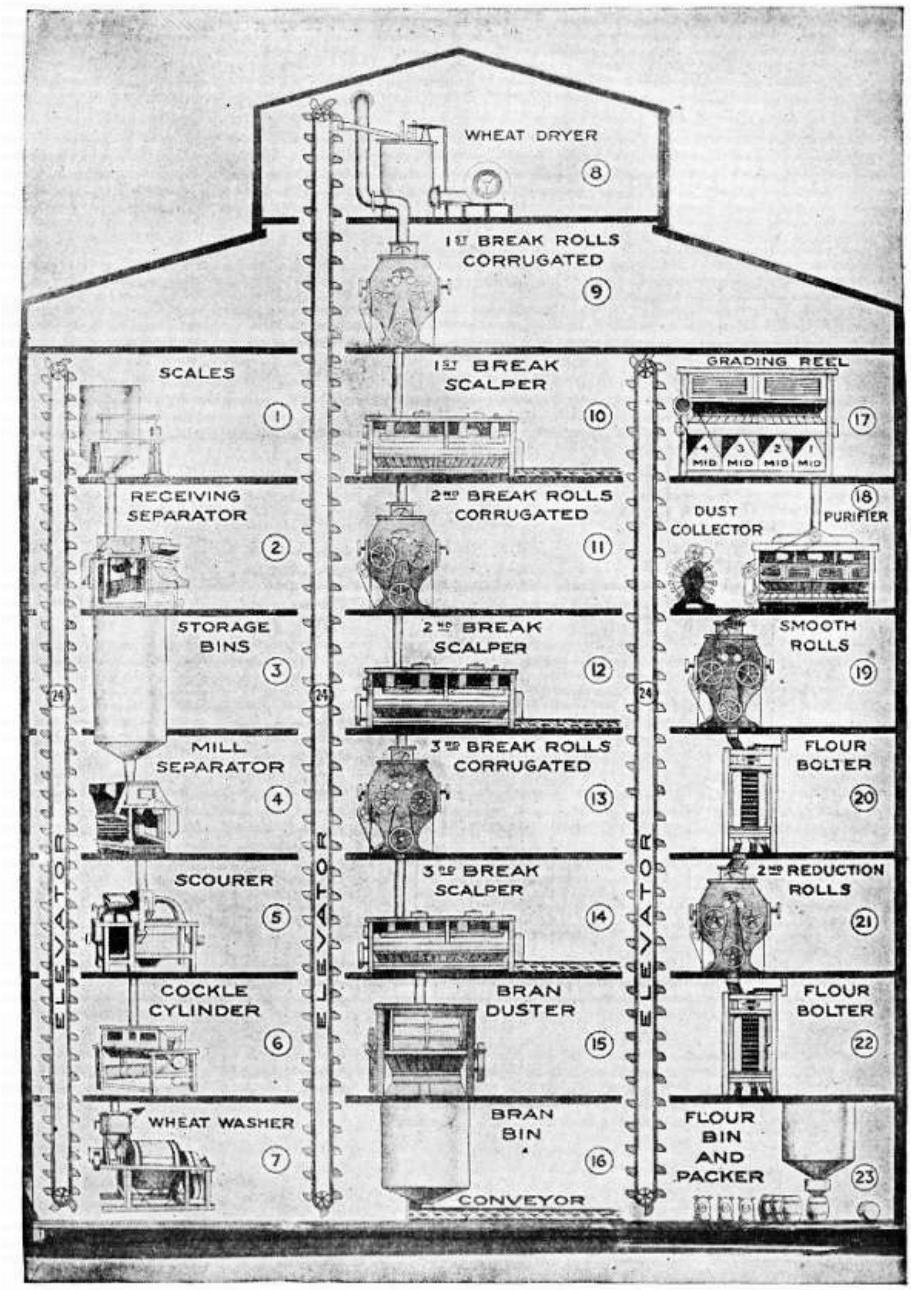

Fig. 54.—Simplified diagram of a flour mill. ***Courtesy of the Washburn Crosby Co.***

The typical parts in a modern flour mill are as follows: (1) Scales, for weighing wheat as it is received. (2) Receiving separator, for separating other kinds of seeds from wheat. (3) Storage bins, for reserve supply of wheat in advance of mill requirements. (4) Mill separator, for further separating foreign seeds from wheat. (5) Scourer, for removing dust from wheat kernels. (6) Cockle cylinder, for removing all round seeds. (7) Wheat washer, for thoroughly cleansing the wheat. (8) Wheat dryer, for drying wheat after washing. (9) 1st break rolls, for rupturing bran, enabling bran and germ to be separated from interior. (10) 1st break scalper, for sifting middlings through bolting cloth to separate from bran. (11) 2d break rolls, for further loosening the middlings from bran. (12) 2d break scalper, for separating more middlings from bran. (13) 3d break rolls, for further loosening middlings from bran. (14) 3d break scalper, for final separation of middlings from bran. (15) Bran duster, for dusting low grade flour from bran. (16) Bran bin, for packing bran for shipment. (17) Grading reel, for separating middlings by sifting through various sizes of bolting cloth. (18) Dust collector and purifier, for cleaning and purifying middlings by air and sifting. (19) Smooth rolls, for grinding purified middlings very fine to flour. (20) Flour bolter, for sifting flour from purified middlings. (21) 2d reduction rolls, for further grinding of purified middlings. (22) Flour bolter, for separating flour from purified middlings of second grading. (23) Flour bin and packer, for packing flour for shipment. (24) Elevator, for raising products to the various machines.

Other forms of flour.—There has been much discussion of entire wheat flour *versus* white flour, and the practical conclusions are as follows: the bread from whole wheat flour compares favorably with that from white flour (see Fig. 51), but this material is slightly less available for digestion than the material of the white flour. The mineral content is higher, and when the income is so limited that this cannot be furnished in milk, green vegetables,

and fruit, whole wheat bread should be used. It makes a pleasing variety, too, for any table.

Graham flour is a coarse flour, containing the outer bran. It is useful for its effect upon the intestines in case of constipation, but has to be avoided by some people on account of its irritating effect. White flour may have coarser material mixed with it, for variety in bread making, such as rye or Indian meal, or graham flour.

Yeast in bread.—Yeast is put into bread dough in order to produce carbon dioxide gas to lighten the whole mass. It is studied in the chapter on preservation of fruit, but in bread making we need to foster its growth instead of destroying it as, you will recall, we found necessary in preserving. You can easily reason out for yourself just how this should be done, especially after performing the experiments with yeast.

If yeast is in good condition, it has little effect on the flavor of bread, even if used in a rather large quantity to hasten the process.

The best forms of yeast now in use are the compressed and dried cakes, the former needing to be fresh, the latter keeping the vitality of the yeast cells for a long time. Liquid yeast may be made at home, but it is somewhat uncertain unless made with great exactness, and less easy to manage on the whole than the other forms. 198

Proportions of the ingredients.—One part of water to three of flour, or one cup to three of flour for a loaf, is an average proportion. The practiced bread maker will vary this slightly to suit the variations in the flour from time to time, but it is a safe rule for the beginner to follow. Spring wheat flour requires somewhat more water than the winter wheat, or the blend of the two. *Salt* should be used sparingly, for although it improves the flavor of the loaf, salt is a preservative which retards or prevents the growth of lower organisms, and in the case of bread it acts therefore as a check to fermentation. One teaspoonful to a loaf is the largest amount that it is best to use.

The quantity of *yeast* depends upon several conditions. The larger the amount of yeast used, the shorter is the time of rising, and as many as two compressed yeast cakes may be used to one loaf if it is necessary to hasten the process, without any perceptible effect on the color, texture or flavor. If a very large amount of yeast is used, the bread is “crumbly,” and a difference in flavor will be noticed. A smaller amount may be used if time is allowed for the rising, even $^{1}/_{8}$ cake of compressed yeast to a loaf, if the bread is to rise over night in warm weather. It must be remembered that, if the rising process is too prolonged, other organisms have a chance to work, and the bread may sour.

A small amount of *sugar* hastens fermentation, and from one to two teaspoonfuls to a loaf may be used. Many people prefer the flavor of bread with no sugar, however. Some bakers use malt extract both as a yeast food to hasten fermentation and for its effect upon the flavor.

Fat, or *shortening*, should be sparingly used, not more than one or two teaspoonfuls being allowed to a loaf. If you study a number of bread recipes, you will see that this ingredient varies more than the others. As a matter of fact, if the flour is of good quality and the bread well made, this ingredient is not necessary (in loaf bread at least), although it seems to improve the quality of biscuit and rolls. 200

Methods of mixing and the rising of bread.—Dissolve the yeast in a portion of the liquid, stir this mixture into the remaining liquid, add half the flour, and beat the mixture thoroughly at this stage. Add the sugar if any is to be used. When this soft mixture, called the “sponge,” becomes full of bubbles, add the salt, the shortening if used, and the remaining flour. Knead the dough by the hand, or by the machine, for about ten minutes, or until it is smooth and elastic. Put it into a greased bowl, cover the bowl, and allow the dough to remain until it doubles its bulk. Some bread makers knead in all the flour at the first, and obtain a good result. The first rising is more rapid, however, and experience seems to prove that the results are better on the whole with the sponge. Cut the dough down, knead again, using as little flour as possible. Shape into loaves, place the loaves in greased pans, cover, and leave again until the loaves double their bulk, when they are ready for baking. If left too long, the bubbles of gas become too large.

Temperature and *time* are important, in this matter of mixing and rising. The process may be shortened to five or six hours, including the baking, or lengthened to twenty-four by the choice of the amount of yeast and the temperature. The shorter process is the better, on the whole. After reading over the sections of the chapter on preservation of fruit, performing the yeast experiments, and discussing the results, you will be able to answer these questions:

1. What should be the temperature of the ingredients when the bread is mixed? 201
2. If milk is used, how may the souring of the milk be prevented?
3. What temperature will you secure for the bread while it is rising?

4. If an emergency occurs, and the dough cannot be kneaded or baked at the moment it is ready, what can be done? Can you think of two expedients?

A few suggestions.—The kneading stretches the gluten and long kneading gives a fine grain. In such a recipe as that for the making of Parker House rolls, a very delicate quality results from a protracted process; one old-fashioned housekeeper recommends a half hour's kneading three times. Fortunately a sufficiently good bread or roll may be made by ten or fifteen minutes' kneading at a time.

Bread dough may be cut or stirred with a large knife in place of the kneading, and this is a good method to teach to those who live in crowded space and find it difficult to have a perfectly clean kitchen and proper utensils. With this method the dough must be softer, and it remains in the bowl until it is turned into the baking pan. The resulting loaf is somewhat moist, and not fine-grained, but the flavor is good.

Brushing the surface of the dough in the bowl or pan with water or milk will prevent the formation of a dry crust on the top.

Baking the bread.—The temperature of the oven should be steady, and about 380° F. An authority recommends 180° C. (355° F.) when the loaf is put in, rising to 220° C. (425° F.).[15] The amount of flour for one loaf has been given. A loaf this size should be baked in a pan $8\frac{1}{2}$ to 9 inches × $3\frac{1}{2}$ to 4 × 3 to $3\frac{1}{2}$. The material of the pan is not of great consequence. Tin gives good results, a longer time being required for baking in a granite pan. A loaf should bake about one hour. (See Fig. 55.)

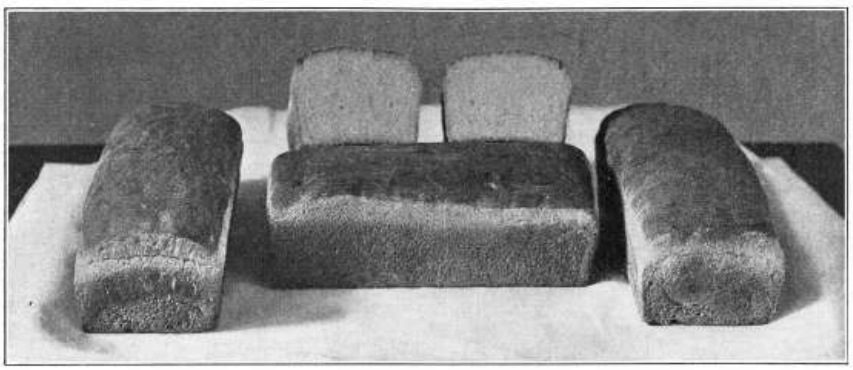

Fig. 55.—A few loaves of bread. ***Courtesy of the Dept. of Foods and Cookery, Teachers College.***

Rolls and biscuit may be shaped in many ways. (See Fig. 56.) How will the baking differ from that of the loaf?

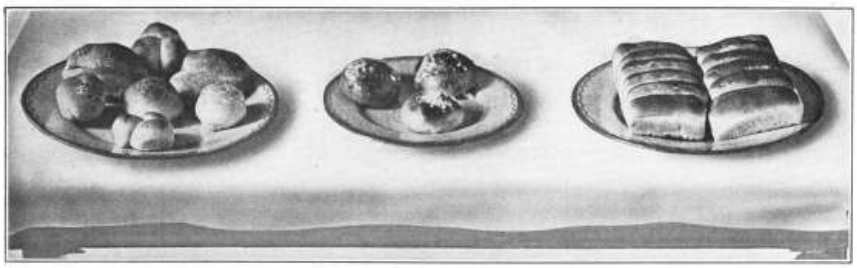

Fig. 56.—Rolls of different shapes. ***Courtesy of the Dept. of Foods and Cookery, Teachers College.***

Care of bread after baking.—Remove from the pans, cool on a rack, place in tin box or stone jar, and cover with paraffin paper.

Uses of stale bread.—Bread that has become too dry may be freshened by moistening the surface and heating in the oven. Bread may be used for toast, croutons for soup, escalloped dishes, puddings, crumbs for coating other food materials, and may be made into cups for holding other materials.

EXPERIMENTS AND RECIPES

A. Experiment with gluten.

Materials.—1 cup of flour, a 10-inch square of cheesecloth, a piece of string, a pan or tin or granite plate.

Method.—Tie the flour in the cheesecloth, and wash it, preferably under the faucet, until the starch is washed out. Remove the gluten, stretch and knead into a ball. Place the ball on a pan in the oven. Note results. Note temperature of oven, if possible.

B. Experiments with yeast.

1. *Materials*, (*a*) 1 cake of yeast dissolved in $\frac{1}{3}$ of a cupful of lukewarm water with water added to make $\frac{1}{2}$ cupful, (*b*) $\frac{1}{4}$ cup water and $\frac{1}{4}$ cup flour stirred together + 1 tablespoonful of molasses. Divide this mixture into three parts.

Method.—Add 2 tablespoonfuls of (*a*) to each of two thirds of (*b*). Put remaining portion of (*a*) into a saucepan and bring it to the boiling point and then add it to the third part of (*b*). Number these bowls 1, 2, 3.

(1) Surround bowl No. 1 with lukewarm water and keep the water at this temperature by adding warmer water from time to time. Note result.

(2) Surround bowl No. 2 with cracked ice and salt. Note result.

(3) Surround bowl No. 3 with lukewarm water as in No. 1. Note result.

(4) Before the end of the hour remove bowl No. 2 from the ice water and surround it with water at 100° F. and watch results.

State conclusions as to effect of temperature upon the growth of the yeast cell.

2. *Materials.*—1 yeast cake dissolved in $\frac{1}{2}$ cup of water 80° F. + 1 tablespoonful molasses. Limewater. 4 small wide-mouthed bottles, or test tubes, 4 saucers or beakers.

Method.—Fill the small bottle, cover with a saucer and invert; or the same with the test tubes. Keep the bottles at a temperature of 80° F. until they are emptied. Test for carbon dioxide with a match, and with limewater.

1. Plain bread.—You should be able to make your own recipe for plain bread from the foregoing pages. Write this out in detail.

2. Milk bread.

Proportions.

Milk	2	cups
Butter	2	tablespoonfuls
Sugar	1	tablespoonful
Salt	$1\frac{1}{2}$	teaspoonfuls
Yeast	1	cake dissolved in $\frac{1}{4}$ cup lukewarm water
Sifted flour	6	cups

Special method.—Scald milk and add to this the butter, sugar, and salt. Cool this until it is just lukewarm. Add the dissolved yeast and stir in the flour beating thoroughly. Proceed as in general directions.

3. Entire wheat bread.

Proportions.

Scalded milk	2 cups
Sugar	$\frac{1}{4}$ cup
or	
Molasses	$\frac{1}{3}$ cup
Salt	1 teaspoonful
Yeast	1 cake dissolved in $\frac{1}{4}$ cup lukewarm water
Entire wheat flour	$4\frac{2}{3}$ cups

Special method.—Add sweetening and salt to scalded milk and cool until lukewarm. Add dissolved yeast and beat in the flour. Cover with cloth and let rise to double its bulk. Again beat and turn into greased bread pans, filling half full. Let this rise to not quite double its bulk, and bake same as white bread. This mixture may also be baked in gem pans.

4. Parker House rolls.

Proportions.

Scalded milk	2 cups
Butter	3 tablespoonfuls
Sugar	2 tablespoonfuls
Salt	1 teaspoonful
Yeast	1 cake dissolved in 1/4 cup lukewarm water
Flour	

Special method.—Add butter, sugar, and salt to milk. When lukewarm, add dissolved yeast cake and three cups of flour. Beat thoroughly, cover and let rise until light. Cut down and add enough flour to knead (it will take about 2 1/2 cups). Let rise again, toss on floured board and knead, pat and roll out to 1/3 inch thickness. Shape with a biscuit cutter first dipped in flour. Dip the handle of a case knife in flour and make a crease through the middle of each round. Brush over 1/2 of each piece with melted butter, fold over, and press edges together. Place in greased pan, one inch apart, cover, let rise, and bake in hot oven twelve to fifteen minutes. As the rolls rise they will part slightly, and if hastened in rising are apt to lose their shape.

5. Buns.

Proportions.

Scalded milk	1 cup
Butter	1/3 cup
Sugar	1/3 cup
Salt	1/2 teaspoonful
Raisins cut in quarters	1 cup
Yeast	1 cake dissolved in 1/4 cup lukewarm water
Ext. lemon	1 teaspoonful

Special method.—Add 1/2 sugar and salt to milk. When lukewarm, add dissolved yeast and 1 1/2 cups flour. Cover and let rise until light. Add butter, remaining sugar, raisins, lemon, and flour enough to make a stiff batter. Let rise, shape like biscuits, let rise again and bake. If wanted glazed, brush over with beaten egg before baking.

6. German coffee bread.

Proportions.

Scalded milk	1 cup
Butter	1/3 cup
Sugar	1/4 cup
Salt	1/2 teaspoonful
Egg	1
Yeast	1 cake dissolved in 1/4 cup lukewarm milk
Raisins stoned and cut in pieces	1/2 cup
Flour	

Special method.—Add butter, sugar, and salt to milk. When lukewarm add dissolved yeast cake, egg well beaten, flour to make a stiff batter, and raisins. Cover and let rise. When light spread in buttered pan one half inch thick. Cover and let rise again. Before baking brush over with well beaten egg and cover with following mixture. Melt 3 tablespoonfuls butter, add 1/3 cup sugar and 1 teaspoonful cinnamon. When sugar is partially melted, add 3 tablespoonfuls flour and remove from fire.

Laboratory management.—For individual work or for work in groups of two, the use of 1/2 cup of liquid will be found to make as small an amount of dough as it is desirable to handle. In making the white bread two portions may be baked in one tin, brushing with butter where the two portions touch each other, so that the loaves will separate when baked.

Where it is necessary to hurry the process not less than 1/2 yeast cake should be used with this quantity.

It is impossible in an ordinary school period to complete the entire process. A number of solutions will occur to the teacher. One of these is to arrange the lessons as follows:

Lesson I.

Yeast experiments, summary, bread mixed in groups and set to rise, demonstration by teacher of kneading, using dough previously prepared.

Lesson II.

Quantity of dough set to rise by volunteer pupils before class. Dough kneaded, shaped and set to rise by pupils. Review of yeast experiments. Baking of bread.

Lesson III.

Parker House rolls or sweet breads mixed and set to rise, completed by volunteers after class.

In recipes where three risings are called for one may be omitted, if necessary.

7. Toast.—Directions for making toast will be found in Chapter IV.

To serve toast.—Toast should be served as soon as it is made, if possible, and if not must be kept hot. Fold it in a napkin. Toast may also be buttered, piled neatly on a plate, and kept hot in the oven until it is time for serving.

For milk toast the bread is cut somewhat thicker than for buttered toast. The milk is prepared by thickening, No. 1 under White Sauce. Dip each slice of toast in the thickened milk and then put the slices in a dish for serving and pour the thickened milk over. To moisten toast that is too dry, or when moist toast is wanted to serve under some other food, place it in a steamer or colander over boiling water a few minutes before buttering it. This is much better than toast moistened with boiling water.

8. The sandwich.—The sandwich is a convenient way of serving bread and other foods away from the table, for picnics, teas, and receptions.

To prepare the bread.—Either white or brown bread may be used. Select a well-shaped loaf of fine grain that will not crumb when it is sliced. Cut off the end of the loaf, spread the loaf evenly with butter, cut a thin slice, butter again, and so on. The butter should be softened. Be careful to spread it evenly and see that it is near the edge of the bread. Sandwiches may be made either with or without the crust. If the crust is to be removed, cut it off the loaf before buttering and slicing.

The filling.—There is an endless variety of filling possible for sandwiches, from slices of meat and poultry, which make a substantial luncheon for picnics, to the dainty fillings used for afternoon teas and receptions. A crisp bit of lettuce leaf with Mayonnaise dressing is always acceptable. Cream cheese mixed with nuts and raisins is a good filling. For a sweet sandwich, jam or jelly may be spread on the slices and possibly a small amount of cream cheese put between. You can invent many combinations.

The shape of the sandwich may be oblong, triangular, or round. The round sandwich is cut with a sharp cooky cutter. The pieces remaining may be dried and used for bread crumbs. The crusts may always be utilized in this way.

9. Croutons.—Cut a slice of bread a day old $^{1}\!/_{2}$ inch thick. Spread with soft butter, cut off the crust, put the slices in a pan, cut in cubes and set the pan in the oven until the croutons are brown.

EXERCISES

1. What is a standard for good bread?

2. Describe a perfect loaf.

3. How do climate and method of raising affect the composition of wheat and flour?

4. What are the essentials of good bread flour?

5. Why is it so necessary to control temperature in bread making?

6. What is the best temperature and why?

7. Explain the part played by gluten in bread making.

8. State the underlying principles of bread making.

9. Explain the advantage of a bread machine over the hand in kneading.

10. What is the best temperature for baking a loaf? For baking biscuit?

11. What are the principles and practical points in toast-making? (See Chapter IV.)

12. What is the argument in connection with homemade bread *versus* baker's bread?

13. How can the public insure good quality baker's bread?

14. What is the nutritive value and digestibility of bread?

15. How much bread in the 100-Calorie portion?

CHAPTER XIII

MEATS AND POULTRY

The meats that we commonly use are derived from the flesh of domestic and wild animals of herbivorous habits and from fowls. The flesh of carnivorous animals is seldom used as food. The various kinds are obtained as follows:

Meat	*Animal*
Beef	Ox
Veal	Calf
Mutton	Sheep
Lamb	Young sheep
Pork	Pig
Ham and bacon	Pig
Venison	Deer

Under the head of poultry we include the common fowl, turkeys, ducks and geese, the guinea hen, and game birds.

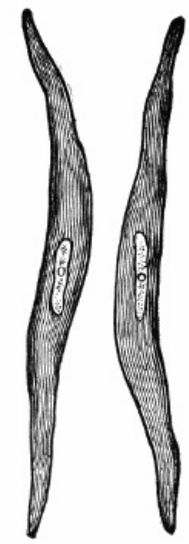

Fig. 57.—Fiber cells of plain muscular tissue. *Kimber's Anatomy for Nurses.*

Quality of good meat.—The quality of meat is dependent on the condition of the animal from which it is derived. The creature should be in perfect health and well fed. Good beef is largely obtained from the cattle ranges of the West, but there is no reason why cattle should not be raised to greater extent in the East. Sheep for mutton are best raised where the climate is not too severe. Methods of slaughter, transportation, and preservation all affect the quality of beef. The pure food laws and Federal meat inspection law are valuable to the consumer in their control of the quality of the meat, that it shall be free from disease and from adulterations. See Chapter XVII for the discussion of preservatives and pure food laws.

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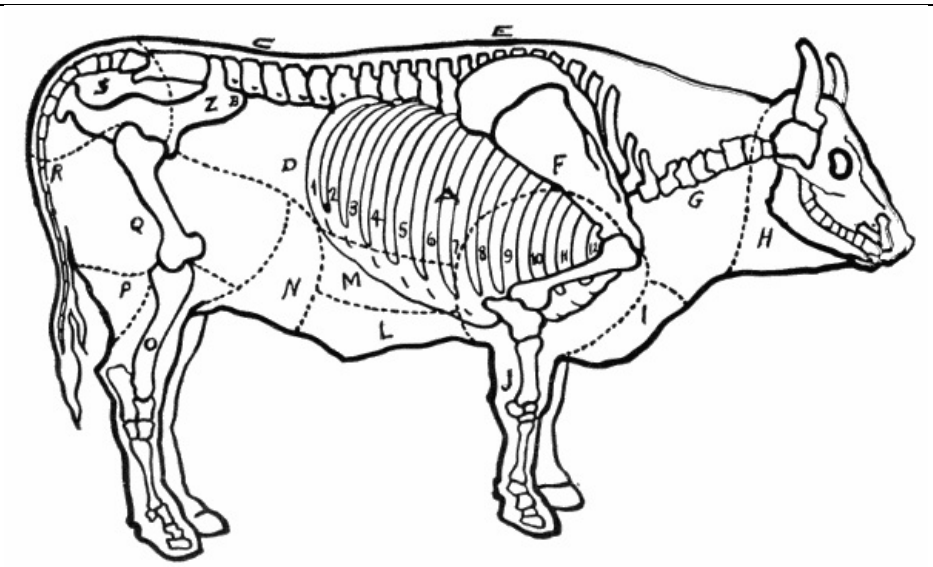

Fig. 58.—Cuts of Beef.

Key:

A. Ribs
B. Hip bone
C. Loin
D. Porterhouse
E. Prime ribs
F. Shoulder
G. Neck
H. Head
I. Brisket
J. Shin
L. Navel
M. Plate
N. Flank
O. Leg
P. Horseshoe
Q. Round
R. Oxtail
S. Rump
Z. Sirloin

Courtesy of Bureau of Publications, Teachers College.

In meat as it is purchased we have bone, fat, and the flesh, consisting of the muscle of the animal with its connective tissue. The color of the meat should be clear and fairly bright, not purplish or dull. There should be little or no odor, and the meat should be firm and elastic to the touch.

Beef should be a bright red and well streaked with fat.

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Veal should be pink and is somewhat less firm than beef. If watery and flabby, it is too young.

Mutton is a duller red, and firm. The fat is white or slightly yellow and hard.

Lamb is pink, rather than red, and slightly less firm.

Pork is rather pale, somewhat less firm than beef and mutton, and the fat is softer.

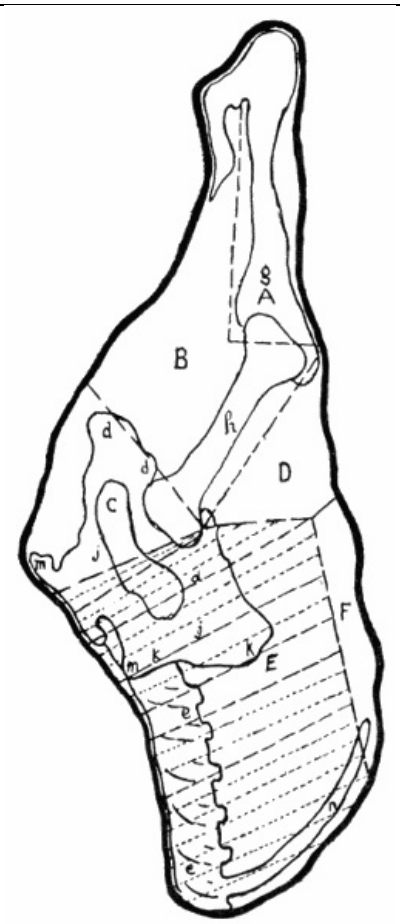

Fig. 59.—The hind quarter of beef hanging.

Cuts:
A, Leg; *B*, Round; *C*, Rump; *D*, Top Sirloin; *E*, Loin; *F*, Flank.

Bones:
g, leg bone; *h*, socket bone; *j*, rump bone; *k*, hip bone; *e*, back bone; *m*, part of rump bone; *n*, wing rib.

Courtesy of Bureau of Publications, Teachers College

Tough and tender meat.—To understand the difference between the tough and tender cuts we must be familiar with the structure of the muscle (see Fig. 57). Each muscle consists of bundles of tubes held together by connective tissue. In tough meat, the muscle tubes are thicker and there is more connective tissue present. Exercise strengthens the muscle, and this accounts for the fact that the unexercised muscles of the young animal give us a softer meat. In the mature animal the muscles most exercised furnish the tough meat, and the less used muscles the tender. If you study Fig. 58, you can easily determine where the tough meat will occur, if you think of the proportionate amount of exercise that the different muscles receive. The tough cuts come from the neck and legs, the tender cuts from the middle of the back, the toughness increasing as the cuts approach the neck and the hind legs. The muscles of the abdomen are also tender, but they give a coarse-grained meat. The various cuts of meat are shown as they occur in the standing animal in Fig. 58, and in the hind and fore quarters hanging, in Figs. 59 and 60. The individual cuts of beef and mutton are shown in the figures that follow. The tender cuts from the ribs and loin are the most highly prized, and therefore bring the highest price. These cuts are liked because of their tenderness although the nutritive value of the tough meat is as high or possibly even higher than that of the tender. All meat is now high-priced, and you will find the reasons for this discussed in Chapter XVII. For the sake of economy we are forced to use the relatively cheaper cuts, and to seek for meat substitutes. We must also take pains to use the cooking processes that will make the tough meats palatable.

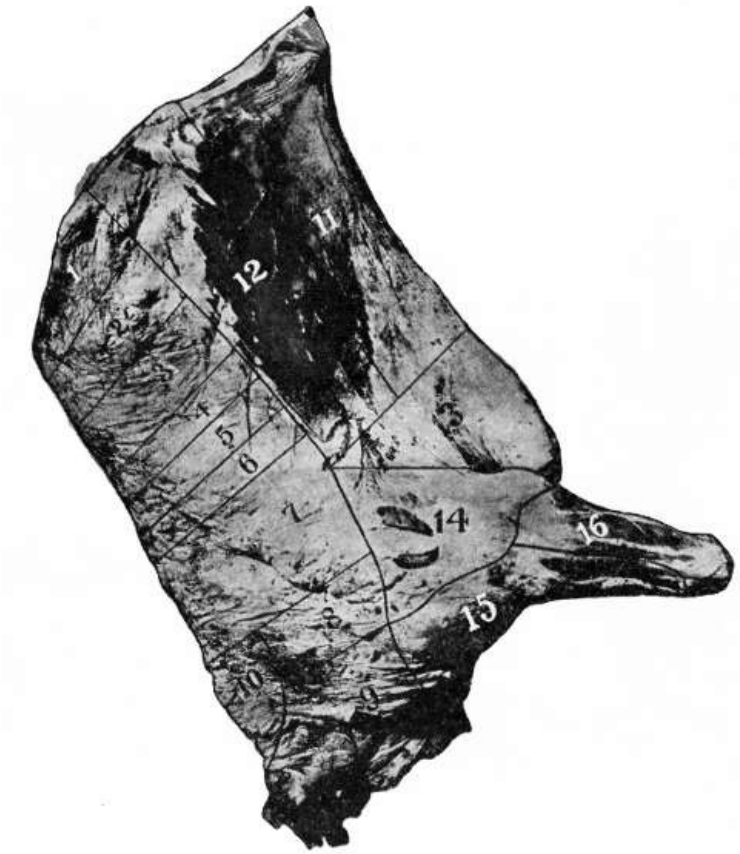

Fig. 60.—The fore quarter of beef, hanging.

KEY	USES
1. 1st and 2d ribs Prime	Roasts
2. 3d and 4th ribs Prime	”
3. 5th and 6th ribs	”
4. 7th rib	”
5. 8th rib	”
6. 9th rib	”
7. Chuck steaks, or roasts, 10th to 13th ribs	”
8. Chuck pot roast	”
9. Neck	Beef tea, etc.
10. Yoke	”
11. Navel	Stew and corning
12. Plate	”
13. Brisket	Corning
14. Cross Rib	Pot Roast
15. Shoulder	”
16. Shin	Soup

Courtesy of the Bureau of Publications, Teachers College.

Composition and nutritive value.—Figure 64 shows you the composition of several common meats. Meat is valuable chiefly for its protein, fat, and mineral salts. The juices of the meat in the muscle cells contain nitrogenous extractive materials which give flavor, and are possibly stimulating, but they have no food value. From the bone and also from the connective tissue, gelatin is dissolved in cooking. Gelatin is a protein, but differs in certain chemical properties from other proteins, and cannot be used as the only source of nitrogen. It is a very useful protein, however, and as it can be substituted in part for more expensive proteins, it used to be called a “protein saver.”

In spite of the fact that meat is a common article of diet it should not be used in excess. Other forms of protein, as those in eggs and milk, are usually digested as easily, and most people can digest vegetable proteins if the vegetables are carefully prepared. Very little children should not have meat, for it has stimulating properties which are undesirable for them, and it takes away the taste for foods more important for growth (see Food for Growth, Chapter XVIII). When used largely in the diet, meat tends to cause intestinal putrefaction and to form excess of acid in the body. It is less likely to be harmful if taken with plenty of fruits and green vegetables and liberal drinking of clear water.

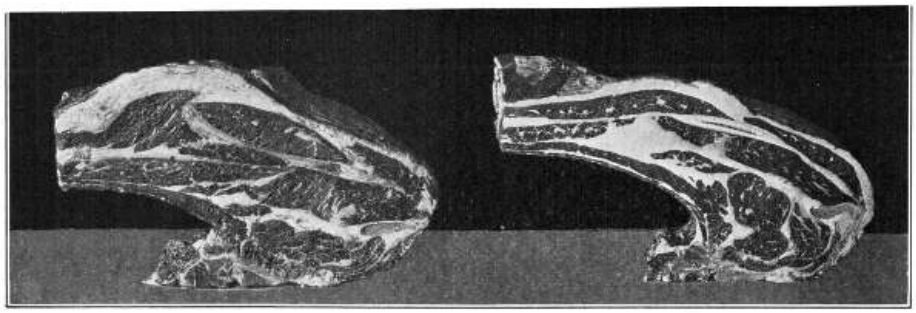

Fig. 61a.—Left: Chuck rib roast, 9th and 10th ribs. Right: Blade rib, 7th and 8th ribs.

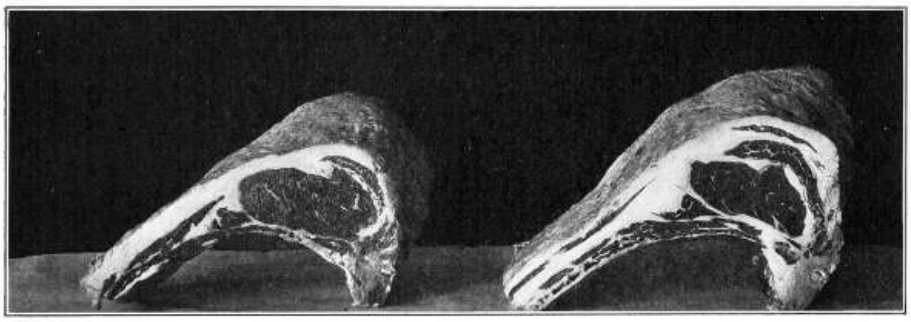

Fig. 61b.—Left: 1st cut prime rib roast. Right: 2d cut prime rib roast. *Courtesy of Bureau of Publications, Teachers College.*

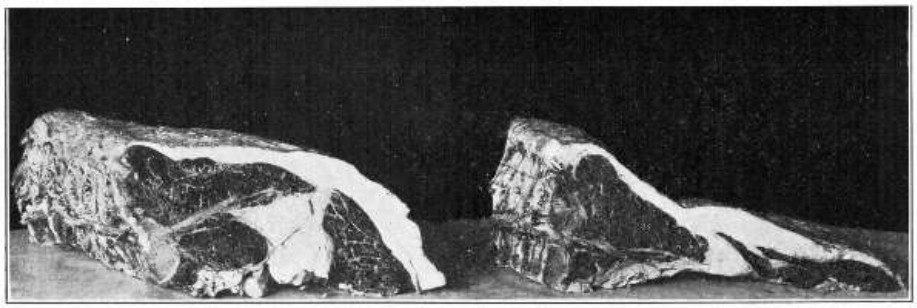

Fig. 62a.—Porterhouse steak; Delmonico steak. *Courtesy of Bureau of Publications, Teachers College.*

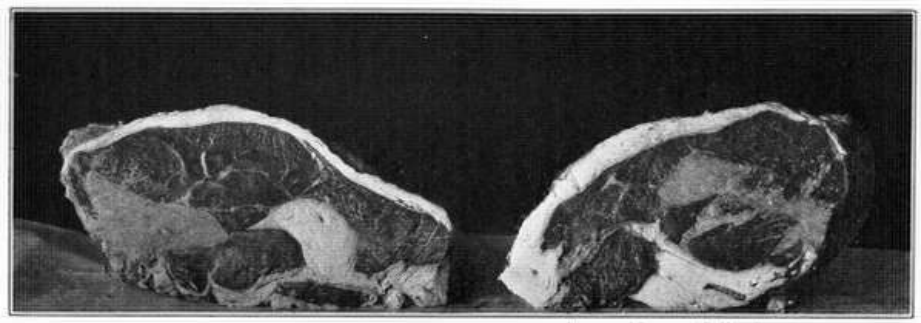

Fig. 62b.—Flatbone sirloin steak; Hip steak.

It should be realized that in none of the European countries is meat used so liberally as in the United States, and that there are reasons to believe that we might be better off if we could satisfy ourselves with a meat consumption nearer the average of other civilized peoples—say half as much meat per person per year as we are now accustomed to use. The fuel value of meat depends largely upon the amount of fat which is eaten. If a pound of steak contains 2 ounces of fat and 14 ounces of clear lean, the rejection of the fat means a loss of fully one half of the fuel value. The following table shows the difference between raw meat of the same cut, free from bones and connective tissue, due to differences in amounts of fat. Most people would prefer the strictly lean meat.

Table Showing 100-calorie Portions of Raw Edible Meat

	Lean Meat	Medium Fat
	Weight, Ounces	Weight, Ounces
Beef, round	2.3	1.7
Chicken (Fowl)	3.2	1.6
Lamb, leg	2.8	1.6
Mutton, leg	1.9	1.5
Pork, loin chops	1.4	1.0
Veal, leg	2.9	2.2

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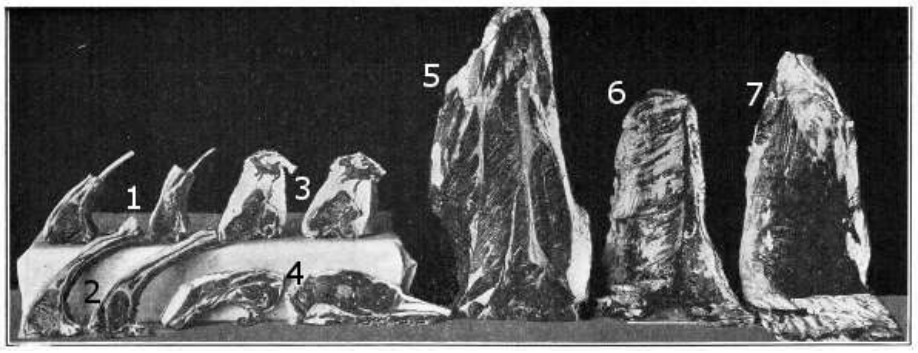

Fig. 63a.—1: Rib lamb chops, French. 2: Rib lamb chops. 3: Loin lamb chops. 4: Left: Blade shoulder chop. Right: Round bone shoulder chop. 5: Chuck steak. 6: Skirt steak. 7: Flank steak.

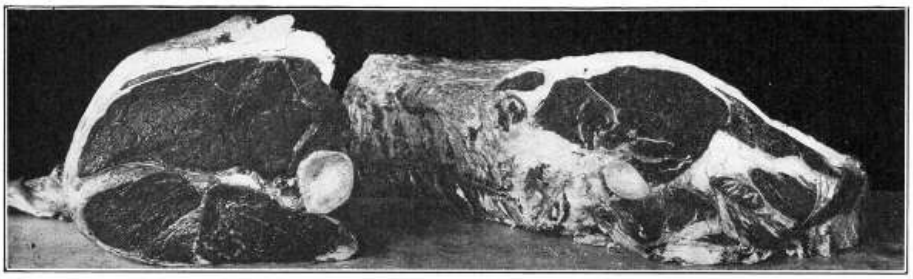

Fig. 63b.—Left.—Top and bottom round. Right.—Round bone sirloin steak. *Courtesy of Bureau of Publications, Teachers College.*

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For very complete and conveniently arranged tables giving the percentage composition, the food values per pound and per ounce, the weight and nutrients of the 100-Calorie portions of all the important meats and other food materials as well, see Rose's "Laboratory Handbook for Dietetics."

Dangers from meat.—Three dangers from meat must be recognized; (1) animal parasites, such as the trichina sometimes found in pork, (2) poisons developed in the meat by bacteria when it is kept too long or without sufficient refrigeration, this danger being recognized as ptomaine poisoning, (3) bacteria, sometimes present in meat, which are directly injurious to man and which are now held to be the cause of most of the sickness commonly attributed to ptomaine poisoning. Government protection must be given us here, but the housekeeper too has a responsibility. If the raw meat has failed to receive proper inspection, we can protect ourselves by cooking the meat to a degree that will kill any parasite present. For this reason meat should not be served that looks raw or too underdone. The cooked meat should be pink rather than red.

Meat poisoning may be avoided in the first place by exercising great care in regard to the odor of meat. Meat may hang to "ripen," as the butchers say, but one must learn to distinguish between the odor of properly ripened meat, and that of even slightly tainted meat. Quite as important is the *rapid cooling* of meat, poultry, fish, and soups that are not to be used at once. Cases of digestive disturbance and even actual poisoning sometimes occur when underdone meat, especially lamb, veal, or poultry, remains warm overnight.

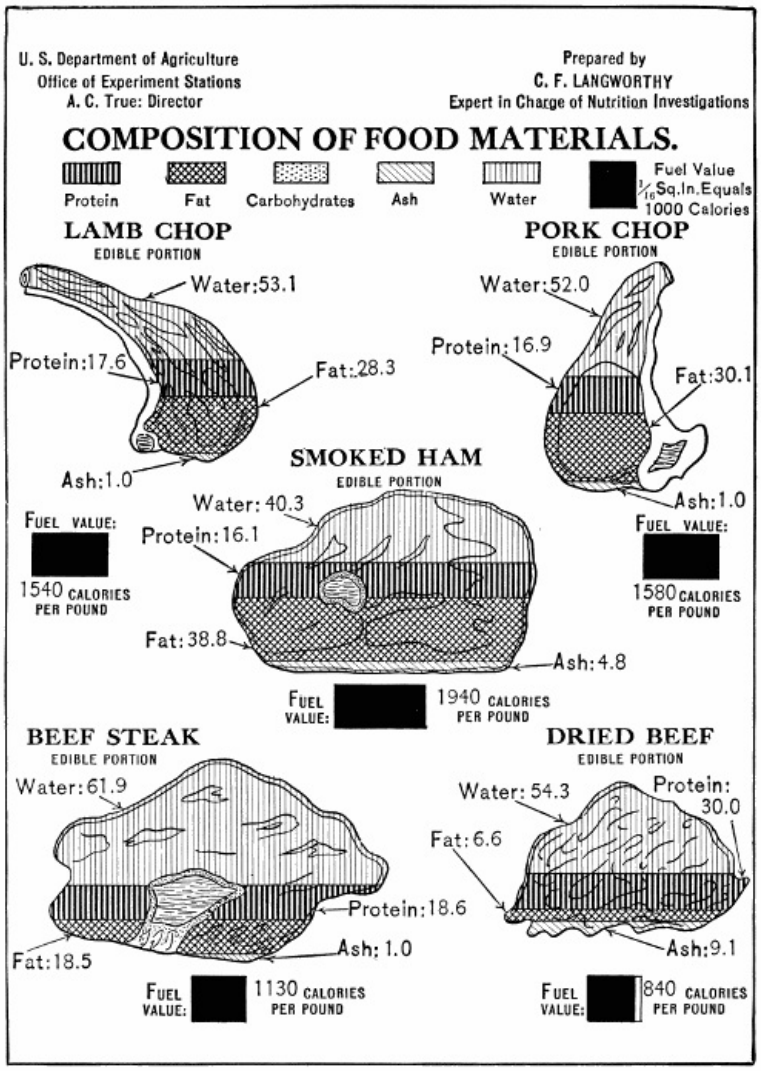

Fig. 64.—Composition of meats.

The effect of heat upon meat.—The *fat* of meat is melted by heat. The meat fiber shrinks and hardens with intense heat; on the other hand it softens at a temperature somewhat below the boiling point of water. The structure of the muscle must be studied further in order to make the principles of cooking perfectly clear. If you think of the structure of the muscle cell as somewhat resembling the structure of an orange, you can picture quite clearly what happens under different conditions. Open a section of orange and separate some of the single cells. These may represent the muscle cells of meat that can be seen only under the microscope. If you cut across one of these tiny cells, the contents will escape, and this is what happens when the muscle cells are cut across. Then, too, if the muscle is heated, the juices will pass through the membrane of the cell, and this happens, too, if the meat is put into cold water. The substances in the juices of the meat which are not coagulated by heat are called the extractives, because they can be extracted by hot water. The most valuable protein matter remains behind in the muscle cell, however. Among these proteins are those known as meat albumin, and this behaves in cooking very much as does the white of egg,—that is to say, it coagulates. 220

Bearing these facts in mind, we can decide just what to do in order to bring about the result that we desire in meat cookery, for sometimes we wish to extract the juices and sometimes we wish to have all, or nearly all, retained in the meat. We are now ready to state the principles of meat cookery as follows:

1. *Juices retained.*

In broiling, pan broiling, roasting, and boiling the high temperature coagulates the meat albumin and hardens the fiber on the surface, thus forming a coating which prevents the further escape of juices. In the roasting and boiling of large pieces the temperature may then be lowered to prevent the further shrinking and hardening of the fiber in the interior of the meat, which comes from a protracted high temperature. With a very thick steak after the surface searing the cooking may be completed in the oven. 221

2. *Juices extracted.*

In beef juice or beef tea, this may be done by placing the chopped beef in a jar and placing the jar in an oven, or in hot water; or for beef tea and ordinary soup by putting the chopped meat, or small pieces of meat, in cold water and heating the water slowly.

3. *Juices partly retained and partly extracted.*

This is desirable in stews, in braised beef, and in pot roast. State for yourself just how this would be accomplished.

4. *Connective tissue softened* at low temperature, and with water.

5. *Sterilization by continued* heat which destroys parasites and bacteria.

6. *Rapid cooling*, when serving is not immediate.

Flavors suitable with meat.

Herbs. All the pot herbs including savory, marjoram, thyme, sage, pot marigold.

Vegetables. Onion, carrot, turnip, celery, celery root, parsley root and leaf.

Spices. Clove, allspice, mustard, red, black, and white pepper. Some nationalities use nutmeg.

Acids. Lemon, tomato, and other acid fruits.

EXPERIMENTS AND RECIPES

Experiment A.

Chop finely a small piece of meat, squeeze out the juice with a lemon squeezer and heat this juice in a saucepan. Observe the coagulation that takes place.

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Experiment B.

(1) *Apparatus.*—If possible, 2 glass beakers, 1 square wire net. If these are not available, use an ordinary tumbler and a small saucepan.

(2) *Method.—a.* Put a small piece of meat in a beaker with cold water, and allow it to stand.

b. Bring water to the boiling point in the beaker on the net over the gas flame. Throw in a small piece of meat.

Compare the appearance of the two pieces of meat and the water in the two beakers.

1. Broiled steak.

(1) Wipe steak with a damp cloth. If a wood or coal stove is used, have a bed of glowing coals ready. If gas is used, have the gas broiler thoroughly heated. Grease the bars of the broiler. Place steak in the broiler and sear meat first on one side, then on the other. Continue to turn the broiler and cook the meat until it is brown and done according to taste. Steak an inch thick will take about ten minutes to be cooked to a medium degree. Chops are broiled in the same way.

(2) Steak and chops may also be broiled in the pan. An iron frying pan is the best utensil. Heat the pan, and brush it over with a small piece of fat cut from the steak or the chops. The purpose of this is merely to keep the meat from sticking to the pan. The principle of procedure is the same as with (1). The steak or chops must be frequently turned, using a knife and a fork, being careful not to prick the meat with the fork. The length of time is slightly longer than for (1). This method must not be confused with the frying of steak in a pan with a large amount of fat. By this method the steak is not fried, and it is often a convenient substitute for (1).

2. Roast of beef.

Wipe roast with a damp cloth. Sprinkle with salt and dredge with flour. Place in a roasting pan, fat side up if it is a standing roast. Put the roast in a very hot oven and after fifteen minutes reduce the heat. Baste roast two or three times with the fat that tries out during cooking. The usual allowance of time for a medium rare roast is fifteen minutes for every pound of meat.

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Roast beef gravy.—After the roast has been taken from the pan, pour out all but $1\frac{1}{2}$ tablespoonfuls of the melted fat. Stir in 1 heaping tablespoonful of flour and brown very slightly. Add $\frac{1}{2}$ teaspoonful salt. Strain.

3. Bouillon.

Shin of beef	6 pounds
Cold water	3 quarts
Peppercorns	½ teaspoonful
Cloves	6
Bay leaf	½
Thyme	3 sprigs
Marjoram	1 sprig
Parsley	2 sprigs
Carrot Turnip Onion	½ cup each cut in dice
Celery Salt	1 tablespoonful

Wipe beef and cut the lean meat in inch cubes. Brown one third of the meat in fat cut from meat or marrow from a marrow bone. Put remaining two thirds with bone and fat in soup kettle, add water and let stand for thirty minutes. Place on back of range, add browned meat, and heat gradually to the boiling point. Cover and cook slowly six hours, keeping below the boiling point during cooking. Add the vegetables and seasonings, cook one and one half hours, strain and cool as quickly as possible. This is called soup stock.

To clarify bouillon.—When stock is cold, remove fat which has hardened on top and put quantity to be cleared into a stew pan. Allow white and shell of one egg to each quart of stock. Put over fire and stir constantly until boiling point is reached. Boil two minutes. Set back on stove and let simmer twenty minutes. Remove scum and strain through double thickness of cheesecloth.

4. General directions for meat soups.

Soup making is an art that is well worth cultivating. The expert soup maker will obtain delicious flavors by adding bits of many kinds of left overs—almost anything that is found in the refrigerator in the way of fruit, vegetables, and pieces of meat. With the coming of the gas stove, many people have given up soup making. These various left overs add much to the flavor of the soup and can be used in a thickened soup which is like the bouillon strained and thickened. The thickening may be flour, arrowroot, cold cereal, sago, tapioca, or rice. Spaghetti, vermicelli, and fancy forms of paste are sometimes served. Vegetables may be cut into dice or fancy shapes and served in the clear soup. A great variety is possible in flavoring and serving soup if one will take the trouble to make it an art.

Soup meat may be served in a soup of the old-fashioned kind, thickened and containing vegetables. In such a soup some fat is left, and the total result is a dish that makes a meal when served with bread.

When the soup is a clear soup, the meat that is left may be used for made over dishes; although some practical housekeepers think that it costs almost as much to make it palatable as to buy fresh meat. Try it in an escalloped dish with plenty of tomato, onion, and some dried herbs for additional flavor.

5. Beef stew with dumplings.

Lean meat	3 pounds
Potatoes	4 cups, cut in ¼ inch slices
Turnip Carrot	⅔ cup each, cut in half inch cubes
Onion	½ small one, cut in thin slices
Flour Salt Pepper	¼ cup

Wipe meat, cut in 1½ inch cubes, sprinkle with salt and pepper, and dredge with flour. Cut some of the fat in small pieces and try out in frying pan. Add meat and stir constantly, that the surface may be quickly seared. When well browned, put in kettle, and rinse frying pan with boiling water, that none of the flavor may be lost. Cover with boiling water and boil five minutes, then cook below the boiling point until meat is tender (about 3 hours). Add vegetables except potatoes and seasoning the last hour of cooking. Parboil potatoes five minutes and add to stew 15 minutes before taking from fire. Thicken stew with ¼ cup flour mixed with enough cold water to pour easily. Pour in deep hot platter and surround with dumplings.

Teacher's Note.—Broiled steak would be suitable for group work, using small steaks (Delmonico cut). A small roast may be prepared by a group and roasted after class. This meat and that left from the steak should be used in a subsequent class for a lesson on left over meat. Broiled or pan-broiled chops may be prepared individually.

6. Dumplings.

Flour	2 cups
Baking powder	4 teaspoonfuls
Salt	½ teaspoonful
Butter	2 teaspoonfuls
Milk	⅞ cup

Mix and sift dry ingredients. Work in butter with a knife, add milk gradually. Remove enough liquid from stew so that when dumplings are dropped in they will rest on top of meat. Drop by spoonfuls and let cook about twenty minutes.

The stew should be thickened before dumplings are dropped in.

7. Uses of left over meat.

(1) *Rissoles.*—Run meat together with small piece of onion through a chopper. Add salt, pepper, a little cold cereal, or bread crumbs, and beaten egg, allowing one egg to about a pound of meat. Shape into flat round cakes, roll in flour and sauté in butter until well browned. These may be served with tomato sauce.

Tomato Sauce.

Onion	1 teaspoonful chopped
Salt	¼ teaspoonful
Pepper	
Flour	2 tablespoonfuls
Butter	2 tablespoonfuls
Sugar	1 teaspoonful
Cloves	3
Tomatoes	2 cups

Brown the onion in butter and stir in the flour. When it has bubbled up, add the tomatoes and seasonings. Stir constantly until it thickens. Strain into a hot bowl.

Teacher's Note.—One sixth of these recipes would be as small an amount as it would be practicable to use.

(2) *Croquettes.*

Cold meat or chicken	2 cups
Salt	½ teaspoonful
Pepper	⅛ teaspoonful
Cayenne	Few grains
Onion juice	Few drops
White sauce	1 cup, thick, hot
Beaten egg	
Dried bread crumbs	

Mix ingredients in order given and let mixture cool. Shape into croquettes, roll in crumbs, beaten egg and crumbs again, place in a frying basket and fry in deep fat to a golden brown.

(3) *Escalloped meat*

Cold meat	
Bread crumbs, soft	2 cups
Onion	1 slice, chopped fine
Salt	½ teaspoonful
Mixed poultry seasoning	1 tablespoonful

A little chopped celery is desirable

This is a simple method of serving left over meat that needs no specific

recipe. Layers of bread crumbs are alternated with layers of meat which may be chopped or cut into small pieces. Liquid may be used like tomato or tomato juice, or soup that is left over, or plain water. The flavor may be varied by the use of the different materials that are suitable to meat. Layers of mashed potato may be used instead of bread.

POULTRY

In selecting poultry see that the flesh is firm, that there is a good amount of fat underneath the skin, and that the skin is whole and a good yellow. Notice the odor of the fowl particularly. The skin of cold-storage poultry has not such a good color and is sometimes broken. Often the flesh is shrunken, and if the cold storage has been too long continued the odor is unpleasant. Refrigeration is allowable for a period. Another way to judge cold-storage poultry is by the price. Well-fed poultry freshly killed brings a high market price and a bargain quite often proves to be poultry too long in cold storage. Good quality poultry is at present a high-priced food. 227

To prepare poultry for cooking, the "dressing" of the chicken is often done now at the market. If it is necessary to do this at home, make an incision with a sharp knife just inside of one of the legs, in the groin. Insert the hand and remove all the entrails. The skin must be loosened at the neck and the crop removed. In any case, wash the chicken thoroughly inside and out, even holding the cavity under running water. If there is hair remaining on the chicken, singe this off over burning paper or over a gas flame.

The composition is essentially the same as that of meat. The white of chicken, fowls, and turkeys is thought to be more digestible than the dark meat.

GENERAL METHODS AND RECIPES

The principles of cookery are the same as with the meat. Chicken soup is made on the same principle as beef soup. After straining, it is delicious with the addition of milk or cream. The meat of the chicken may be chopped fine and used as a thickening. Rice may be added or a hard-boiled egg chopped fine.

Chicken may be served cold, for luncheon or supper, and is always very desirable in made-over dishes. Any stuffing left over may be used in the made dishes.

1. Roast chicken.

Dress and clean a chicken. Fill the cavity with stuffing and sew edges together. Truss chicken and place on its back in a roasting pan. Rub surface with salt and spread breast and legs with butter. Dredge with flour. Put a little water in bottom of pan. Place in hot oven and when flour is well browned, reduce the temperature. Baste frequently during roasting with liquid in pan. When breast meat is tender and a brown crust formed the bird is cooked. A four-pound chicken requires about 1 ½ hours. 228

Stuffing. (See recipe for stuffing, page 237.)

Mix all together. No moisture need be added as the juices of the chicken will be sufficient.

Gravy.—Pour off liquid from pan in which chicken has been roasted. Add 2 tablespoonfuls of either chicken fat or butter. Stir in 2 tablespoonfuls of flour and let bubble up. Add one cup stock, in which giblets, neck, and tips of wings have been cooked, and stir steadily until thickened. Add ½ teaspoonful salt.

2. Chicken fricassee.

Clean and cut up a fowl. Cover with boiling water and let boil 5 minutes. Simmer until meat is tender. Remove chicken from kettle and place pieces in hot, greased frying pan. Sauté until browned. Put on platter. Melt 4 tablespoonfuls chicken fat in pan. Add 4 tablespoonfuls flour. Stir and let bubble up. Add 2 cups chicken stock, stir and let boil until thickened. Pour over chicken on platter.

Laboratory management.—A lesson on poultry is a very expensive one and difficult to manage so that each may have a share of the work. Such a lesson is

suitable where the pupils have had work in previous years and are used to working in groups.

Preserved meats and poultry.—Smoked and salted meats are valuable foods, although the nutritive content is somewhat less available for digestion. The salted and smoked meats need long and slow cooking below the boiling temperature of water.

Canned meats and *poultry* of good quality are now in the market, and they are convenient and useful when not used to excess. Buy well-known brands. The government inspection of canned meats is of great importance, for the individual cannot protect himself. Canned soups are convenient for those who cook by gas and who live in small quarters. Buy good brands even if they are somewhat more expensive. The best firms manufacturing canned soup are scrupulously clean in their methods and pride themselves on using good material.

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Other parts of meat and poultry.—Some of the internal organs of the animals and fowl are used for food. Most of them are comparatively cheap, and may be made palatable.

The *liver and kidneys* are organs having to do with the waste products of the body and objection is raised to their use on that account. If used, they should be soaked in cold salted water, put into fresh cold water, and allowed to heat very slowly. This water should be poured off, and then a brown stew can be made. What flavors are pleasant with liver and kidneys?

Make your own recipe for liver or kidney stew.

The *heart* does not contain waste products. Why is it tough? What process would you select to make it tender? Even when softened, it would not be attractive or very palatable without further treatment. It is hollow, somewhat as the chicken is before roasting. Look over the recipes and flavors suitable to meat and see if you cannot make your own for Baked Heart.

Sweetbreads, the pancreas, are highly prized on account of their delicacy, and are costly. They may be broiled, or served in sauce in pastry cases or in patties.

Calf's head and brain.—The brain is sometimes used as substitute for sweetbreads. From the meat and bones of the head soup and stew may be made.

EXERCISES

1. From what animals are meats derived?

2. What are the chief values of meat?

3. Why should its use be limited?

4. What actual dangers may arise from its use?

5. What precautions must be exercised by the government, inspector and the housekeeper?

6. We are told that chicken pie should have the crust pricked or lifted when it comes from the oven. Is this reasonable?

7. How may you judge good meats in the market?

8. Why is the neck of beef tough? For what would you use it?

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9. Why is porterhouse steak tender? Why is it not used in a stew? (It would make a delicious stew.)

10. What cuts would you select for stewing and braising?

11. Make a list of the cuts of beef and mutton and lamb, pork, etc., in your notebook, with the best methods of cookery for each.

12. Add to this list the current prices of each in your locality.

13. What is the size and cost of a 100-Calorie portion of beef round?

14. With this in mind, calculate how much round steak you would buy for dinner for five people. How much porterhouse?

15. Explain the structure of the muscle.

16. What takes place when meat is seared? When is this process used?

17. Explain the principle of soup making. Devise an experiment to show the effect of salt

upon the pieces of meat. What is the nutritive value of soup meat?

18. Explain the principle of stewing meats.

19. What is the difference between broiling and pan broiling?

20. What are some of the best ways of utilizing left over meat and poultry?

21. Which is more economical, croquettes or an escalloped dish? Explain fully.

22. How may you distinguish poultry in good condition from that too long in cold storage?

23. Why is good poultry not a cheap food?

24. Discuss making soup *versus* buying canned soup.

25. What are the advantages of canned meat? The possible disadvantages?

CHAPTER XIV

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FISH, SHELLFISH, AND OTHER MEAT SUBSTITUTES

Fish and shellfish are valuable assets as food, so much so that the government has a Bureau of Fisheries, and has established stations at intervals on the coast and on inland lakes for the study and production of those foods that come from salt and fresh water. We have used these products of the waters as if the supply were limitless, forgetting that fish and shellfish are living creatures with habits that we cannot ignore without working havoc to the species. Young salmon and shad are hatched in the upper reaches of the rivers, and if we insist on trapping the mature fish at the river mouth on their northern migrations, the number of young decreases, and salmon and shad become high-priced foods. To ignore fishery and game laws is an ignorant and dishonest proceeding, with far-reaching economic results.

Varieties of fish.—In Bulletin No. 28 of the Office of Experiment Stations, United States Department of Agriculture, forty-four different fish are listed, all used as food. A visit to the fish stall in the market of a seaboard city will acquaint you with many interesting species. Fresh and salt water fish differ in flavor, and there is a difference to be detected between fish from running, or from lake water, brook trout, for instance, having a superior flavor. The food supply also influences the flavor, and both fresh and salt water fish have a better flavor when taken from sandy and rocky bottoms rather than muddy. The habit of the fish also has an effect on the quality and taste. The chequit, for instance, is so sluggish and easy to catch that it is sometimes called “lazy” or “weakfish,” and it is watery and poor flavored compared with the shad, a fish of more vigorous habits. The amount of fat also causes a difference in flavor, such high flavored fish as salmon and shad containing much fat. The distinctive flavors of mackerel and herring are apparently not due to fat, since their fat content is not particularly high. Among the most common and best liked fish are bass, blackfish, bluefish, cod, flounder, haddock, halibut, herring, mackerel, porgy (sometimes called scup or scuppaug), salmon, shad, smelt, weakfish, whitefish. Brook trout and salmon trout are luxuries.

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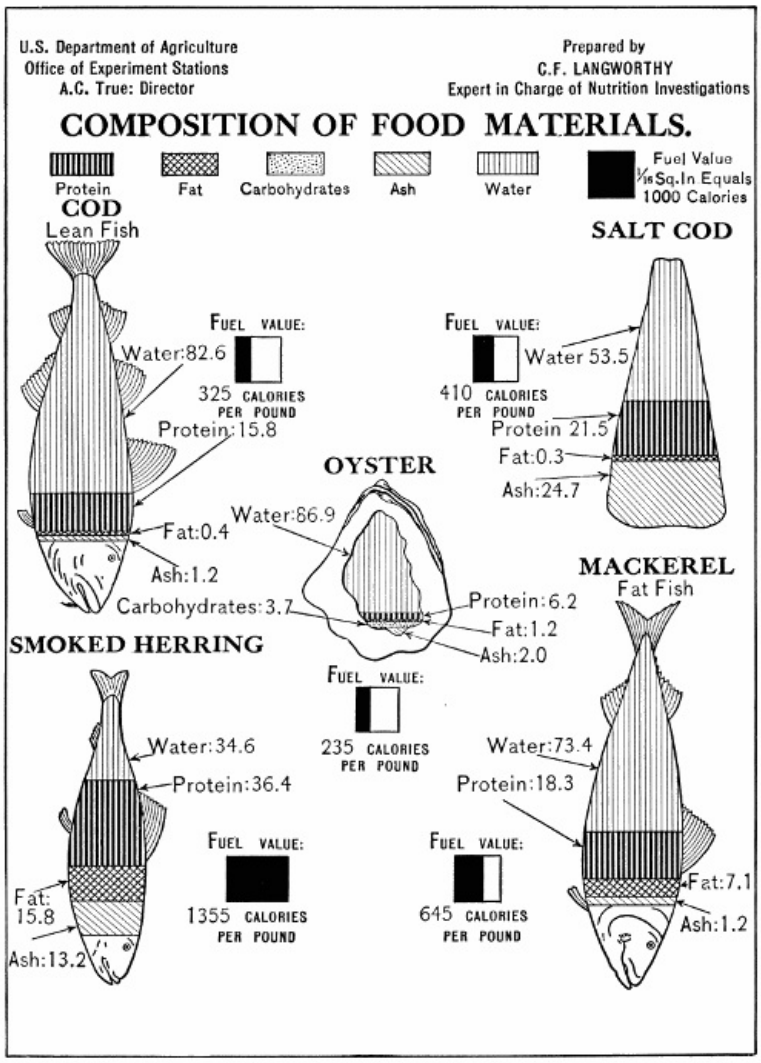

FIG. 65.—Composition of fish.

Composition and nutritive value.—Figure 65 shows the composition of several kinds. Compare their composition with that of meat. The nutritive content is high, yet fish seems a lighter and less satisfying food than meat, although on the seaboard of some countries it is the chief animal food. The digestibility of fish and meat are about equal, but some varieties of fish are less digestible than others, this being true of the oily and strong-flavored fish,—herring, mackerel, salmon, and shad.

There are popular prejudices for and against fish that are not warranted. The idea that fish is a "brain food" because it contains phosphorus was exploded long since, for fish contains no more phosphorus than some other foods, and phosphorus is no more valuable to the brain than to the other tissues.

Fish, however, is valuable in the dietary for supplying protein and giving variety, and in season, it is one of the cheaper foods.

Quality of fish.—Fish deteriorates and decomposes much more rapidly than meat, and is at its best when cleaned and cooked just after being caught. Ice will preserve fish for a short time only. If ever on a camping trip you have eaten bluefish caught in the surf, or trout from the brook, cooked immediately, you know what flavor a fish may have. Fish should be killed immediately, and put on ice if they are not to be cooked at once. If there is no ice, clean the fish, sprinkle the flesh with pepper and salt, wrap in a wet cloth, and set in a breeze or draught.

When fish are transported over long distances they should be packed in ice in refrigerator cars, and you will notice that the fishman in the shop keeps the fish on ice until he sells them.

In selecting fish, see that the flesh feels firm and that the eyes are still bright. If you have a keen sense of smell, this will also guide you, although to the novice the odor of fish may be disagreeable even if untainted.

Fish in season and caught plentifully near by, are of good quality and should be cheap. Shad and salmon have their season in the spring, bluefish come north in the summer, sometimes as late as August, porgies are a summer and autumn fish, and smelt are abundant in the winter. Deep-sea fish like cod and halibut have a long season, and may be

bought at any time.

GENERAL METHODS AND RECIPES

The *scaling* and *cleaning* of fish are important first steps. In the city this may be done for you at the market, but sometimes on fishing expeditions when you are not a successful fisher you may make yourself useful by cleaning the fish. Clean the fish on a large piece of paper. Use a sharp strong knife, and rub off the scales from the tail to the head. To skin a fish well, you should first watch an expert. Cut through the skin of the back and abdomen, loosen it at the tail and pull it off. 235
Remove the head, open the abdomen, and take out the entrails. Burn the paper on which the fish has been cleaned. Fish is boned by slitting the flesh down the back, and patiently separating the flesh from the side bones, and finally pulling out the spine and attached bones. The strong odor of fish clings to everything the fish touches. Wash the fish, the knife, and your own hands in cold water and salt. Always pour the water in which fish is washed or cooked down the sink at once, pour in some salt, and flush the trap with cold water. The utensils, and dishes in which fish is served, need very careful washing in several waters.

The *connective tissue* of fish softens and dissolves more readily than does that of meat. Fish varies in the dryness of the flesh, but there is no such thing as tough fish, and the texture of the muscles is about the same in all parts of the fish, although there is a difference in flavor in the dark and white flesh when these both occur. On account of this characteristic of the connective tissue the fish “falls apart” and our aim must be to prevent this.

Principles of cooking.

1. The protein is affected as in all other foods where it occurs.

2. The fat is melted.

3. Connective tissue quickly softened.

To avoid the breaking of the fish it may be wrapped in cloth for boiling, and the water should simmer only. The coating of small fish or slices of large fish with beaten egg and crumbs tends to hold it together. In all cases avoid overcooking. Fish is done when a fork easily pierces it and separates the flakes of flesh from the bone.

1. Boiled fish.

Use thick pieces of large fish for boiling, or if small fish are used they may be boiled whole. Add salt and vinegar to water in proportion of 1 tablespoonful of salt and two of vinegar to three quarts of water. Use enough water to cover the fish. Wrap the fish in cheesecloth to prevent breaking apart, and plunge into boiling water. Do not let the water boil after fish is in. The fish is done when the flesh leaves the bone or when the flesh flakes apart easily. The usual time for a thick piece is 30-40 minutes.

Mock Hollandaise sauce. 236

Butter	3	tablespoonfuls
Flour	3	tablespoonfuls
Eggs	2	
Milk	2	cups
Salt	1	teaspoonful
Lemon	$\frac{1}{2}$	to 1.

Make as for white sauce, adding the beaten eggs just before taking from fire and stirring until well thickened. Add lemon juice just before serving. This sauce is suitable for boiled fish and vegetables.

2. Left over fish.

Fish may be picked apart, mixed with cream sauce, and served as creamed fish or served as an escallop.

Escalloped fish.

2 cups left over fish, picked over and freed of bones.
1 cup thin white sauce, dried bread crumbs buttered.

Butter a baking dish and line with crumbs. Add a layer of fish, using half, and cover with half the sauce. Cover with a layer of crumbs. Add another layer of fish, sauce, and crumbs, making this last layer of crumbs quite thick. Place in a hot oven and leave until crumbs are brown and fish is heated through.

To butter crumbs.

Melt a little butter in a saucepan and turn the crumbs in, stirring them over and over with a spoon until all the crumbs are coated.

3. Baked fish.

Almost any medium sized fish is suitable for baking. The favorites are bluefish, shad, haddock, and halibut, sliced.

Clean the fish, seeing that all scales are removed. Stuff and sew. Shape with skewers to form a letter S and place upright on a baking pan or lay fish on side. If the fish is not a fat kind, put strips of salt pork over it and in pan or cut gashes in fish and lay strips of pork in them. Dredge with flour. Bake one hour for a three-pound fish, in a hot oven, basting frequently with the tried-out fat. Serve with drawn butter or Hollandaise sauce.

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Fish stuffing.

Dried crumbs	1	cup
Melted butter	1/2	cup
Salt	1/4	teaspoonful
Pepper	1/8	teaspoonful
Onion juice	A few drops	
Parsley Capers Pickles	1	teaspoonful each, finely chopped

Mix ingredients in order given.

4. Creamed codfish.

Soak the fish in cold water, and pull it apart with knife and fork. Put it in a saucepan of cold water, allow the water to heat slowly, and stop the heating just before the water reaches the boiling point. Pour off the water, shake the saucepan over the fire, add a thin white sauce, No. 2, and reheat. Serve on toast if desired.

5. Codfish balls or cakes.

Ingredients.

Codfish, picked	1 cup
Potatoes, cut in cubes	2 cups
Egg	1
Salt, if needed	to taste
Flour for dredging	

Method.

Put the fish and potatoes in a stewpan, cover with cold water, bring the water to the boiling point, and cook until the potato is tender. The whole process will take about 20 minutes. Drain off the water very thoroughly and shake the stewpan over the fire to dry the contents. It is very necessary to have the mixture free from water. Mash and heat the mixture in the stewpan, and add the egg. Taste to see if more salt is needed, as is sometimes the case. Finish as follows:

(*a*) Shape into round flat cakes about an inch thick, dredge with flour and sauté.

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(*b*) The same, browning the cakes on a greased pan in the oven, or under the gas flame, turning if necessary.

(*c*) Shape in balls, place these in a wire frying basket, lower the basket into hot fat until the balls brown, lift the basket, drain, and drain the balls on paper. Keep hot until it is time to serve.

Laboratory management.—For individual work or work in groups of two, small fish, as perch, may be procured and these may be stuffed and baked in the period.

SHELLFISH

The shellfish are of two classes; the mollusks including clams, mussels (seldom used in this country), oysters, and scallops, and the crustaceans,—lobsters and crabs. None of the mollusks have high nutritive value, but they are a protein food, and add to the variety of the diet. The composition of the oyster is shown in Fig. 65, and it will be noted that the fat percentage is small and the calorie value low.

The oyster is raised in beds in the ocean, or bays often near the river mouth, and it is the neighborhood to the river that makes it possible for the oyster to carry germs of contagion, particularly of typhoid fever, when city sewage poured into the river passes over the oyster bed. Here, too, government protection is essential, and this is a matter that has created so much excitement that conditions are already improved. There is an association of oyster growers who make a point of advertising clean oyster beds, and cleanly methods of handling and transporting.

Oysters vary in size and flavor, the flavor seeming to depend upon the locality. The smaller are sought for serving raw, and the medium and larger for cooking. They are sold by the measure or number when taken from the shell, the latter giving the surer quantity; and the price is usually one cent apiece. They are in season from September to May. The whole flesh of the oyster is soft and edible, even the muscle by which it opens and shuts its shell being tender.

Clams are of two kinds, distinguished differently in different places. They are known as hard and soft, or round and long, and in Rhode Island the hard round clam still bears the Indian name Quahaug, the soft shell clam being the only “clam.” 239

The long clam lies buried in the soft mud of creeks and muddy shores left exposed at low tide, when they are dug by hoes from the mud. The round clam lies on the bottom of shallow warm waters, and is raked with an implement made for the purpose. The round clam is used when very young and small in place of raw oysters; but both kinds when matured have a tough portion that is not softened in cooking, and that is more or less indigestible. The long “neck” which protrudes from the shell has to be discarded.

Both kinds may be roasted in the shell, and are very palatable served hot with melted butter, salt, and pepper. They are most commonly used in soups and in chowder. They are purchased by the quantity or number, are cheaper than oysters, and are always in season.

Scallops, as purchased, are only a part of the animal in the shell, consisting solely of the round white muscle which operates the shell. The escallop, or scallop, is migratory, moving by a shooting motion, the mature scallops reaching the creeks and shores in the autumn, and though found in so-called beds they are not fixtures like the oysters. The flavor is sweet, and they have a quality that makes them more or less indigestible, especially when fried. They are very palatable and more digestible served in a stew made like an oyster stew. They are sold by the measure and are cheap in season.

The lobster is now a luxury, for methods of catching in the past have made them scarce in their old haunts. The lobster is a much more highly developed animal than the mollusk, having strong muscles inside its coat of mail, and the flesh has a protein content that compares very favorably with meat. When fresh, and not served with rich sauces or eaten at irregular hours, it is not especially indigestible, and may be the main dish at luncheon or supper, served simply with salt, pepper, and melted butter and not taken with meat foods. Its own delicious flavor needs no addition in the way of sauces and high seasoning. 240

The crab is essentially like the lobster, being smaller, and having a sweeter flavor. The soft shell crab is caught just as the old shell is shed, and is highly esteemed as a delicacy. Both lobsters and crabs are cooked in the shell, and if allowed to die naturally before cooking they are uneatable. They may be purchased alive or cooked, and one is surer of their condition when they are bought alive. Twenty-five cents a pound is now an average price for lobsters in shell. Crabs are somewhat less expensive at times, but soft shells are always high-priced.

The following table shows the food value of a few of this group in terms of the weight of the 100-Calorie portion.

100-calorie Portions of Fish and Shellfish

Kind	Fresh Fish Weight of 100-calorie Portion As Purchased (Entrails Removed)	Edible Material

	Ounces	Ounces
Blue fish	7.8	4.0
Cod.	7.6	5.5
Flounder	12.5	6.2
Haddock	10.0	4.9
Halibut steak	3.5	2.9
Mackerel	4.5	2.5
Salmon	2.8	1.8
SALT OR SMOKED FISH		
Cod, Salt	4.4	3.4
Herring, Smoked	2.2	1.2
Halibut, Smoked	1.7	1.6
Mackerel, Salt	1.4	1.2
SHELLFISH		
Clams		6.9
Crabs		4.3
Lobster		4.2
Oysters		7.0
Scallops		4.8

241 **Preserved fish and shellfish.**—*Smoking and salting* are two old-time methods that are still in use, and smoked salmon, herring, and finnan haddie furnish us well-flavored foods at a reasonable price. Small smoked herring are eaten uncooked, and the other two kinds are excellent broiled, or parboiled and finished in the oven. Salt cod should not be despised, for it is convenient and may be made palatable. Like the meats, the fish preserved by these methods are slightly less available for digestion.

Preserving in oil is made familiar to us by the sardine of Italy in olive oil and the small herring of America in cottonseed oil, which also bears the name of sardine. The latter is less delicate in flavor than the European sardine, but is of course cheaper, and is palatable and of equal food value.

Canned fish and shellfish are used in localities where fresh fish are not easily available, and should not be unwholesome if the process is properly inspected. Canned salmon is the most common, and makes an excellent luncheon dish when well prepared (see chapter on salads).

242 **Principles of cooking.**—The protein in all of these is the chief consideration. The oyster is more delicate when cooked just below the boiling point of water for a brief period only. This is also true of the clam, except the tough membranes which must be chopped. The flesh of both lobster and clam is toughened by cooking, and the process should be short.

GENERAL METHODS AND RECIPES

General directions.—All fish and shellfish should be thoroughly cleansed in cold water before using, and under running water when possible. Wash oysters, clams, and scallops in a colander or strainer under the faucet. If the oyster or clam liquor is used, put it through a fine strainer.

1. To serve oysters and small clams raw.

Arrange on finely chopped ice on a plate, with a piece of lemon in the center. Cut a section of lemon, not a slice. Horse-radish is sometimes served with the raw oyster. Garnish with parsley if you wish.

2. Creamed oysters.

Clean oysters of all pieces of shell. Cook them below the boiling point for a few minutes until plump and edges begin to curl. Drain and add to white sauce seasoned with celery salt. Serve on toast, in bread cases, or patty shells.

3. Sautéd oysters.

Clean one pint of oysters, sprinkle on both sides with salt and pepper. Lift by the tough muscle with a fork and dip on both sides in cracker crumbs and sauté in butter until well browned on both sides.

4. Clam chowder.

Proportions.

Clams	1	quart
Potatoes	4	cups, cut in $^{3}/_{4}$ inch dice
Onion	One,	chopped
Salt	1	tablespoonful
Pepper	$^{1}/_{8}$	teaspoonful
Butter	4	tablespoonfuls
Milk	6	cups, scalded
Soda Crackers		

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Clean and pick over clams, separate the hard and soft part of clams and chop the former. Strain clam liquor through cheesecloth. Try out the pork and fry the onion in it until brown and turn into a large kettle. Boil potatoes until tender, drain, and pour potatoes into kettle. Add clams, milk, butter, and crackers broken into small pieces. Let cook three minutes. Just before serving add clam liquor previously heated. Serve in bowls.

5. To prepare lobster and crabs for serving.

Make ready a large kettle of rapidly boiling water. Wrap a piece of paper around the lobster or crab, and plunge it head downward into the boiling water. Let the water boil gently for 20 minutes—longer if the lobsters are very large.

To open, a strong pair of scissors is the best utensil and sometimes a hammer is necessary for the heavy claws. Pull out the flesh, keeping it as whole as possible. The stomach of the lobster and crab should be taken out and can be recognized near the head. The long intestine should also be removed and is easy to find in the hinderpart by splitting open this part and removing a long white string. The soft green portion is the liver and is eatable.

To serve.—(*a*) Pick apart and serve on lettuce with a French dressing, or (*b*) Serve hot with melted butter.

Meat Substitutes

Among these, beans, peas, lentils, eggs, milk, and cheese have already been mentioned. Fish is classed also as a meat substitute.

Nuts.—These are a valuable meat substitute, some of them having a good protein content, and a high fat content as well. (See Fig. 66.) They maybe served raw for dessert, with some fruit either fresh or dried, raisins and nuts being a pleasing combination. They should be thoroughly masticated. They are also palatable and possibly more digestible when cooked. The reason that many people consider nuts indigestible is because they eat them between meals, and do not give them a proper place in a meal, eating them when enough food of other kinds has been taken. One who is open-minded in the matter of menus will find that nuts, raw or cooked, can literally take the place of meat in a meal.

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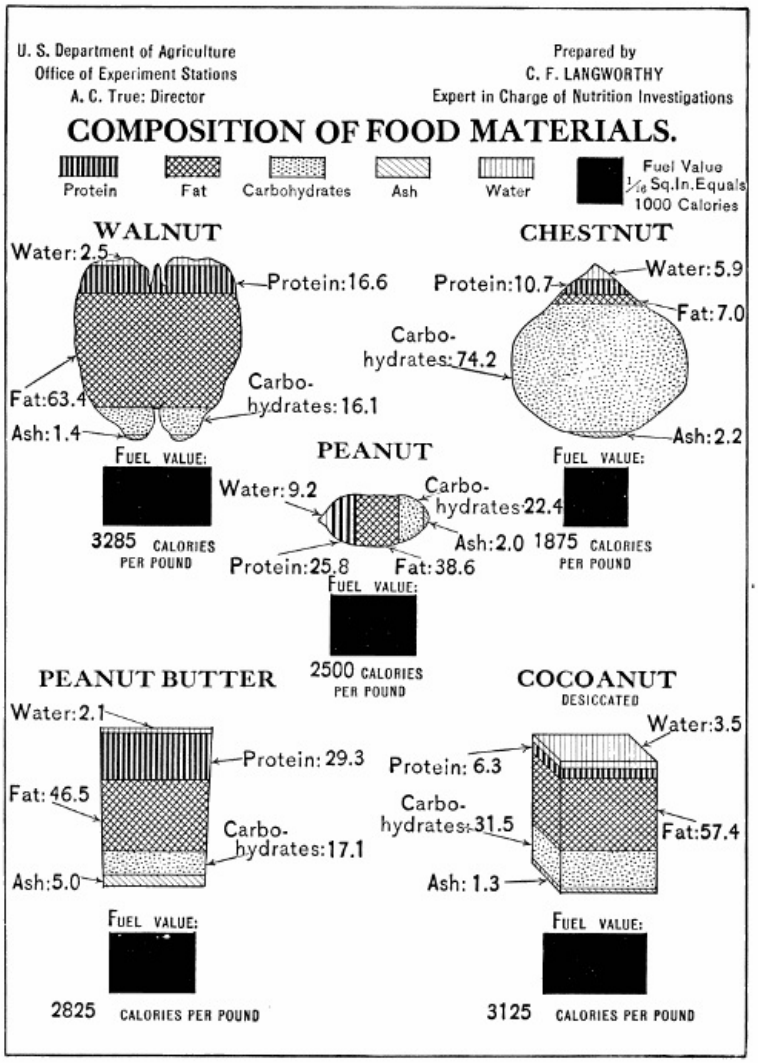

Fig. 66.—Composition of nuts.

Almonds are always available in the markets and are so rich in protein and fat that a pound of shelled almonds is equivalent in food value to about three pounds of steak. At usual prices a good grade of almonds is more economical than the ordinary cuts of meat.

Chestnuts are a staple food in parts of Italy, and have a delicious flavor in soups, stuffings, and sauces. Our own native chestnuts, boiled and served whole or roasted, make an excellent simple dessert.

Hickory nuts, *English walnuts*, *pecan nuts*, and *filberts* are not only palatable in muffins, cake, and yeast bread, but add to the food value in a rational way.

Peanuts are rich in oil and protein. They are nearly equal to almonds in food value and are even more economical. Peanuts are too concentrated a food for eating between meals or to be taken after a meal already sufficient, but they may take the place of meat in the meal and peanut butter may be used on bread and in sandwiches without butter. They, too, may be used with cake and cookies.

Chopped nuts may be served with a variety of desserts. Remember always that they are to be considered food.

100-Calorie Portions of Shelled Nuts

Kind	Weight of 100-Calorie Portion Ounces
Brazil nuts	0.5
Chestnuts	1.5
Filberts	0.5
Hickory nuts	0.5
Peanuts	0.6
Pecans	0.5
Walnuts (English)	0.5

Teacher's Note.—When time permits and circumstances make desirable the

development of the economic phase of the food work, students may be directed to look up the composition, or the food value per ounce or per pound, of a variety of the foods of whatever group is under study and work out the return in food value for a given expenditure of money. The tables in Rose's "Laboratory Handbook for Dietetics" will be found especially useful in such work.

EXERCISES

1. What is the chief food value of fish?

2. Compare the composition of fish and meat.

3. What are the causes influencing the flavor and quality of fish?

4. What precautions may be taken to prevent the spoiling of fish?

5. How may the oyster beds be safeguarded?

6. In what way does the cookery of fish and shellfish resemble that of meat?

7. In what important way does the cookery of fish differ from that of meat?

8. Why is fish cheapest in season?

9. Estimate the cost of 100-Calorie portion of one or two given varieties.

10. What precaution is necessary in opening a lobster?

11. What must a food contain to make a meat substitute?

12. What are the important meat substitutes?

13. In what way should nuts be used in the diet?

14. What are some of the practical ways of using nuts?

15. Price several kinds of nuts and several cuts of meat in the market, then look up the composition of each, remembering that the whole kernel of the nut is eaten, but often only the lean part of the meat. With this in mind calculate the food value actually obtained for a given expenditure in each case.

CHAPTER XV

SALADS AND DESSERTS

Salads and desserts are sometimes looked upon as luxuries, and something to be omitted where people must exercise strict economy, and as more or less indigestible forms of food to be avoided. As a matter of fact both of these types of dishes are extremely valuable in giving variety to the diet. They may be very inexpensive, and when they have the right relation to the rest of the meal, are not more indigestible than many other forms of food. A heavy salad or rich dessert eaten after a sufficient amount of other food will naturally cause digestive disturbance.

To disprove the theory of great cost of desserts, two friends once had an amusing contest to see which could serve the largest number of palatable desserts at the lowest price. It was interesting to see how many could be made for a cost of from six to ten cents for a family of five.

Materials used for salad.—The word "salad" is said to be derived from the Latin "salis" (salt) which implies that the salad has been looked upon more or less as a relish. We all associate with a salad appetizing crispness and freshness. The materials used in the modern salad are so varied that a complete list would include nearly all our fruits and vegetables and meat foods.

Green vegetables.—Celery, chicory or endive, corn salad, cress, cucumber,

dandelion, lettuce, onions, peppers, romaine or cos lettuce, radishes, and tomatoes.

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Cooked vegetables.—Beans, string and whole, beets, cauliflower, carrots, potatoes, and spinach.

Fruits uncooked.—Any fresh fruit, possibly with the exception of some of the berries.

Meat and poultry.—The white meats like veal, chicken, and turkey are more attractive in salad, but any kind of cold meat may be used.

Fish and shellfish.—Lobsters, crabs, scallops, and cold fish.

Nuts.—Several kinds may be used in combination with fruit.

Jellies.—Tomato jelly, meat, chicken, and fish molded in jelly, may be served as a salad.

Eggs.—Hard-boiled eggs are used as a garnish.

Cream cheese.—May be served with lettuce.

Salad dressings.—Plain lettuce or celery served with salt is in a sense a salad, but it is our custom to dress the lettuce with a mixture which contains an acid and usually an oil. A very simple, old-fashioned form of dressing used in this country is vinegar and sugar. Substitute lemon juice or fresh lime juice for the vinegar and you will have a very refreshing and simple salad for a summer day.

The ordinary dressing consists of vinegar or lemon juice, and oil; another form is mayonnaise, where the yolk and sometimes the white of egg are used to hold the oil and vinegar together.

Another form is a cooked dressing which may be bottled and kept for a longer time than the French dressing or the mayonnaise.

Olive oil.—This is the most delicious oil for salad dressing when the flavor is liked and when it can be afforded.

Cottonseed and corn oil.—There are now in the market clarified cottonseed oil and corn oil that may be used in mayonnaise dressing, and the flavor is not unacceptable, and certainly superior to the poorer grades of olive oil which quite likely contain one of these oils as an adulterant. Cottonseed oil makes a better substitute for olive oil then does corn oil as it is at present refined.

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Butter.—Butter may be used in boiled salad dressing for those who dislike the flavor of the oils.

The acids in dressing.—These may be either vinegar or lemon juice, and many people with whom the vinegar disagrees can eat a salad made with lemon juice. The acid should not be used in excess in any case; the best dressings do not give a distinctively acid taste.

Adjuncts.—Salt, mustard, cayenne pepper, paprika.

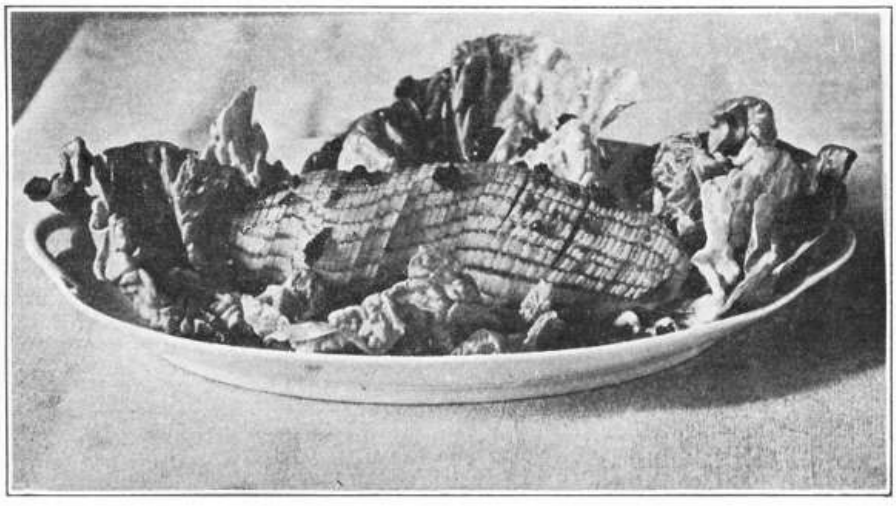

Fig. 67.—A cucumber salad. ***Courtesy of Dept. of Foods and Cookery, Teachers College.***

General directions.—The two important points in the preparation of the material for salad are, first, that *everything* should be thoroughly dry, and, second, thoroughly chilled. The importance of these two points cannot be overemphasized, and they are of equal value in salad making. Many a salad is unpalatable because it is watery and wilted. For the preparation of green vegetables see Chapter VII. Vegetables should be cut in cubes or sometimes in slices. Meat, poultry, and shellfish should be cut in small pieces or chopped. The prepared meat should be mixed with some of the oil and acid and allowed to stand in an ice box for some time before it is dressed and arranged for serving. This process is called marinating in the cookbooks, and gives a flavor to the salad that it cannot have if a dressing is poured over the meat just before serving.

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Combinations in salad.—Several well-known combinations will at once occur to you. Meat salads usually have a mixture of celery. Several vegetables may be used together, as beans and carrots, or carrots, peas, and string beans with lettuce. Apples, nuts, and celery make a pleasing combination. Indeed there would seem to be no end to the possibilities here.

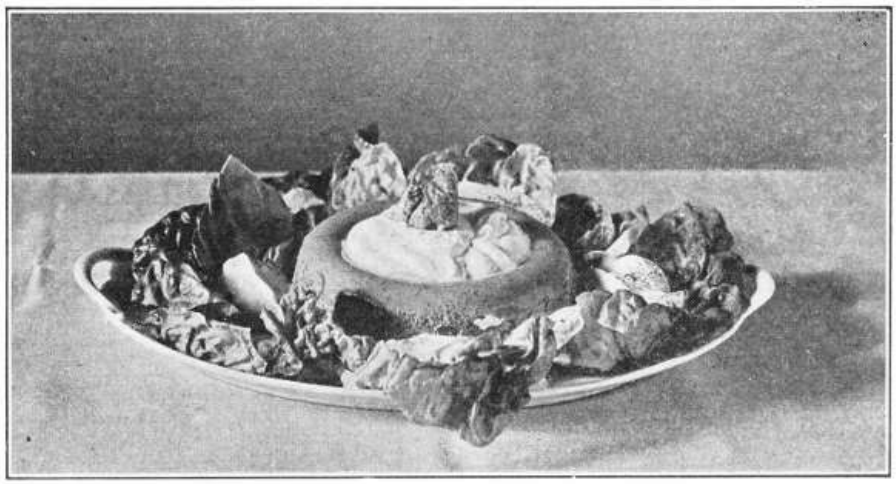

Fig. 68.—A salad with salmon molded in gelatin. *Courtesy of Dept. of Foods and Cookery, Teachers College.*

Serving and garnishing.—The principle here is to make the dish attractive with as little labor as possible. Everything served as a garnish should be eatable. A bed of crisp dry lettuce leaves is the most attractive setting for any salad. When this is not procurable, cress makes an attractive border to a salad. Figure 68 shows you a salmon jelly molded in a ring and attractively served in lettuce. Figure 67 shows a cucumber placed on lettuce leaves, dressed with a French dressing and sprinkled with chopped peppers. The cucumber is sliced ready to serve; the slices being cut not entirely through the cucumber. This is rapidly prepared and is most attractive. When the salad is arranged in its dish, it should be put in the ice box and allowed to remain until it is time to take it to the table. The salad is sometimes served on individual plates.

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1. French dressing.

Ingredients.

Salt	$\frac{1}{2}$ teaspoonful
Pepper	$\frac{1}{4}$ teaspoonful
Vinegar	2 tablespoonfuls
Olive oil	4 tablespoonfuls

Method.

Mix the salt, pepper, and vinegar and stir in the olive oil slowly. A few drops of onion juice may be added.

2. Mayonnaise dressing.

Ingredients.

Mustard	1 teaspoonful

Salt	1	teaspoonful
Powdered sugar	1	teaspoonful
A few grains of cayenne		
Eggs	Yolks of 2	
Lemon juice	2	tablespoonfuls
Vinegar	2	tablespoonfuls
Olive oil	1 1/2	cups

Method.

Stir together the eggs, mustard, salt, pepper, and sugar. Add the oil, a drop at a time, stirring and beating constantly. The back of a silver fork is a good thing for mixing mayonnaise, though some people prefer a Dover beater. As the dressing becomes very thick it should be thinned occasionally with vinegar and lemon, alternately, but never let it lose its consistency. After the first, the oil may be added more rapidly. All ingredients and utensils must be cold. If the weather is warm, the bowl should be surrounded with ice water. If the dressing should separate, begin with another yolk of egg and stir the separated mixture into it slowly, as before. Set the bowl in a cold place and it should keep for many days.

3. Boiled dressing.

Ingredients.

Eggs	2
Mustard	1/2 teaspoonful
Salt	1/2 tablespoonful
Sugar	1/2 tablespoonful
Vinegar	3 tablespoonfuls
Hot water	1/2 cup
Butter	1 tablespoonful
A few grains of cayenne	

Method.

Mix the dry ingredients and beat with the eggs until light. Add the vinegar and water and cook in a double boiler, stirring constantly until thick and smooth. Remove from the fire, stir in the butter and set away to cool. A little cream added after the dressing cools is a great addition. Sour cream may be used instead of the water, in which case less vinegar and butter should be used.

4. Potato salad.

Ingredients.

Potatoes, cold-boiled or baked
Parsley or onion juice
Egg, hard-boiled, olives, pickled beets, etc.
French dressing

Method.

Cut the cold-boiled or baked potatoes into 1/2-inch cubes. Marinate (*i.e.* mix and let stand) with French dressing. Chopped parsley or onion juice may be mixed with potatoes. Arrange in a mound and garnish with slices of hard-boiled egg, olives, pickled beets, etc.

5. Chicken salad.

Ingredients.

Cold-boiled or roast fowl
Celery, 1/2 as much as fowl
French dressing
Mayonnaise or boiled dressing
Olives

Method.

Cut cold-boiled or roast fowl in 1/2-inch cubes. Add to this 1/2 as much celery which has been washed, scraped, and cut into cubes. Marinate with

French dressing. Just before serving moisten with mayonnaise or boiled salad dressing. Garnish with celery tips and olives.

6. Waldorf salad.

Ingredients.

Apples, tart and juicy
Celery, $^1/_2$ as much as apples
Mayonnaise dressing
Lettuce leaves

Method.

Select tart, juicy apples. Cut in quarters, pare and core and cut in $^1/_2$-inch cubes. Add half as much celery, washed, scraped, and cut into cubes. Mix with boiled or mayonnaise dressing and serve cold on lettuce leaves. If handsome red apples can be had, they may be washed and polished and a slice cut from the stem end and the apple used as a cup after scooping out the inside to use for a filling with the celery. Serve on a lettuce leaf. Chopped nuts may be mixed with the apple and celery if desired.

7. Stuffed tomato salad.

Ingredients.

Tomatoes, medium sized
Boiling water
Salt
Cucumbers (or celery)
Mayonnaise dressing
Lettuce leaves

Method.

Cover medium sized tomatoes with boiling water for a minute and remove the skin. Cut a thin slice from the top and take out part of the seeds and pulp. Sprinkle inside of the tomato with salt, invert, and let stand one half hour. Fill tomatoes with cucumbers (or celery) cut in small cubes and moistened with mayonnaise dressing. Arrange on lettuce leaves and garnish top with mayonnaise dressing.

Laboratory management.—$^1/_2$ egg yolk (1 teaspoonful) and $^1/_4$ cup of olive oil is as small a quantity as is practicable to use in making the mayonnaise. This quantity made by groups of two works out well as the process of adding the oil drop by drop is difficult for a beginner working alone. The boiled dressing works in well as a variation of the boiled custard.

Desserts

The dessert in this country includes the sweet dish, or the fruit at the end of the meal. In simple meals the dessert is usually one of the two, although in more elaborate meals fruit is served after the sweet dish, and sometimes crackers and cheese are served at the last. From the point of view of nutrition and digestibility this is more than is necessary, and you will notice that when both are served, the fruit is often declined. Like the salad, the dessert may be made from a large variety of materials and bears different names. There are hot puddings and cold puddings, pies and tarts, jellies and ices and ice creams. It is very interesting to read over the many dishes of this class in a cookbook and to attempt to classify them. If you are fortunate enough to have access to a cookbook of the eighteenth century, you will find that much labor was given to the preparation of elaborate structures which served as table ornaments; even now you will find French cooks who spend much time in making elaborate displays of their skill. For everyday life the dessert should be attractive to the eye and yet simple.

Materials used in desserts.

Eggs, milk, and cream; these are important and are used in custards, in dishes stiffened with gelatin or thickened with cornstarch, or in ice cream.

Breadstuffs.—Cake and sponge cake, bread crumbs and sliced bread, are valuable in desserts. Bread pudding may be made a very delicious dish. Bread

may be combined with fruit in the shape of an escalloped dish. Baking-powder biscuits, crust, and shortcake are also used.

Other starchy substances.—These are cornstarch, arrowroot, sago, tapioca and manioca.

Fruits.—Raw and cooked fruits of every possible kind. A few fruits like the lemon, orange, grapefruit, and melon are not cooked. For preparing fruit served alone, see Chapter VI.

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Gelatin.—This material has been mentioned in the chapter on meat. It is prepared for use in desserts in a number of forms, the granular being the most convenient. Gelatin has the property, first, of absorbing water, then of dissolving at the boiling temperature of water and becoming stiff again when cool. After dissolving, as it is cooling and just as it begins to thicken slightly, it can be beaten like white of egg. If beating is attempted while the liquid is warm, or again if it becomes too stiff, the result is not successful. This property makes it useful in the sponges and other fancy desserts where the light spongy texture is desirable.

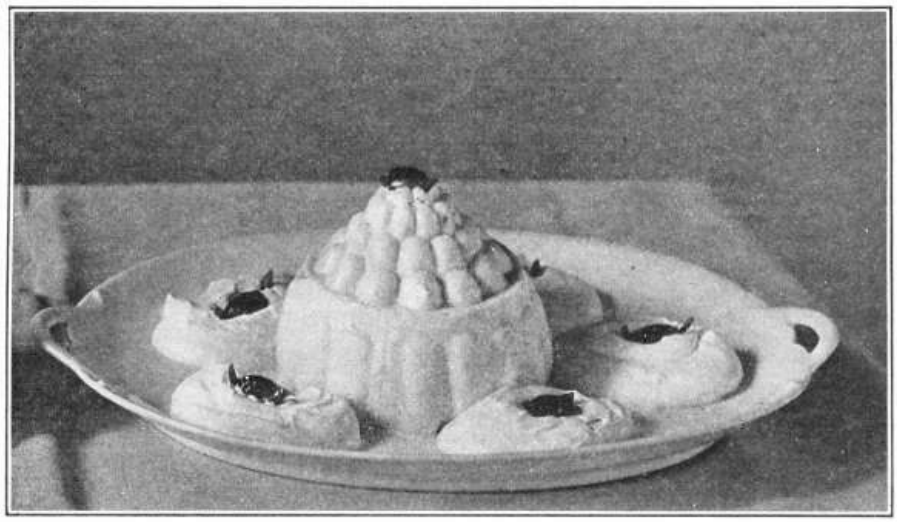

Fig. 69.—A gelatin mold. ***Courtesy of Dept. of Foods and Cookery, Teachers College.***

Making desserts attractive.—This is done by serving hot desserts in a dish around which a napkin may be folded; and cold desserts, especially those made with gelatin, may be molded in some attractive form and garnished. Figure 69 shows a very simple gelatin dessert garnished with candied cherries and a little angelica, the stem of a plant which has been sugared, and the whole surrounded with whipped cream. Whipping the cream and putting it around the base takes only a few minutes. As in salad, the garnish should be eatable and easily prepared.

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1. Boiled custard.

Ingredients.

Milk	1 pt.
Sugar	2 tablespoonfuls
Eggs	3
Vanilla	$\frac{1}{2}$ teaspoonful
Salt	$\frac{1}{8}$ teaspoonful

Method.

Put the milk, sugar, and salt in a double boiler to scald. Separate the eggs and set the whites in a cold place until wanted. Beat the yolks until lemon-colored. Pour a little of the scalded milk on the yolks of the eggs, stirring until well mixed. Set the double boiler back on the stove and pour the egg and milk mixture slowly into the rest of the scalded milk, stirring constantly until thickened enough to coat the spoon. Remove from the fire, add the flavoring, and turn into a dish to cool. Just before serving beat the whites to a very stiff froth and pile by spoonfuls on the custard. The whites may be sweetened with powdered sugar after beating if desired. Corn starch may be used, and fewer eggs.

2. Baked custard.

Ingredients.

Milk	1	pt.
Sugar	2	tablespoonfuls
Salt	1/8	teaspoonful
Eggs	2	
Lemon *or* Vanilla	1/2	teaspoonful

Method.

Scald the milk, sugar, and salt together. Beat the eggs in a baking dish and pour the scalded milk over them. Add the flavoring and stir well. Set the baking dish in a pan of boiling water and bake in a moderate oven until a knife thrust into the custard will come out clean. Serve cold either plain, or with chocolate sauce. Nutmeg may be grated on top of the custard before baking, or caramel flavoring may be added in place of the vanilla.

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3. Chocolate sauce.

Ingredients.

Chocolate	1	square
Sugar	1/4	cup
Boiling water	1/2	cup
Cream	1/2	cup

Method.

Mix the chocolate, boiling water, and sugar together and stir over the fire until smooth and thick. Add the cream and serve hot.

4. Caramel flavoring.

Ingredients.

Sugar	2	cups
Boiling water	1	cup

Method.

Pour the sugar into a saucepan and stir over the fire until it becomes a thick brown sirup. Pour the boiling water on this and leave on the fire, stirring occasionally until the sugar is all dissolved. This may be bottled and kept for some time.

5. Shortcake.

Ingredients.

Flour	1	cup
Baking powder	1	teaspoonful
Salt	1/4	teaspoonful
Butter	4	tablespoonfuls
or		
One half butter and one half lard.		
Milk	1/2	cup

Method.

Mix dry ingredients and cut butter into this mixture with two knives. Stir in the milk and spread the mixture out on a buttered layer cake tin. Bake in a hot oven until brown. Wash and hull a box of strawberries, sprinkle with 1/2 cup of sugar, and crush with a spoon. When the shortcake is done remove from the pan, cut around the edge with a sharp knife and right through the center of the cake, making two layers of it. Spread the lower layer with butter and then with the crushed strawberry. Replace the top layer and serve hot. Fresh peaches, preserves, or a mixture of orange and banana may be used for this shortcake.

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Another kind of strawberry cake is made of sponge cake, and served cold with whipped cream.

6. Steamed pudding.

Ingredients.

Suet chopped	1	cup
Raisins, currants, and citron sliced	1	cup
Egg	1	
Sweet milk	1	cup
Molasses	1/2	cup
Soda	1	teaspoonful
Salt	1/4	teaspoonful
Flour	3 1/2	cups

Method.

Skin, wash, and chop the suet, and dredge with flour. Wash, pick over and seed the dried fruit, slice the citron if it is used, and dredge all with flour. Stir together the milk and molasses, sift the dry ingredients with the flour, and stir the liquid into the flour slowly. Add the suet, beating the mass thoroughly, and last the fruit, sprinkling in both the suet and the fruit as you stir. Fill a greased mold 2/3 full, close tightly, and cook in a kettle of boiling water for three hours. Serve with a hard or foamy sauce.

Laboratory management.—This can be made in class if each pupil will bring an empty baking powder or cocoa tin to school. A strip of greased cloth should be fastened around the edge of the cover. The recipe can be made in 1/4 cup proportions, and this amount can be cooked if the class period is two hours in length, but it is better to have the cooking finished at home. This is a seasonable exercise at Thanksgiving or Christmas.

7. Brown Betty or apple scallop.

Ingredients.

Buttered crumbs
Tart cooking apples
Sugar
Cinnamon
A little water

Teacher's Note.—Individual shortcakes may be made by using a stiffer dough and rolling and cutting them like biscuits.

Method.

Put a layer of buttered crumbs in a baking dish. Pare and slice tart cooking apples and put a layer into the dish. Sprinkle with sugar, cinnamon, and a little water. Add a layer of bread crumbs and repeat with apples, flavoring and cover the top with crumbs. Bake in a moderate oven until apples are cooked and crumbs brown. Any fruit such as peaches or blueberries may be used instead of apples. Serve hot with hard or foamy sauce or cold with cream and sugar, or the bread may be used in slices, buttered.

8. Hard sauce.

Ingredients.

Butter	1/3	cup
Powdered sugar	1	cup
Lemon extract	1/3	teaspoonful
or		
Vanilla	2/3	teaspoonful
Nutmeg		

Method.

Cream the butter; add sugar gradually, and flavoring. Grate nutmeg over the top. Chill before serving.

9. Foamy sauce.

Ingredients.

Butter	1/2	cup
Powdered sugar	1	cup
Egg	1	

Vanilla	1	teaspoonful

Method.

Cream the butter, add gradually the sugar, the egg well beaten, and vanilla. Beat while heating over hot water.

10. Tapioca cream.

Ingredients.

Pearl tapioca	½	cup
or		
Minute tapioca	1½	tablespoonfuls
Scalded milk	2	cups
Eggs	2, *or*	1
Sugar	⅓	cup
Salt	¼	teaspoonful
Vanilla	½	teaspoonful

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Method.

Minute tapioca needs no soaking. If pearl tapioca is used, it must be soaked one hour in cold water to cover. Pick over and wash the tapioca, drain off the water and add tapioca to the milk and salt scalded in the double boiler, and cook until the tapioca is transparent, or about ½ hour. Beat eggs and add the sugar to them. Combine mixtures by pouring a little of the hot mixture in the egg and then stirring this into the mixture remaining in the double boiler. Stir over fire until it becomes thick. Add the flavoring and pour into a dish to cool.

11. Apple tapioca.

Ingredients.

Minute tapioca	¾	cup
Lemon peel		
Boiling water	2½	cups
Salt	½	teaspoonful
Tart apples	6	
Sugar	½	cup

Method.

Cook the tapioca in salt water until it becomes transparent. Core and pare the apples and place in the bottom of the baking dish. Fill the cavities with sugar and add a little lemon peel. Pour the tapioca over the apples and bake in a moderate oven until the apples are soft. Serve cold with sugar and cream.

12. Lemon jelly.

Ingredients.

Shredded gelatin	½	box
or		
Granulated gelatin	2	tablespoonfuls
Lemon juice	½	cup
Cold water	½	cup
Boiling water	2½	cups
Sugar	1	cup

Method.

Soak the gelatin in cold water for 20 minutes. Add the boiling water and sugar and stir until it dissolves. Add the lemon juice and strain into a mold and set away to harden. When it is stiff loosen from the sides of the mold (a cloth wrung out of hot water may be needed). Turn on to a plate and serve with whipped cream or soft custard.

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13. Snow pudding.

Ingredients.

Granulated gelatin	1	tablespoonful
Cold water	½	cup
Boiling water	1	cup

Sugar	1	cup
Lemon juice	1/4	cup
Eggs	Whites of 3	

Method.

Mix as for lemon jelly. Set aside in a cool place, and as soon as it becomes sirupy stir occasionally until quite thick. Then beat with wire spoon or whisk until frothy. Fold in the beaten whites, and continue to beat lightly until quite stiff. Pile by spoonfuls on a plate and serve with boiled custard, or mold as in Fig. 69.

Frozen mixtures.—There are some interesting principles to note here. The freezing is accomplished by using a mixture of chopped ice and rock salt. Can you explain how this reduces the temperature?

Another interesting point is this: Have you ever seen a milk bottle on a cold winter morning with the paper cover or even the metal cap pushed up, the frozen milk standing high above the top of the bottle? What does this suggest to you in connection with the filling of the ice cream freezer?

It must be noted, too, that a larger amount of flavoring material is needed in a frozen dessert than in one that is not. The frozen custard, for instance, needs more vanilla than one prepared in the ordinary manner. Can you account for this?

Method of freezing.

There are many patterns of ice cream freezers that are well constructed and inexpensive. They are sold by the size, a 2 quart freezer giving you 2 quarts of the frozen cream. See that the crank is oiled and the whole apparatus clean. Have ready pounded ice and rock salt, usually in the proportion of 1 part salt to 3 of ice. Machines come for cutting the ice, but it is easy to pound it in a strong bag. Set the freezer can in place, put around it the ice and salt alternately, shaking down and packing firmly. Have the ice cream mixture cool, pour it in, having the can not more than 2/3 full. Put on the lid, cover with ice and salt, and begin to turn the crank. Open and stir down once or twice, being careful to keep out the salt. Take out the crank before the cream is too stiff. Pack the cream firmly down in the can. See that the melted water is removed from the pail, put in more ice and salt, and leave until the ice cream is firm.

To mold ice cream or mousse. Directions for packing in a mold are given under *strawberry mousse*.

14. American ice cream.

(*a*) *Ingredients.*

Cream	1	quart
Sugar	3/4	cup
Vanilla	1	tablespoonful

Method.

Mix ingredients and freeze.

(*b*) *Ingredients.*

Milk	1	pint
Flour	1	tablespoonful
Egg	1	
Sugar	1	cup
Salt	1/4	teaspoonful
Cream	1	quart
Vanilla	1	tablespoonful

Method. As in French ice cream.

15. French ice cream.

Ingredients.

Cream	1	quart
Milk	1	quart
Eggs	4	or 6 to 8 yolks
Sugar	1 1/2	cups

Vanilla	2	tablespoonfuls

Method.

Make a custard of milk, eggs, sugar, and vanilla. Add cream, chill and freeze.

16. **Milk sherbet.**

Ingredients.

Milk	4	cups
Sugar	1 1/2	cups
Lemons	Juice of	3

Method.

Mix juice and sugar, stirring constantly while slowly adding milk. If the mixture should curdle, this will disappear when frozen.

17. **Raspberry ice.**

Ingredients.

Water	4	cups
Sugar	1 2/3	cups
Raspberry juice	2	cups
Lemon juice	2	tablespoonfuls

Method.

Make a sirup by boiling water and sugar twenty minutes, add raspberry juice, strain and freeze. Any fruit juice may be used for this sherbet.

18. **Strawberry mousse.**

Ingredients.

Cream	1	quart
Strawberries	1	box
Sugar	1	cup
Granulated gelatin	1 1/4	tablespoonfuls
Cold water	2	tablespoonfuls
Hot water	3	tablespoonfuls

Method.

Wash and hull berries, sprinkle with sugar, and let stand one hour; mash and rub through a fine sieve, add the gelatin soaked in cold water and dissolved in hot water. Set in a pan of ice water and stir until it begins to thicken; then fold in the whipped cream, put into a mold, cover, pack in two parts ice to one of salt, and let stand four hours. Use a mold with a tight cover and seal the crack with a strip of cloth dipped in melted butter and bound around the mold while still wet.

EXERCISES

1. Explain the value of salads and desserts in the dietary.
2. What are the important points in a good salad?
3. Give a number of agreeable combinations of material in a salad.
4. What are the substitutes for olive oil?
5. Why should mayonnaise dressing be kept cold in the mixing?
6. Make a classification of the different types of dessert.
7. What is gelatin, and why is it useful in desserts?
8. What are the underlying principles of custard making?
9. Why is it important that the can in a freezer should not be filled to the top?
10. Why does chopped ice and salt freeze the mixture?

11. Estimate the cost of the following dishes for five people: Potato salad with boiled dressing; a baked custard; a Brown Betty; French ice cream; raspberry or lemon ice.

12. Explain what is meant by garnishing.

CHAPTER XVI

PREPARATION OF MEALS AND TABLE SERVICE

The preparation of a number of dishes assembled for a meal requires a skill quite different from that necessary for the making of a single dish. A menu being decided upon, it needs an accurate sense of time, forethought, and promptness, to have a number of dishes ready at the same time, or in proper sequence if several courses are served. Such questions as the following must be answered:

Technique of preparation.

1. What steps in preparation can be taken ahead of time, as washing, paring, cutting, etc.?

2. What dishes take the longest to cook?

3. Which must be served the moment they are done?

4. Which can be kept hot for some time without injury?

5. Which can be finished and cooled perhaps several hours before?

6. Do the dishes selected require the same utensils at the same time? (If so, the menus must be changed.)

7. What is the order of serving?

To understand the bearing of these questions you will need to select some menu and make a plan for preparing it. (See exercises at the end of this chapter.)

The fact is obvious that in preparing a meal you cannot finish the dishes one at a time, but that steps individual to each dish must be interwoven with each other, and the cook must have them all “on her mind,” and is often doing half a dozen things at once. As a high school girl, preparing a part of her first meal, remarked, “This is as good training as mathematics.”

The woman at home will devise many ways of easing and shortening the labor just before the meal is served, avoiding haste and anxiety in this way. With the fireless cooker and other slow-cooking apparatus, the heavy work may sometimes be done far ahead of mealtime. A dessert can be prepared and be cooking as breakfast dishes are washed, and at the time left overs are put away they can be arranged ready for serving, as in the case of poultry or meat to be served cold. While the preparation of the midday meal is in progress, something can sometimes be done for the last meal, too. This, indeed, is a field for generalship, and it is a successful campaign when the meals are all on time and well prepared, and the cook and family cheerful.

Important points in serving each dish.—Each dish should be perfectly done, neither over nor under cooked. All hot dishes should be hot, and cold dishes cold. Lukewarm food is not agreeable. Bread and cake and some kinds of pastry are the only foods that may have the temperature of the room. Sliced meat and salads should be *cold*. Chill chocolate éclairs before serving and see how much they are improved; indeed, experiment with a number of foods that are usually served at room temperature.

To keep food hot.—A hot closet above a coal or gas range is made for this purpose, and steam heaters sometimes have hot-closets. A double boiler is a help, and one utensil may be set into a larger, filled with boiling water. Some dishes can be set back on the stove, or over a simmering gas burner with an asbestos mat underneath. The oven may be used sometimes, with the door set ajar. The food may be kept covered unless it will steam, in which case cover it with a towel. Serve food in hot dishes.

To keep food cool.—Leave the dish in the ice box until the last possible moment. Sometimes serve with ice (butter in warm weather). If ice is lacking, use other cooling devices. Serve in chilled dishes. 267

Garnishing the dish.—All food must be neatly placed in the dish, and arranged or piled with some sort of symmetry, and this is the most that some people have time to do. Many foods may be served in the utensil or dish in which they are cooked, and in the case of a baking dish, if its appearance is not neat, a napkin can be folded about it. The simplest form of garnish is browning on the top, which makes many dishes attractive (mashed potato).

Make the garnishing simple, and have it eatable when possible. Slices of hard-boiled eggs on spinach, chopped parsley and butter on boiled or mashed potato, parsley and slices of lemon, with meat and fish.

Vegetable borders are attractive and save labor in dish washing. Arrange the meat in the center of the platter, and pile mashed potato, or boiled rice or peas or beans, or a mixture of hot vegetables around the edge. This saves time in table service, too.

The garnishing of salads, desserts, and cakes is treated in previous chapters.

Table equipment and service.—This is a place where beauty is a large element, and most people understand the charm of a daintily laid table, as the family gathers for a meal. But many factors must be taken into account, for it is an easy matter to pass from the simple and beautiful to an extravagant display, to spend more on the dining-room equipment than the income warrants, and to waste much energy in unnecessary work. Our great need here is to learn to see beauty in simplicity. We must remember, too, that many people in our country live in crowded quarters, and have no time for anything but the simplest kind of table service.[16]

The *table* should be firm, large enough to accommodate the family comfortably, and it should permit of extension when occasion demands a larger board. The top should have an oil finish that will not easily mar and that can be washed off. Have a thick cloth or pad to protect it—the “silence cloth.”

Table covers may be the small doilies with centerpiece, strips of fine linen crash, or blue or brown and white Japanese toweling laid across both ways, a cloth that just covers the table, or a large cloth that hangs well below the table edge. The doilies and strips are used conventionally for breakfast and luncheon, but save much labor when used for all meals. The color may be white, or tinted, but the dark-colored cloth should be banished. 268

The material may be linen or mercerized cotton. Many people think white table oilcloth is impossible, but a table covered with it may be made very pretty; it can be kept clean by washing at the end of each meal, and the saving in labor is incalculable.

The pattern and quality and cost of table linens are mentioned in Chapter XXI.

Napkins may match the tablecloths. A small size economizes labor. Avoid fringes, selecting a scalloped edge or hemstitch. Japanese paper napkins are useful in summer, and for box luncheons.

The dishes.—Only a few practical suggestions can be given here. This is a topic for the art class.

Buy from “open stock.” This means, not a single set, but a pattern that the manufacturer and retailer have always on hand, so that the purchaser can buy one plate or cup and saucer, to replace breakage.

An elaborate or highly colored design becomes wearisome, is not practical for those who have a limited supply of dishes, and is in questionable taste. A positive color demands always the same general scheme for other decorations. A band of color, or a narrow design at the edge, of a color harmonizing easily with other colors, is in good taste. Gold and green are safe colors. See Fig. 72. White dishes with a raised border are dainty, and any color scheme may be used with them. See Fig. 71.

The number of dishes depends upon the simplicity or elaborateness of the method of living and the size of the family. It is much better to begin with a few, and increase the number when necessary, than to have the shelves filled with unused ware. (See exercises.)

Glassware is pressed or cut, the latter being beautiful, but an expensive luxury. Glasses for water, and dishes for berries, are made with simple and attractive designs in the pressed ware, and serve all ordinary purposes. A pretty shape for

the glass for water is shown in Fig. 71.

Silver and plated silver for knives, forks, and spoons, coffee and tea sets, all add to the charm of the table. A large collection is not necessary for everyday use, and it adds greatly to the labor of the housewife. Figure 70 shows some good designs in spoons, and spoons and forks of different sizes come in the same design. A simple design is easy to clean. Three sizes of spoons, tablespoons, teaspoons, and coffee spoons, and two sizes of forks are all sufficient, with a few larger spoons for service and desserts.

Triple-plated ware lasts for years, if well cared for, and comes in good designs.

Pewter, familiar in olden days, is being used again in Colonial designs, and makes an attractive tea or coffee set, is less costly than solid silver, and has a better tone and color than plated ware.

Cutlery.—Plated knives are easy to care for, but steel knives are more effective for some purposes. Purchase good quality steel knives, especially in the carving set.

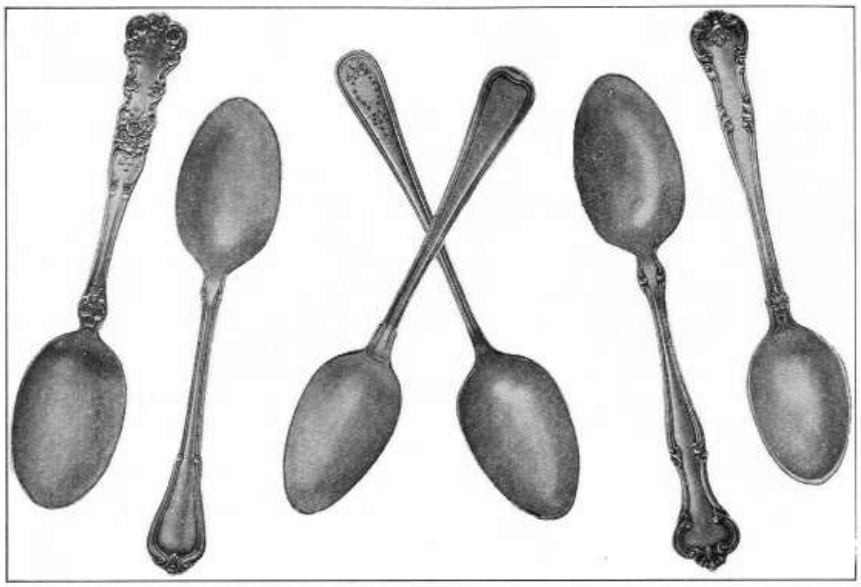

Fig. 70.—Good designs for table silver. *Courtesy of Gorham Co.*

Setting the table.—The first principles here are to have everything clean and shining, and to lay everything straight. Have as little on the table as possible. It is not comfortable to have a large array of articles at one’s place. Figure 71 shows you a dainty and well-laid table, arranged for a Sunday night supper, and this arrangement is a good one for any meal, with substitutes for the chafing dish.

Be sure that the *cloth* is straight, the center fold in the middle of the table, and that the cloth hangs evenly on all sides. See that centerpiece and doilies are laid at even distance.

Laying each place.—In Fig. 71 the knife, edge out, is at the right, with one spoon, and the glass is at the right, in line with the end of the knife. Two forks are at the left, and a plate for bread and butter, with bread knife are at the left, opposite the glass. The napkin is at the left. This plan, somewhat elaborated, may be safely followed for formal service. Two knives may be placed at the right, with the soup spoon, and three forks at the left. If more than these are needed, they may be supplied later, laid on the plate placed for a certain course, in the middle of the plate, handle toward the guest.

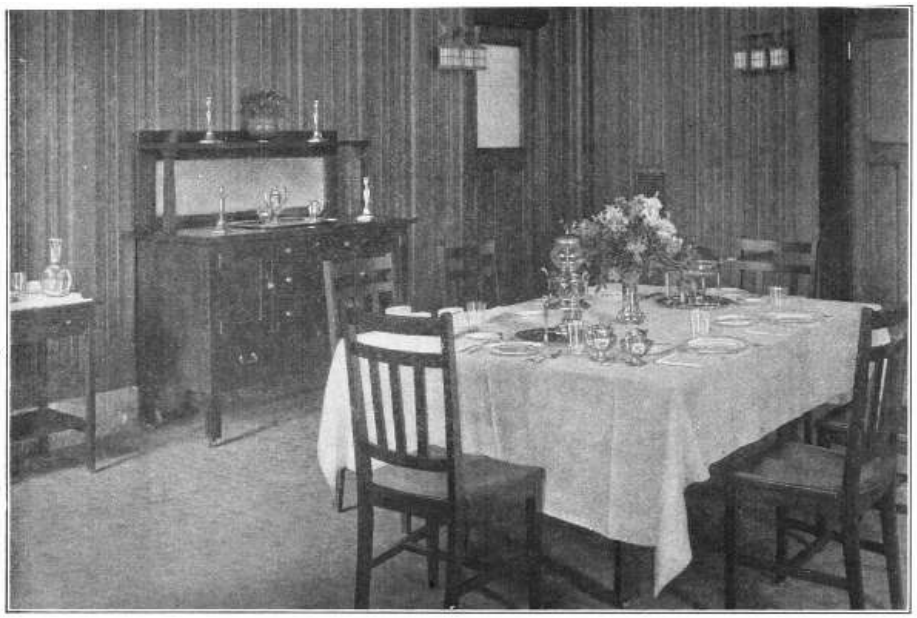

Fig. 71.—A table set for Sunday night supper. ***Courtesy of Dept. of Foods and Cookery, Teachers College.***

The other articles on the table may vary widely. For everyday use, where there is no maid, or only one, set in places convenient to pass, the salt and pepper, vinegar and sugar, bread plate and butter plate, and any small dish of condiment or pickle, with pretty mats for the hot dishes to be set on later, and enough spoons for serving. See that the arrangement is symmetrical and convenient. A table laid in this way has room for little more in the way of "decoration" than a slender vase holding a few flowers in the center. The dishes for dessert can be ready on a side table.

For formal service nothing is placed on the table in addition to the equipment at each place, but some centerpiece containing ferns or flowers, with pretty dishes of silver or glass holding relishes, candies, or dried fruits, a graceful arrangement being to alternate four of these with four candlesticks for meals served late in the day.

Table decorations.—Here fancy may run riot with color schemes, and pretty devices for special occasions. A painted place card, a small bonbon box, a single flower with a pin for fastening it on,—all these have their place at times. Satin ribbon is not an appropriate table decoration laid across the table in a broad band, even when it displays a class color. Find some other way to make the color effective. A color scheme in the food can be carried out to a degree for some occasion, but do not let the color interfere with a really satisfactory menu.

Relishes have already been suggested as decoration—radishes cut in rose shape, olives, candies, and fruit.

The tray for invalid and convalescent.—Figures 72 and 73 suggest the daintiness possible in setting a tray. It is well worth while to spend time in the careful arrangement of the tray, for pretty dishes in orderly array may tempt the appetite of the invalid.

Fig. 72.—A convalescent's tray. ***Courtesy of the Dept. of Foods and Cookery, Teachers College.***

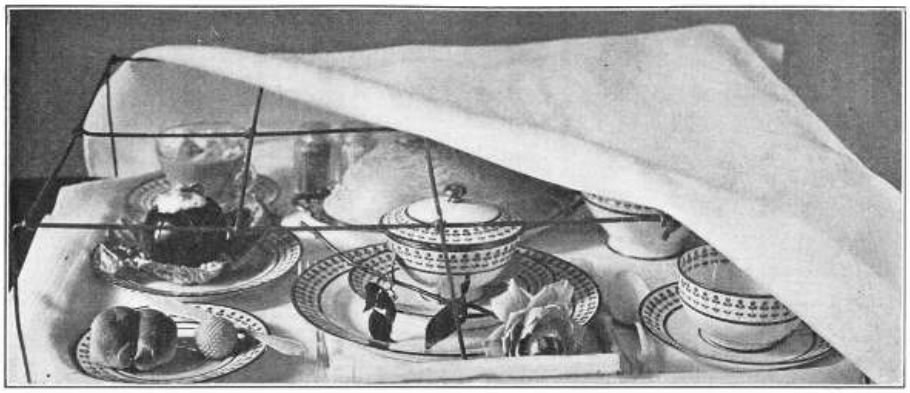

Fig. 73.—A convalescent's tray with rack for holding cover.
Courtesy of the Dept. of Foods and Cookery, Teachers College.

Waiting on the table.—When we wait on ourselves, this should be done with cheerfulness, and all should take a share. After the food is on the table, one person can "help" one thing and one another. It is a good plan for the young people of the family to take turns as waiter in removing the soiled dishes and food and putting on the dessert. A quick method is to place a tray on a small stand near the table, taking the dishes from one place at a time, and sorting them on the tray as you go. The tray can then be carried into the kitchen, with the dishes partly arranged for washing. 274

One mother uses a plan for having everybody help at breakfast time, modeled after the tray system of a cafeteria. The breakfast is cooked ready to serve, and on the kitchen table is a small tray for each one of the family of four. All necessary articles are at hand, and even the boy of seven sets his own tray and helps himself to food, and takes his place at the table; and then when the meal is ended each one carries out his dishes and puts them in neat array for washing.

The waitress at a formal meal has to be alert, rapid yet gentle in all her motions, with a desire to make other people comfortable, and a faculty for remembering their likes and dislikes. A good waitress does not pass a second time a dish once declined.

The waitress must know the menu, and have everything ready for each course at hand on the sideboard, with dishes kept hot in the hot closet.

The table is laid in time, she herself is immaculate, and the room is well aired and the temperature agreeable. A piece of bread is folded in each napkin. If the first course is cold, —perhaps a grapefruit,—she arranges these at each place. If it is to be a hot bouillon, the cook tells her that all is ready, and then she informs the hostess that dinner or luncheon is served.

The details of this type of waiting vary with the place and the taste of the hostess, but the following method is simple and rapid.

Serving.—Serve everything from the side table. Hold the dish to be served firmly in two hands with a napkin underneath, a tablespoon and fork being placed on the dish. Pass to the left of the guest, and hold the dish at a convenient height and near the plate. After all the dishes in a course are passed in this way, watch to see if second helps are needed. 276

Remove the soiled plates at the left, and place the clean at the left, removing with the left hand and placing with the right.

Fill glasses at the right, and remove silver at the right before dessert when there are pieces left unused.

Brush crumbs with a soft, folded napkin upon a plate, at the left, just before dessert when everything is taken from the table but the center decoration, the candies, and the glass of water. With this plan the guest helps himself each time, even the after-dinner coffee being passed on a tray with cream and sugar, and he can take as little as he pleases, or decline. Some hostesses have some of the courses arranged on individual plates and placed, and these may be placed either from the left or right. But the other method is simple and satisfactory.

The finger bowls may be set on plates of dessert size with a doily underneath. If a spoon or fork is needed with the dessert, one or both may be placed on the plate also, one on each side, if both are used. The bowls should be less than half full of water and the water should be a comfortable temperature, neither cold nor noticeably warm. Set the plates arranged in this way before each guest. The guest himself will remove the bowl and doily and silver before the dessert is passed. In large banquets the food must be placed on the individual plate.

The question is sometimes asked, “Who shall be served first?” It is a good plan to change this from course to course, beginning the first time with the guest of honor. It is not a matter of great importance, provided no one has to wait long. Two waitresses make the service quicker.

The guests of honor sit at the right of the host and hostess.

The number of courses.—Two or three courses are enough for everyday comfort and health. In formal serving, it is good taste not to have too many. A first course of grapefruit or perhaps oyster cocktail, a soup, a fish course, or some light substitute for it,—the main course with meat, a salad, dessert, coffee—make a quite sufficient meal. The “entrée” is a light dish, say sweetbreads in cases, after the fish course, but it is quite unnecessary. Many people are becoming very weary of the long-drawn-out dinners and banquets, which are certainly far from hygienic.

Carving.—This is an art that used to be taught as an accomplishment to girls, and it is not an easy matter to master.

If not done at the table, it must nevertheless be well done. Watch a good carver, and practice when you have a chance. A few simple directions can be given, but a demonstration is really necessary. First and foremost, have a sharp, strong knife, and a strong fork. The next essential is a platter large enough to hold the meat, without having it slip off. The fork must be firmly placed in the meat, and the meat held down. Notice the shape of the cut of meat. Meat must be cut across the grain. Loosen from the bone, notice the grain, and cut evenly and firmly. With fowl, discover the joints, pierce with the end of the knife, disjoint, and lay at the side, and then slice the breast across the grain. If carving at the table, learn the preference of those served, whether they wish light or dark meat, meat well done or underdone. Have a spoon for dish gravy and stuffing.

EXERCISES

1. Plan the order of work for the following menus: (*a*) Cooked cereal and cream, stewed prunes, poached egg on toast, popovers, coffee. (*b*) Tomato bisque, lamb chops with peas and mashed potatoes, plain lettuce with French dressing, Brown Betty with foamy sauce, black coffee.

2. What are the important points in serving each dish? Give some simple garnishes.

3. Obtain price lists and estimate the cost of table furnishings.

4. What do you consider good taste in china and silver?

5. What are the important points in table setting?

6. Make a list of dishes to be used for the menus given above, or other menus.

7. What are the fundamentals in waiting on the table?

8. How may the home service be made comfortable?

9. Discuss different methods in formal service.

10. How may the guest be made most comfortable?

CHAPTER XVII

THE COST AND PURCHASING OF FOOD

This is at all times an important matter, but the notable increase in food prices, during the last decade, has made it a matter of interest to all. The cost of food is one item only in the whole cost of living, and this is affected by many conditions in manufacture and commerce and the business of the nations. Economists and others interested in social

questions are studying the problem, but as yet they do not agree upon the cause, or causes, of the increased cost of living. We cannot hope, therefore, to understand the situation fully; but we must be determined to spend money as wisely as we can, and to learn what we may about food prices in relation to food values. There are a few causes of the difference in price between one food and another that are more or less unchanging. The cost of food may be considered from several points of view. The question of the cost for each individual a day and relation of cost and nutritive value are studied in Chapter XVIII. The proportion of the income to be spent for food is taken up in Chapter XIX.

Labor and prices.—The amount of labor involved in producing a food material affects its price. Meats cost more than staple vegetable foods, like corn, wheat, or beans, because we must raise the corn first to feed the animals. Meat is as cheap as vegetable foods only when the animal can find its own food, as in the pioneer days of any country, when only a small part of the land is under cultivation. To the Pilgrim Fathers, meat was cheaper than corn, in terms of labor, with deer at hand in the forest and corn raised with difficulty in small clearings. Meat production is now an industry, and the product an expensive one, especially as the wide cattle ranges of our West, where the animals have formerly found natural food, are now used more and more for other purposes.

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Transportation.—Carrying food from place to place increases its cost. In one sense this is another form of labor. Each person who handles the food material from producer to consumer adds something to what the consumer pays. We have heard much discussion of late of the "middleman," and the effort to bring the producer and consumer closer together. This simply means doing away with some person who handles the product after it leaves the producer and before it reaches the consumer and who must have something for his labor. In transportation there is another element involved, the original cost of the means of conveyance; and the natural wear and tear on the product are items that increase the final cost. The modern farmer who carries his produce to market in an auto truck must have a return for the original cost of the truck and the keeping of it in repair. The long-distance railway furnishes cold-storage cars, and the cost of these and their maintenance affect freight rates. A peach from South Africa costs from fifty to sixty cents in the Boston market. It is probably true, in this case, that a fancy price is asked because African fruit is a novelty here; but the difficulty and expense of long-distance transportation naturally make it costly.

Demand and supply.—The relation of demand to supply affects the price of food in a way not difficult to understand. Where the supply is permanently small and the demand widespread, the price of the particular food material will be high, and *vice versa*. Olive oil is a good example of the permanently high-priced food. California olive oil brings a high price not only because it is pure and well flavored, but because many people want it, and the industry is a small one. Many years are needed to establish an olive grove, and olive raising is not a popular way of making money, because it is slow. One enterprising American firm has bought an olive grove in Spain, and is using new methods there, but the product, though delicious, is no cheaper. Although the manufacture of olive oil will doubtless remain a rather small industry, the use of olive oil is increasing, in this country, at least. It does not seem likely, therefore, to become a cheap form of fat.

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We find nearly the opposite of this in cottonseed oil, a large supply and a relatively smaller demand making a low price. The seed (a by-product of the cotton industry) contains a large quantity of oil, and it is not all used as food. Therefore, it is permanently a low-priced fat, as contrasted with the permanently high-priced fat, olive oil.

Agricultural conditions.—There are two things of which the farmer can never feel sure, the kind of weather to expect and the general character of the season. Of course, the season affects the quality and the amount of any crop, and this, again, influences the price.

Another aspect of the effect of season on food is this: that a food is in its own locality cheaper when it is in season than at other times of year, when it has to be brought from a distance.

Insect pests and plant diseases not infrequently spoil a crop, and the market price goes up with the smaller supply. This is what happened not long since to the potato crop and potato prices, when potatoes were affected by the potato blight. Moreover, if the farmer succeeds in keeping his crop free from a particular pest, it means a more or less permanent increase in his expenses, for in fighting insects and fungi there is an outlay for machinery and chemicals, and much labor is expended. Unfortunately, injurious insects and plant diseases are on the increase, and this may mean a permanent rise in the cost of certain foods. Another fact has to be reckoned with in comparing the prices of different foods. Some vegetables are more difficult to raise than others, even when the season is favorable, and the insects at least partly conquered. Some plants have more vitality than others, and grow under almost any condition of soil and moisture.

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Animal diseases must also affect the price of food. If a large number of cattle are found to have tuberculosis, and are condemned as food, healthy cattle bring a higher price, because, again, the supply is small in relation to the demand.

Quality of food.—Poor food always costs less money than good food, but it may not be economy to buy it. There may be more usable material in one good apple at five cents than in three wormy ones for five.

Form and place in which food is sold.—Food in the package costs more than in bulk, and each fancy label adds a fraction to the cost. Plate-glass windows and ribbon decorations in a shop and the large expense of rent on a fashionable street are all paid for by the consumer.

Relative cost of home and shop products.—When prepared food of any kind is purchased, one pays for raw material plus the cost of fuel and the labor involved in the cooking and the cleaning of apparatus and kitchen. For example, canned soup sold by one of the best manufacturers brings a good price because so much time and labor are used in a careful inspection of all material, and in keeping up a high standard of cleanliness. Remember, too, that whenever cooked food appears on the table, these two items, fuel and labor, are in reality added to the cost of the raw material. We may not pay cash always for the labor, but it must be accounted for in time and energy. The woman who says, "My time doesn't count," has a poor opinion of herself. Whether or not it is better to buy cooked food or to prepare food at home is discussed on page 292.

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Other elements in food prices.—So far we have considered those causes of food prices that are what may be called "natural," always to be taken into account, and only partly under our control. There are others that have to do with big business methods and interests and that have great influence at some one period in a nation's life, and less at others. They are more or less under our control if we have the wisdom and courage to act. A discussion of these causes is part of the study of economics proper, and we can only stop by the way to think of them for a moment.

Transportation must always increase cost, as we have learned, but bad methods, involving the handling of food by many people, increase it unnecessarily. Our present methods of marketing food are clumsy, and not economical, especially in large cities. The subject is being seriously studied with a view to improvement, possibly by the establishment of public markets.

At present we have a bewildering state of things, but the housekeeper who sincerely desires, can learn to buy and prepare the less costly foods in an appetizing way, and leave nothing for the garbage pail but the parts that are actually not eatable.

Comparative costs.—It would be useless to print here a list of actual prices, since they vary in different localities, and are constantly changing. This list can be made by yourselves in your notebooks for your own home town, and for the current year. The table on page 318 is a guide, however, for in spite of fluctuations in prices there are certain foods that are permanently more economical than others; for example, grain products than meats, for reasons already explained. As a rule, the rising cost of food has been so general as not to change greatly the relative economy of the different types of food as compared with each other.

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Cost and nutritive value.—The discussion of cost has dealt so far with the cost of *food materials* as they are found in the market. What we are really seeking to learn is the amount of *nutritive* material to be obtained for a given sum of money, and in order to do this, we must think of our purchases in terms of the *foodstuffs* and their values. The accompanying table from a government bulletin[17] gives an estimate of cost from this point of view in terms of protein and fuel value. Notice that wheat bread is a cheap food, standing first in the amount of building material and energy.

AMOUNTS OF PROTEIN AND ENERGY OBTAINED FOR 10 CENTS EXPENDED FOR BREAD AND OTHER FOODS AT CERTAIN ASSUMED PRICES PER POUND

FOOD MATERIALS	PRICE	10 CENTS WILL BUY	10 CENTS' WORTH WILL CONTAIN	
			PROTEIN	A FUEL VALUE OF
		Ounces	Ounces	Calories
Wheat bread	5 cents per lb.	32.0	2.9	2400
Cheese	22 cents per lb.	7.3	1.9	886
Beef, average	20 cents per lb.	8.0	1.2	467
Porterhouse steak	25 cents per lb	6.4	1.3	444
Dried beef	25 cents per lb.	6.4	.1	315
Eggs	24 cents per lb.	10.0	1.3	198
Milk	9 cents per qt.	38.3	1.2	736
Potatoes	60 cents per bu.	160.0	—	2950
	$1\frac{1}{2}$ cents per			

Apples	lb.	106.7	—	1270

284 The price quoted for eggs is low, and even less could be obtained for ten cents at prevailing prices in 1913-1914. This kind of estimate is a help in making menus and dietaries. (See Chapter XVIII.) Another method of estimating economy for this purpose is by calculating the cost of 100-Calorie portions of various food materials. A table giving such a comparison will be found in the next chapter.

Purchasing Food

In addition to the general principles of buying discussed in Chapter XXI there are some details to be studied in purchasing food.

Personal attention in buying food.—It is absolutely necessary to visit the market and the grocery where food is purchased. The purchaser would not fail to visit a shop before deciding to patronize it regularly, but frequent calls are necessary if buying is to be economical. Select the grocery, market, and bakery with a view to their cleanliness. Notice if the doors and windows are screened, and if proper effort is made to catch flies that may have entered. Refuse to buy food that is exposed upon the sidewalk, and if it is within doors, see that it is protected from dust and flies. The best markets now have tiled walls and floors, which help to insure cleanliness. The difference in odor is marked between a market that is properly cleaned daily, and one where the proprietor uses uncleanly methods. Meat and vegetables, in particular, should be personally selected whenever this is possible. The butcher must understand that the purchaser is familiar with the different cuts of meat and that honest service is demanded in regard to the quality, trimming, and weight of the meat. One does not want to be too suspicious, but it is well for the butcher to know that the purchaser has a set of standard scales at home by which to prove the accuracy of his weighing. It is also important to inspect fruit and vegetables for quality and cost. 285

Quantities in which to purchase food.—The amount that one purchases of a certain food depends on its keeping qualities, and upon the storage space available at home. A general rule may be stated: Buy perishable foods in small quantities; non-perishable foods in large. The reason for buying in larger quantity is that the cost is somewhat less, although sometimes it seems but little less. Some one has remarked that no one is a good buyer who does not consider a quarter of a cent. In a modern house or apartment where there is not room for a barrel of flour or sugar, then the quantity must be gauged by the space. The same is true of canned goods as of flour and sugar. Buying by the dozen saves a little on each can if you have shelf room for piling the cans.

Foods may be classed in this connection as perishable, semi-perishable, and non-perishable. This depends somewhat for any one housekeeper upon the size of her refrigerator, and upon an available place where food may be cool, even if not so cold as in the refrigerator. Those foods classed here as perishable are those which readily “spoil,” that is, those that are affected by mold and bacteria on account of the moisture that they contain, and also those that lose flavor and freshness quickly. Those most easily affected should be kept the coldest; those in the semi-perishable group do not deteriorate so rapidly, although a low temperature is desirable with all of these. Under the non-perishable foods are classed those that are not subject to bacteria or mold in ordinary circumstances. These should be kept dry, however, and never in a heated place. In a sense, no food material is non-perishable. Insects sometimes develop in the cereal products, for instance, and the material is thus rendered unfit for food. The food adjuncts do not spoil except as they lose flavor if kept too long. 286

Perishable.—Milk, cream, uncooked meat, uncooked fish, shellfish, berries, fruits with delicate skins, lettuce, and vegetables that wilt easily.

Semi-perishable.—Butter, eggs, cooked meat and fish, root vegetables, cooked vegetables, left overs in general, skin fruits like apples, bananas, oranges, and lemons, dried fruits, scalded milk and cream, smoked and salted fish and meats, open molasses and sirup.

Non-perishable.—Flour, meals and cereals, sugar, salt, and other condiments and flavorings, jellies, preserves and canned goods, coffee, tea, cocoa, and chocolate.

Suggestions for buying.—Milk and cream must be delivered daily. The average amount used by the family is the regular order. Fresh meat should be delivered on the day wanted unless the refrigerator is large with a space for hanging meat. Even then, it should not be kept more than twenty-four hours. Meat should not be placed directly on the ice.

Fresh berries and delicate vegetables should be delivered on the day wanted. Butter and eggs may be purchased once a week; other semi-perishables in quantities depending on storage space. It is economical to buy a box of lemons, and the root vegetables in large quantities. Flour and sugar are purchased by the bag or barrel; lump sugar, in boxes. Breakfast cereals are best bought in packages, and it is wise not to buy a large number at one time. It is better to purchase oftener and have fresher material. Coffee may be bought in pound cans, but it is economy to purchase it in five or ten pound quantities, unground. Tea comes in closely sealed packages, in $^1/_4$, $^1/_2$, and 1 lb. and larger. Cocoa is bought in $^1/_2$ lb. cans, but it is economy to buy in large cans if it is frequently used. Macaroni is bought by 287
the package, and the number at one time must depend on how much it is used in the menu. Rice, tapioca, and sago may be bought in bulk and kept in tin or glass jars. Salt by the bag or box. Spices, ground, in tight boxes; whole in bulk, to be kept in tightly closed cans. Molasses comes by the gallon or in cans. If in bulk, it is usually acid; in the can it is not. Vinegar comes by the gallon, or in bottles. Canned and preserved goods, singly, by the dozen, or case. Bakery products, when bought at all, should be purchased daily, or every other day. Do not buy so much that stale bread accumulates.

Weights, measures, and packages.—The buyer is at a disadvantage here in regard to quantities, for the baskets in which fruits and vegetables are sold do not always conform to the standard dry measures, and dishonest dealers evade the law in regard to the use of standard scales. Even if they have the standard, they resort to tricks that give the customer short weights. Here the Bureau of Weights and Measures, with its Commissioner and corps of inspectors, comes to the aid of the purchaser. Effective work has been done in our cities in enforcing the laws, and this work continues.

Selling fruit, vegetables, and even eggs by weight would simplify matters in many ways, and this is the custom in some parts of the United States with vegetables and fruit, although it is not yet a common practice; with eggs it seems more convenient to sell by the dozen, but grading according to size is a step toward standardization.

The alluring packages in which so many articles are offered are quite uneven as to the quantities they contain. They certainly do away with some handling of food, and they keep out dust. Unfortunately, an attractive package does not guarantee a clean factory or clean handling in the packing. Dried figs, for example, in pretty baskets are sometimes packed in 288
uncleanly places. Moreover, small packages are poor economy, since the box adds to the cost of the food material, and sometimes there seems even more package than food. If the family consumes many biscuits or “crackers,” it costs considerably more to buy them in packages. Yet, these are convenient, and should be cleanly, and are justified for these reasons, provided the housekeeper does not buy many small packages.

The quantities in canned goods are variable and sometimes below measure when purchased from a second-rate dealer. In September, 1914, the net weight amendment to the National Food Law will go into effect, after which, in general, foods sold in packages must be labeled to show net weight or measure or numerical count.

As already suggested, you should own standard scales for testing the purchases made by weight, even baker’s bread. Buy fruit and vegetables by the quart, peck, and bushel, rather than by the basket of uncertain measure. Examine baskets containing small fruits to see if they have false bottoms. If you discover small measure, report at once to the dealer, and to whatever authority has charge of such matters in your town.

Quality.—Modern methods of manufacture, transportation, and storage make it difficult to determine the history and quality of food we purchase in the markets. Yet the consumer has a natural right to know if the food offered for sale is the best of its kind; fresh eggs, clean milk, meat from healthy animals, untainted and free from harmful preservatives, sound vegetables and fruit, manufactured and preserved foodstuffs unspoiled by the manufacturing processes, free from harmful preservatives, and of good flavor. Many people must be in danger of forgetting the flavor of a fresh-laid egg. The familiar signs in many 289
small shops, “Fresh eggs,” “Strictly fresh eggs,” “Fancy eggs,” are amusing, but they bespeak an unnatural state of things.

As our business methods have created conditions beyond the control of the individual consumer it follows that we must take concerted action, and make and enforce whatever laws are necessary. This is done partly through the Federal government, and partly through state laws and municipal ordinances. Thus, while we may not know the actual conditions in which food is produced, we may through legislation seek to insure that the food we buy shall be

(1) what it purports to be in kind and amount,

(2) free from deterioration or unwholesome conditions,

(3) possessed of full nutritive value.

The Federal Food and Drugs Act of June 30, 1906, commonly known as “The Pure Food

Law," and on which subsequent legislation by most of the states has been largely based, defines the main types of adulteration and misbranding, but, except in the case of confectionery and of habit-forming drugs, does not name the specific substances which are to be prohibited or restricted in use, nor does the law itself contain standards of composition for foods.

According to this law *a food is deemed adulterated*:

(1) If any substance has been mixed or packed with it so as to reduce or lower or injuriously affect its quality or strength.

(2) If any substance has been substituted, wholly or in part.

(3) If any valuable constituent has been wholly or in part abstracted.

(4) If it be mixed, colored, coated, powdered, or stained in a manner whereby damage or inferiority is concealed.

(5) If it contain any added poisonous or other added deleterious ingredient which may render such article injurious to health.

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(6) If it consists in whole or in part of a filthy, decomposed, or putrid animal or vegetable substance, or any portion of an animal unfit for food, or if it be the product of a diseased animal, or one that has died otherwise than by slaughter.

And a food is deemed to be misbranded:

(1) If it be an imitation of or offered for sale under the distinctive name of another article.

(2) If it be labeled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when not so, or if the contents shall have been substituted in whole or in part, or if it fail to bear a statement on the label of the quantity or proportion of any narcotic or habit-forming drug which it contains.

(3) If it bear an incorrect statement of weight or measure.

(4) If the package containing it or its label shall bear any statement, design, or device which is false or misleading in any particular.

For a fuller discussion of the basis of pure food legislation and the essential features of the United States laws see Sherman's "Food Products," from which a part of the summary here given is drawn.

The modern cold storage plant is of immense service in keeping food from the season of abundance to that of scarcity, but it may prove worse than useless if improperly managed. State and federal laws must control the management, and government inspection must be thorough. Cold storage would be a benefit to all under proper conditions of management, and the prices of many foods would be evenly adjusted by the maintenance of a steady supply. Many states now have laws regulating cold storage plants and there is every reason to hope that the abuses which have sometimes existed will be eliminated and the usefulness of cold storage extended.

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We may feel that the progress of the pure food movement has been most satisfactory, even though much more remains to be done. The states generally have either enacted new food laws, or revised their laws following the national law. Under the national law over 2000 prosecutions have already (1913) been decided in favor of the government.

Congress has passed an even more stringent law for meat inspection supplementary to the Pure Food Law with ample appropriation for its enforcement. Moreover, in 1913, the Secretary of Agriculture appointed outside experts to inspect meat-packing establishments throughout the country. This inspection is to check up the regular work being done by the Bureau of Animal Industry.

The enforcing of federal and state laws has already largely stopped the misbranding of package foods as to weight or measure, cheap substitutions, the removal of valuable ingredients, and the sale of decomposed or tainted food derived from diseased animals. Remember that abuses can be kept down to any extent that we are willing to pay for. Taxpayers must appropriate money to pay for inspection, for laws, no matter how good, will not insure pure food unless carried out faithfully by an adequate number of specially trained inspectors.

In the face of all these difficulties we must not be frightened into that state of mind where danger seems to lurk in every mouthful. We must use caution and common sense in our buying, and earnestly support every good movement for bettering conditions.

There is a certain difference in quality even at a first class dealer's that one must learn to distinguish. One can of peaches will cost more than another, because the peaches are

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larger. If it is only this, and there is only a slight difference in flavor in favor of the more costly, buy the cheaper by all means. A fancy brand of imported preserves brings a fancy price which it is not worth while to pay. We have to learn to distinguish between poor and good quality, on the one hand, and between good and what may be called “fancy,” on the other. We should demand the good, but most of us cannot afford the “fancy.”

Ready-cooked foods.—More and more cooked food, canned or otherwise, is taking its place in the market. When canned goods were first manufactured on a large scale they comprised fruits, vegetables, meats, and fish, but we are now accustomed to a miscellaneous variety, including soups, baked beans, puddings, and pudding sauces, spaghetti, hashed meat, and shellfish. Bakery products have a larger sale than ever, and are found in small towns, and even in country districts carried there by bakers’ wagons. In our large cities we find the “delicatessen shop” very common, where small portions of cooked meats and fowl may be purchased after the custom of Europe, and these stores are open even on Sunday.

How shall we decide what is best for us in our buying? We must not condemn entirely the buying of cooked food without a careful study of the situation. The custom has grown with changes in our mode of living, especially in cities, where the small apartment is common, and where gas is the fuel. Under these conditions it is difficult to prepare foods that need long and slow cooking, and these processes are more expensive when gas is used. The long slow cooking of soup and beans, the even baking of bread, are difficult to accomplish. The odors from these processes fill the small apartment, and scent it for some time, and this is unpleasant at all seasons.

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Take another example, the canning and preserving of fruits. The first cost of the fruit is usually high in the city, and this plus the sugar and the gas, and the labor and the lack of storage space make it seem impracticable in these conditions, and many people decide in favor of buying goods already canned. Such housekeeping is simplified by buying cooked products to some extent. The fireless cooker helps here, but not for all processes. Counting in fuel, the cost is not so much greater as we might suppose; and comfort and convenience are increased. Under other conditions, even in the city, a different conclusion is reached. If coal is the fuel, and a steady fire is kept, perhaps in winter for heating purposes, then it is economy to cook most food materials at home.

In the country and small village different conditions prevail. Here the abundance of certain fruits in season makes it economical to can and dry, even counting fuel and labor. In some sections many people can their own vegetables also. However, even in the country in the summer, it is a decided relief to the farmer’s wife, probably short of “help,” to win a little leisure by buying staple bakery products. Here if strict economy is not necessary, is it not better to save strength rather than money? Each housekeeper must work out these problems for herself.

EXERCISES

1. What are the more permanent factors in the cost of food material?
2. Why is vegetable food usually cheaper than animal food?
3. Explain the effect of season upon the cost.
4. Why does transportation affect the cost of food?
5. Why is clean milk more costly than unclean?
6. How do business conditions affect the cost?
7. Why is wheat bread a truly cheap food?
8. How can we estimate the cost of the actual nutrients in food?

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9. Describe the working of the pure food law.
10. Why are such laws necessary?
11. How may we all aid in the passage and enforcement of pure food laws?

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CHAPTER XVIII

MENUS AND DIETARIES[18]

When we have learned to choose and cook wholesome and appetizing food we have not solved the whole problem of successful feeding. It is possible to make people sick with good food, if it is badly selected and fed at wrong times or in unsuitable amounts. Whether children grow to their full size and strength depends more upon the choice of their food than upon any other one thing. The effect of food is strikingly shown in the case of the white rats in Fig. 74. The two upper ones are the same age. Both had the same mother, lived in the same kind of clean cages, and had plenty of food, but the diet of the upper was good for growth, while that for the middle one was not. It remained perfectly well, but became stunted because of the character of its food. You can see that it resembles the lowest one in the illustration, which is only one fourth as old. In this chapter we shall consider how and when and in what amounts to serve food so that every one may get from it the fullest benefit in both health and happiness.

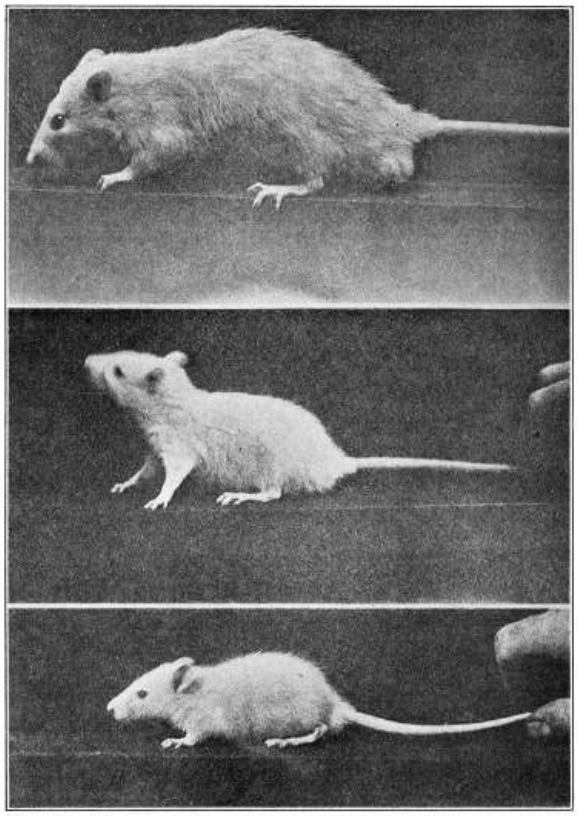

Fig. 74.—The effect of food on growth. Reprinted from publication of the Carnegie Institution. *Courtesy Professor Lafayette B. Mendel.*

In Chapter I we learned that the body is a working machine whose first requirement is fuel. Hence the first consideration in the diet is to have the proper amount of fuel for each day, to provide energy for the constant internal work that keeps the body alive, and for the variable external work which may be so light as to consist of the few movements that one makes lying in bed, or sitting quietly; or so hard as to exercise many muscles, as playing tennis, bicycling, or swimming.

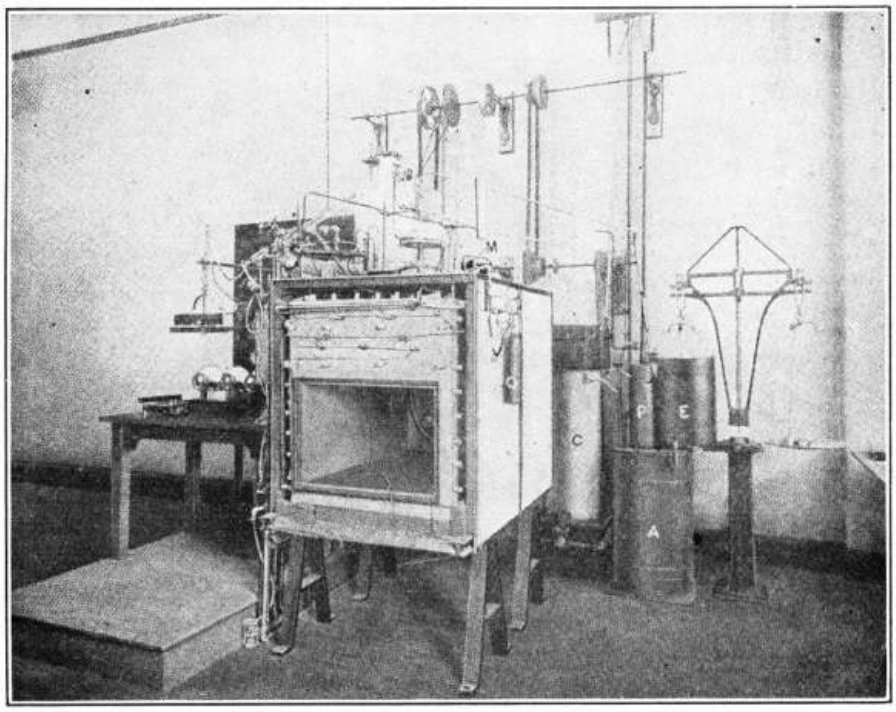

Fig. 75.—Respiration calorimeter, open. From the "Journal of Biological Chemistry." ***Courtesy of Professor Graham Lusk.***

Energy requirements of adults.—We have also learned something about the foods which supply this energy; we must now find out how much fuel (in the form of food) it takes to do different amounts of work, just as the owner of an automobile wants to know how much gasoline per mile or per hour is required to run his machine under different conditions. Very careful experiments have been made on many men in different ways to measure their energy output, the most accurate and interesting being those made in a respiration calorimeter, a device so delicate as to be able to measure the extra heat given off when one changes from lying perfectly quiet to sitting up equally still, thus adding the work of holding the upper part of the body upright. A respiration calorimeter large enough to hold a child is shown in Figs. 75 and 76. You can see that it consists of a chamber with thick walls to prevent loss of heat. In Fig. 75 the door is open. When an experiment is going on the door is closed, as in Fig. 76, air being furnished through special tubes. The walls are fitted with delicate thermometers and every device which will help to get the exact amount of heat given off from the body is employed.

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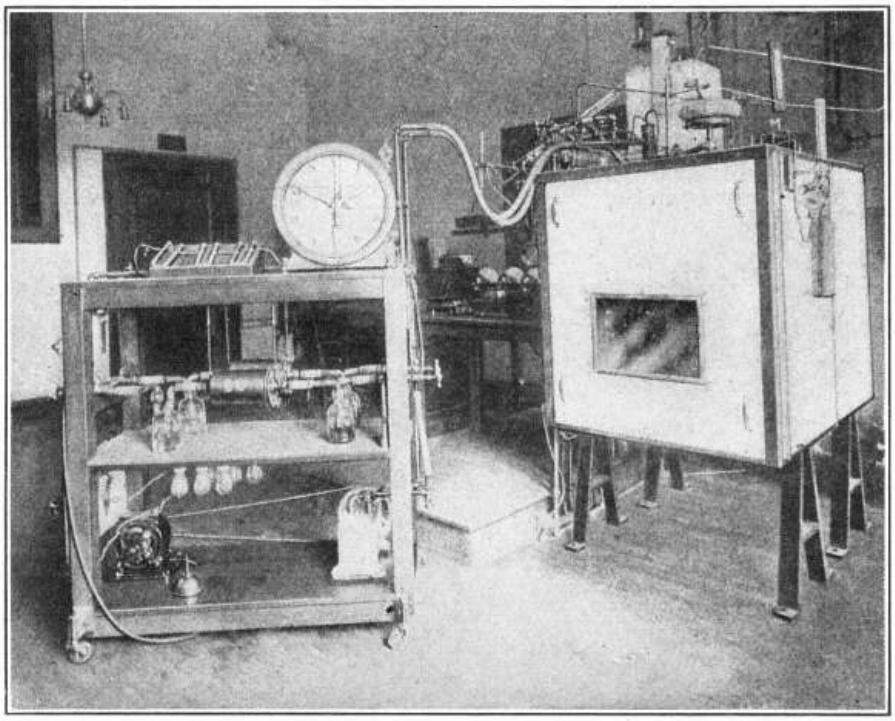

Fig. 76.—Respiration calorimeter, closed. From the "Journal of Biological Chemistry." ***Courtesy of Professor Graham Lusk.***

Just as it takes more fuel to run a big machine than a little one, so it takes more energy for a large person than a small one; therefore we must know the weight of the one whose food requirements we wish to calculate, as well as the amount of energy required to do different kinds and amounts of work. The following table will help in calculating the approximate fuel requirements of any grown person. The food needs of children and young people under twenty-five will be discussed later.

Approximate Energy Requirements of Average-sized Man

Occupation	Calories per pound per hour
Sleeping	0.4
Sitting quietly	0.6
At light muscular exercise	1.0
At active muscular exercise	2.0
At severe muscular exercise	3.0

Light exercise may be understood to include work equivalent to standing and working with the hands, as at a desk in chemistry or cookery; or work involving the feet like walking or running a sewing machine. Many persons, as students, stenographers, seamstresses, bookkeepers, teachers, and tailors do little or no work heavier than this.

Active exercise involves more muscles, as in bicycling compared with walking, or exercise with dumb-bells as compared with typewriting. Carpenters, general houseworkers, and mail carriers do about this grade of work while on duty.

Severe exercise not only involves a good many muscles, but causes enough strain to harden and enlarge them. Bicycling up grade, swimming, and other active sports would be included in this kind of exercise. Lumbermen, excavators, and a few others do even heavier work than this.

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Knowing the weight of a grown man or woman, and something of the daily occupation, as in the case of a professional man, we can estimate the probable energy requirement somewhat as follows:

Sleeping, 8 hours; 8 × 0.4 Calories = 3.2 Calories per pound.

Sitting quietly (at meals, reading, etc.), 8 hours; 8 × 0.6 Calories = 4.8 per pound.

At light muscular exercise (dressing, standing, walking, etc.), 6 × 1.0 Calories = 6.0 Calories per pound.

At active muscular exercise 2 hours, 2 × 2.0 Calories = 4 Calories per pound.

Total Calories per pound for 24 hours, 18; 18 × 154 pounds (the weight of the average man) = 2772, or approximately 2680, Calories per day required. Calculate in this way the energy requirement for various grown persons whom you know.

Energy requirements during growth.—In estimating food requirements of those who are under twenty-five years old, we must bear in mind that the same materials which serve for fuel serve in part for building material. Protein is used for muscle building as well as for supplying energy, and the larger one grows, the greater the reserves of carbohydrate and fat which he can carry. Furthermore, internal activity is greater in the young than the middle aged or very old, and external activity is apt also to be greater. Think, for instance, how much running children do compared with their parents. For all these reasons, we cannot use the table for adults in calculating the energy requirement of young people. In the following table an attempt has been made to take account of their greater needs, but the estimates include only moderate exercise; with hard work more will be required. Notice that the highest allowance per pound of body weight is for the youngest children.

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Energy Requirements during Growth

Age in Years	Calories per pound per day
Under 1	45
1-2	45-40
2-5	40-36
6-9	36-30
10-13	30-27
14-17	27-20
17-25	not less than 18

With these two tables for calculating energy requirement we can determine about how

much will be needed by each member of the family. A group consisting of a professional man, his wife, and three children under 16 will require about 10,000 Calories per day; a workingman's family with the same number of children from 12,000 to 14,000, because of the harder work which both parents and possibly the children will do.

Protein requirement.—Since few of our foods consist of a single foodstuff, and we are not likely to make even a single meal on pure fat, or pure protein, or pure carbohydrate alone, we are sure to get some building material in any diet, but we must see to it that we are getting amounts which furnish the best possible conditions for growth and repair.

As we have already seen, nitrogen in the form of protein is necessary to the life of every cell in the body. From protein, too, muscle is built, though we cannot build good muscle merely by feeding protein; a diet moderate in its amount of protein, but with plenty of fuel for healthy exercise is best for muscle building. Under all ordinary conditions, if ten to fifteen Calories in every hundred (10 to 15 per cent of the total Calories) are from protein, the need for this kind of building material will be met. Thus a family requiring 10,000 Calories per day should have from 1000 to 1500 of these as protein Calories. The following table gives the protein Calories in the 100-Calorie portions of some common food materials. 302

Table Showing Distribution of Calories in 100-calorie Portions of Common Food Materials

Food Material	Weight	Distribution of Calories		
	Ounces	Protein	Fat	Carbohydrate
Almonds, shelled	0.5	13	77	10
Apples, fresh	7.5	2	6	92
Bacon	0.5	6	94	—
Bananas	5.5	5	6	89
Beans, dried	1.0	26	5	69
Beef, lean round	2.5	54	46	—
Bread	1.4	14	4	82
Butter	0.5	1	99	—
Cabbage	13.3	21	7	72
Carrots	10.1	10	5	85
Cheese, American	0.8	27	73	—
Cod, salt (boneless)	3.1	98	2	—
Cornmeal	1.0	10	5	85
Eggs, whole	2.7	36	64	—
Flour, white	1.0	12	3	85
Lamb chops	1.3	23	77	—
Lentils	1.0	29	4	67
Macaroni	1.0	15	2	83
Milk, whole	5.1	19	52	29
Milk, skimmed	9.6	37	7	56
Oats, rolled	0.9	17	16	67
Peanuts, shelled	0.6	19	63	18
Peas, canned	6.4	26	3	71
Peas, dried	1.0	27	3	70
Salmon, canned	2.4	54	46	—
Veal	3.2	70	30	—
Walnuts, shelled	0.5	10	82	8

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Notice that some foods, like bread, have about the right proportion of protein calories; others, like beef, beans, and peas are very high in protein calories. By combining some foods high in protein with others containing little or none, we can get the right proportion. Thus, 100 Calories of beef combined with 400 each of bread and butter will give 900 Calories of which 114, or 12.7 per cent, are from protein.

	Protein Calories	Total Calories
Beef	54	100
Bread	56	400
Butter	4	400
Totals	114	900

(114 ÷ 900 = 0.127 or 12.7%)

It is interesting to work out other combinations which give these good proportions.

Ash requirement.—We are also assured of ash in any ordinary diet, but some attention

should be paid to kind and amount, especially as many common foods have lost the parts richest in ash. Patent flour, for instance, made from the inner part of the grain, is not so rich in ash as whole or cracked wheat. Valuable salts are also lost in cooking vegetables when the water in which they were cooked is thrown away. If not desired with the vegetable, this should be saved for gravy or soup. It is not necessary to calculate a definite amount of ash for the diet, if ash-bearing foods are freely used. By reference to the table on page 384 you can see what foods are valuable for supplying the important kinds of ash. Milk is particularly rich in calcium and hence is required when the bones are growing. Eggs have iron and phosphorus in forms well suited to growth. But if eggs are too expensive, the vegetables and fruits generally will supply these same substances.

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Diet for growth.—Diets made in the chemical laboratory from mixtures of pure (isolated) protein, fat, carbohydrate, and ash to satisfy all the requirements which we have so far mentioned, do not behave alike when fed to animals. The kind of protein is important as well as the amount. This is shown by experiments in which only one protein is fed at a time. On some, the animals will not thrive. On others, adult animals do very well, but the young ones become stunted like the one shown on page 295. Milk has been found to contain proteins on which young animals can thrive. But even in diets containing the protein from milk, young animals do not develop normally unless the salts of milk are added too. No perfect substitute for milk has ever been found. During the first year of life, a child lives on it almost exclusively; for the first five years it should be considered the most important article in the diet; and throughout the period of growth it should be freely used if children are to become vigorous men and women. If not liked as a beverage, it can be used in cocoa, or cereal coffee, in soups, puddings, and other dishes. Considering what milk may save in the way of more expensive protein foods, such as eggs and meat, and of ash-supplying foods like fruits and vegetables, it is to be regarded as a cheap food. It is possible to get the proper amounts of fuel and protein from white bread and meat, but such a diet is poorly balanced as to ash constituents and especially lacks calcium. It would need to be balanced by adding some fruit or vegetable and even then would not contain as much calcium as is best for growing people. A diet of bread and milk, on the other hand, is so nearly perfectly balanced (supplying fuel, protein, and ash constituents in suitable amounts) that it can be taken exclusively for a long time. Whole wheat bread and milk would be even better, because the whole wheat would supply more iron, in which white bread and milk are not rich. The addition of fruits and vegetables to the bread and milk diet would also be an advantage—partly for the same reason.

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Other foods especially valuable for growth are eggs and cereals from whole grains. Children should acquire the habit of eating fruits and green vegetables of all kinds, for when they are older and likely to take less milk and cereals, the fruits and vegetables supply important ash constituents and also help to prevent constipation.

The foods good for children are also good for adults, but the latter can keep their bodies in good repair with less protein and ash in proportion to body weight than are required during growth, and many kinds of protein serve for repair. If there are not enough milk and eggs to go around, adults can take meat, nuts, peas, beans and bread for protein, and trust to these and fruit and vegetables for ash. When the body has been wasted by sickness, however, a return to the foods of growth, especially a diet of milk and eggs, is best for building it up again.

The number of meals in a day.—Knowing how much and what kinds of food are best for each member of the family, we must next find out how to divide the total food for the day into meals. Few of us could take our required fuel in one meal, and if we could, we should probably be hungry before the time for the next meal. Some persons get along very well with two meals a day, but usually their fuel requirement is not high. Most people are more comfortable and more likely to eat a suitable amount in a deliberate fashion if they have three meals a day. When large amounts of fuel have to be taken, four or five meals may be better than three; babies who have to eat in proportion to their size, often $2\frac{1}{2}$ times as much as their mothers, take $2\frac{1}{2}$ times as many meals, *i.e.* 7 or 8 in a day.

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The amount of food for each meal.—While the number of meals depends largely on the amount to be eaten in the whole day, and the appetite of the subject, the amount at each meal is most influenced by the nature of the daily occupation. The baby with nothing to do but eat and sleep has meals uniform in kind and amount. The business man who works very hard through the middle of the day, and has not time to take an elaborate meal, nor time to rest after it so that it may digest easily, takes a light luncheon and makes up for it at breakfast and dinner. The outdoor worker who has a long hard day and expends much energy, takes an hour at noon for a substantial dinner, in addition to a hearty breakfast and supper and sometimes a mid-forenoon or mid-afternoon lunch.

Regularity of meals.—More important than the number of meals is regularity as to time of eating and amount of food. Training for the digestive tract is just as important as training the eye or the hand or the brain. We cannot expect good digestions if we have a hearty luncheon to-day, none at all to-morrow, and perhaps a scanty and hasty late one the

next day. To take food into the stomach between meals is to demoralize the digestive system. Foods that are excellent as part of a meal provoke headaches and bad complexions, and many symptoms of a protesting stomach, when taken between meals. The younger the person, the more important is regularity. Little children soon suffer if their meals are not "on the minute." Adults have more difficulty in controlling their time, but if they have to be late to meals, they should be more careful than usual to eat slowly and to choose plain simple food that will digest easily.

Mental attitude toward meals.—Good food may be provided at the proper time and yet the members of a family may fail to keep well and happy unless they come to meals in the right condition. Haste, chill, exhaustion, anxiety, excitement, fretfulness, or anger may interfere with the digestion of the most digestible of meals. Orderly table service, good manners, and cheerful conversation are very important factors in the success of a meal. Peace and joy as well as "calories" are watchwords of good nutrition. 307

Balanced meals.—Having determined how many meals to serve in the day and what their hours shall be, the next question is how to choose and distribute the constituents of the day's ration so as to promote digestibility and satisfaction. A meal of pure protein, or fat, or carbohydrate would not be relished, and would have some physiological disadvantages. Digestion is likely to be more complete on a mixed diet. A meal of carbohydrate alone leaves the stomach more quickly than any other kind, and one would feel hungry before the next meal, though one might have had plenty of fuel; a meal of fat alone would leave the stomach very slowly, and one would not have so good an appetite for the next meal; a meal of pure protein would stimulate heat production without any particular advantages, except possibly in very cold weather: it would be decidedly undesirable in hot weather. For these and other reasons it is best to have the different foodstuffs represented in each meal, and to see that no one contains an excess of fat, which tends to retard all digestion. This is what is usually meant by a balanced meal, but it may also include care that about the same proportion of fuel is served at the same meal each day. A meal does not need to be "balanced" in quite the same sense as a day's ration. The latter must have a definite amount of fuel, a suitable proportion of protein, ash well represented, some food for bulk, the whole selected with regard for the physical condition, tastes, habits, and pocketbooks of those to be fed.

Menus.—Food taken at a stated time constitutes a meal. It may consist of a single food material, as bread, or a single dish, as soup; or it may contain many kinds of food and many dishes. When the day's ration consists of a single food, there is no trouble in arranging the bill of fare, for all meals are alike. But as soon as we have two foods, we may consider whether they will digest better if eaten together or separately, and which way they will please the palate better. Balanced diets do not necessarily afford attractive menus. Macaroni and oatmeal would make a fairly well balanced meal except as regards ash constituents, but no one would call such a combination pleasing. By the substitution of a little cheese and an orange for the oatmeal, a meal containing about the same fuel value and proportion of protein could be arranged, and it would certainly appeal more to the appetite, and furnish better proportions of ash constituents. 308

In the construction of the menu for the day or meal, we must consider not only food values and time of day and combinations which shall be digestible, but flavor, color, texture, and temperature of our foods. The study of digestible combinations belongs to the science of nutrition. The harmonious blending of tastes, odors, colors, and the like is an art. Just as there are pleasing combinations of sound, so there are harmonies of flavor; certain dishes seem naturally to "go together." Habit has a great deal to do with food combinations. A Chinaman would not eat sugar on rice; a Japanese would not cook beans with molasses as the Bostonian does. It is interesting to experiment with new combinations, and study to find out why old ones are pleasing. Why do we like crackers with soup? Butter on bread? Toast with eggs? Peas with lamb chops?

Digestible menus.—Some of our eating habits are worth preserving and cultivating. Fresh fruit for breakfast stimulates the appetite and helps to prevent or overcome constipation. A mild-flavored food like cereal is better relished before we have had meats or other highly flavored food. Soup at the beginning of a meal puts the stomach in better condition to digest the food that follows. Ice cream at the end of a meal is less likely to chill the stomach than at the beginning. Bread and butter afford a good combination of fat and carbohydrate. Crackers help in the breaking up of cheese into particles easy to digest. 309

Not all of our eating habits are good, however. Griddlecakes, melted butter, and maple sirup taste good, but the cakes make a pasty mass difficult for digestive juices to penetrate. The sirup is likely to ferment, and the butter coating the whole delays digestion greatly. Chicken salad is popular, but combinations of protein with much fat (as in the mayonnaise dressing) always digest very slowly. Simple dishes, without rich sauces or gravies, and not excessively high in fat, are easiest of digestion. Pastries, fried foods, meats with much fat, like pork and sausage, are always more or less difficult and should be attempted only by the strong, or when the body is free from physical or nervous weariness, and not about to undertake mental work.

Attention to the art of menu making not only helps to make the diet easier to digest, but also better balanced. Foods which are similar in color, flavor, and texture, like potatoes and rice, are not artistic in combination, and it is better to substitute for one of them a green vegetable, or meat or butter, in which case we get a better balance, as more ash, protein, or fat would then be included with the starch of the rice or potato.

In making the bill of fare it is a great mistake to consider each meal by itself alone. If we do so, some days are likely to be very high in fuel, while others may be very low. Then, too, the impression left from one meal carries over to the next. We do not care to see on the dinner table the same foods that we saw at luncheon. Our love of variety is one of nature's ways of seeing to it that we get different kinds of foodstuffs in our diet. Variety stimulates appetite, but this does not mean a great variety at one meal. The truest variety is obtained by a few well-selected dishes at each meal. If we do not exhaust our resources on one meal, we shall be able to have a greater range of foods in the course of a week. A hotel may have fifty or sixty items on its bill of fare, but after a few days one feels as if there were a great sameness, because all of them are impressed on the mind at each meal and every day. 310

Dietaries.—A dietary, as we shall use the term here,[19] is a statement of the food requirements of a person or group of persons for a day or some other definite length of time, with a selection of foods to satisfy this requirement.

The first part of a family dietary will have to be calculated according to the age, weight, and occupation, as stated on pages 299-303. When complete, it will stand somewhat like this:

Food Requirements

Members of Family	Age	Weight Pounds	Total Calories	Protein Calories
Man	40	154	2680	268-402
Woman	38	120	2160	216-324
Girl	16	110	2200	220-330
Boy	12	75	2250	225-338
Boy	6	40	1600	160-240
Total requirements			10,890	1089-1634

In selecting food to satisfy these requirements it is a good plan to make first a list of those foods that need to be included in the day's dietary, no matter what the particular menu may be. This will include foods for growth where there are children, special dishes needed if any one is sick, and those common foods which we are accustomed to include in every day's menu, such as bread and butter. 311

For the family which we are considering, this list will stand somewhat as follows:

Food	100-calorie Portions
Milk	20[20] (6 for each child, the rest for the adults)
Cereal	5
Eggs (for children)	2 (counting $^{2}/_{3}$ portion per egg)
Fruit	5
Green vegetable	2
Meat or meat substitute	5
Bread	15
Butter	15

This list is to be kept in planning the menu, whose character is further determined by certain dishes which we wish particularly to have included. For instance, we may desire roast beef for dinner. This is a highly flavored meat, and a protein food which will go a long way towards satisfying the adult's protein needs. Special protein food for breakfast may well be omitted, or take the form of eggs, which are a contrast to the meat in flavor, form, etc. Protein food for luncheon might be fish or some other meat substitute.

Vegetables for dinner should not only harmonize with the meat, but contrast pleasingly with each other. This result is insured by choosing one vegetable from the starchy type, as potatoes or sweet potatoes, and the other vegetable of the green or succulent group, as spinach or asparagus.

Below are two menus, in which have been kept in mind the foods which ought to be included (see page 311) and the artistic arrangement of the day's meals, with roast beef as the keynote. 312

Menu No. I. Menu No. II.

Breakfast	*Breakfast*
Oranges	Grapes
Flaked wheat	Oatmeal
Twice baked rolls and butter	Toast with butter
Milk for children	Cereal café au lait for children
Coffee for adults	Coffee for adults
Luncheon	*Luncheon*
Creamed salmon on toast	Eggs au gratin
Peas	Stewed tomatoes
Graham bread and butter	Bread and butter
Stewed pears	Raspberry tapioca
Milk to drink	Cocoa
Dinner	*Dinner*
Clear tomato soup	Julienne soup
Roast beef	Roast beef
Mashed potatoes, string beans	Creamed macaroni, spinach
Cabbage salad	Celery and nut salad
Lemon jelly, whipped cream	Pineapple ice, lady fingers
Milk for children to drink	Milk for children to drink

By a little calculation from tables giving the 100-Calorie portions of food materials[21] we can find out whether or not we have well-balanced dietaries. Let us take, for example, Menu I, and make a list of the foods required to prepare it for a family of this size.

Food Material	100-Calorie Portions	Total Calories	Protein Calories
Oranges	2.5	250	15
Flaked wheat	5.0	500	74
Rolls	5.0	500	61
Milk for children	6.0	600	114
Thin cream for cereal	5.0	500	26
Butter for rolls	5.0	500	5
Sugar for coffee	1.0	100	—
Creamed salmon			
Salmon	3.0	300	160
Milk	2.0	200	38
Flour	0.3	33	4
Butter	2.0	200	2
Toast	3.0	300	43
Peas	2.5	250	70
Butter for peas	1.0	100	1
Graham bread	5.0	500	68
Butter for bread	5.0	500	5
Pears	2.5	250	8
Sugar for pears	2.0	200	—
Milk to drink	6.0	600	114
Tomato soup			
Tomatoes	0.5	50	10
Butter	2.0	200	2
Flour	0.3	33	4
Roast beef	5.0	500	138
Mashed Potatoes	5.0	500	52
Milk	1.0	100	19
Butter	1.0	100	1
String beans	0.5	50	11
Butter for beans	1.0	100	1
Bread	5.0	500	72
Butter	5.0	500	5
Cabbage salad			
Cabbage	0.5	50	10
Lettuce	0.1	10	—
Heavy cream for dressing	2.0	200	4
Lemon jelly			
Gelatin	0.5	50	50
Lemon juice	0.1	10	—

Sugar	4.0	400	—
Whipped cream			
Heavy cream	3.0	300	7
Milk to drink	6.0	600	114
Totals		10,636	1308

It is evident that we have enough protein, and as a good share of it is from milk, we know that it will satisfy the children’s requirements in the best possible way. The adults will get theirs largely from the salmon and meat. Comparing this list with our first tentative one, we find that we have used in building up our dietary 21 portions of milk, 5 of cereal, 5 of fruit (not including lemon juice), 4.1 of green vegetable, 8 of meat (including salmon), 18 of bread, and 22 of butter, but no eggs. We have a good representation of the different kinds of foodstuffs, with this exception, and as the boys would need the eggs most, we could put them in for their breakfast, thus adding about 140 total Calories and 50 protein Calories. With this addition we are still slightly deficient in total energy, but to add one or two hundred Calories is a very simple matter. A second serving of potatoes, an extra roll for those whose fuel requirement is highest, or a slightly more liberal use of butter, might well solve the problem. This dietary calculation shows how the menu may help in getting a balanced diet, and how knowledge of food values can be applied as a check on the menu. If we had had fewer dishes in each meal, we should have had to plan to serve larger portions of some or all of them, or to use more freely such staples as bread, butter, and milk.

Each family must find out the kind of menu best suited to its resources. Some typical meal plans suitable for everyday use are given below.

Typical Breakfast Plans

I

Fruit
Toast
Beverage

II

Fruit
Cereal
Toast
Beverage

III

Fruit
Meat
Toast
Beverage

IV

Fruit
Cereal
Meat
Toast
Beverage

V

Fruit
Cereal
Meat
1 other hot dish
Toast
Beverage

Typical Luncheon Plans I

Hot dish
Bread and butter
Beverage

II

Hot dish
Bread and butter
Simple dessert
Beverage

III

Soup
Another hot dish
Bread and butter
Dessert
Beverage

IV

Soup
2 other hot dishes
Salad
Dessert
Beverage

Typical Dinner Plans

I

2 hot dishes (as meat and vegetable)
Bread and butter
Dessert

II

Soup
2 or 3 other hot dishes (as meat and one or two vegetables)
Bread and butter
Dessert
Beverage

III

Soup
2 or 3 hot dishes
A relish (as jelly or pickle)
Bread and butter
Salad
Dessert
Beverage

More elaborate plans than these should usually be reserved for state occasions.

The cost of the dietary.—The types of menu used will depend very largely upon the income of the family. It is comparatively easy to plan attractive bills of fare if one does not have to consider the amount of work involved in preparing them, or the cost of the materials to be used. With knowledge of food values an expensive dietary may be wholesome, but there is great temptation to overeating and waste of food, and it is wise to keep meals simple for the sake of good digestion. Most families have to consider carefully the cost of food if any money is to be saved for books or travel or emergencies. A dietary such as planned on page 313 will probably cost from $1.50 to $2.00 for the day, or from $1\frac{1}{2}$ to 2 cents per 100 Calories, depending on the locality. Nothing is allowed for waste, which may, if the cook and those who eat the food are not careful, amount to from 10 to 15 per cent of the total cost. It is often estimated that the "average" man will consume about 3000 Calories per day, and the cost may be expressed on this basis as from 45 to 60 cents per man per day; or the dietary spoken of as a 45-cent or 60-cent dietary or whatever the exact cost per 3000 Calories may be. The cost of food for such a family for a year would at this rate be from $550 to $750.

If the allowance for food be placed at 25 per cent of the total income,[22] this dietary would be appropriate for a family with an income of $2200 to $3000 per year. The majority of families have to get along with a lower expenditure for food, yet they want to be well nourished and to enjoy their fare. Fortunately there is no real connection between cost and nutritive value, some of the most nutritious foods being among the cheapest. At the same time, we cannot get wholesome food for nothing. There are very few foods which to-day cost less than $\frac{1}{3}$ of a cent per 100 Calories, and these are mostly cereal products, such as cornmeal, rolled oats, and flour, or sugars and molasses. These alone will not make a well-balanced, palatable dietary, though they will supply all the fuel needed for an "average" man

for a day for ten cents. In many parts of the country to-day it is hardly possible to make a dietary satisfactory week in and week out with an average allowance of less than ¾ of a cent per 100 Calories, and even this sum will prove satisfactory only provided there be skill in food preparation as well as food selection. With an allowance of 1 cent per 100 Calories it is possible almost anywhere to make a balanced dietary with some attractiveness in appearance and flavor. In choosing foods with regard to cost a table that shows which are cheap fuel and which dear, is a great help. Prices vary so much with place and season that it is difficult to make one which is very exact, and some rearrangement to suit any particular region may be necessary. The table on page 318 will, however, serve as a guide.

TABLE OF FOOD MATERIALS
Arranged according to cost per 100 Calories

GROUP I Less than 1¢ per 100 Calories	GROUP II 1-2¢ per 100 Calories	GROUP III 2½-5¢ per 100 Calories	GROUP IV Over 5¢ per 100 Calories
Apples, dried	Almonds	Beans, canned	Asparagus
Bacon (all fat eaten)	Apricots, dried	Limas	Beans, canned, string
Beans, dried	Bananas	Beans, string, fresh	Celery
Bread	Butter, over, 32¢ per pound	Beets, fresh	Chicken
Butter under 32¢ per pound	Cabbage	Cauliflower	Cod, fresh
Corned beef	Carrots, old	Codfish, salt	Cucumbers
Cornmeal	Cheese	Corn, canned	Lettuce
Cornflakes	Chestnuts	Eggs, 25-36¢ per doz.	Olives
Cornstarch	Chocolate	Haddock	Oysters
Cottonseed oil	Cocoa	Halibut	Peaches, canned
Crackers, soda	Cream	Ham	Pears, canned
Dates	Eggs under 25¢ per doz.	Lamb chops	Salmon, canned
Farina	Figs	Onions (city prices)	Sardines, canned
Flour	Grapes	Oranges	Scallops
Grapenuts	Milk, 7 to 13¢ per qt.	Round steak	Steak, choice cuts
Lard	Olive oil	Rump of beef	Spinach
Lentils	Peaches, dried	Tomatoes	Veal, loin
Macaroni	Peanuts	Veal, leg	
Milk at 6¢ or less per qt.	Peanut butter		
Molasses	Pork sausage		
Oatmeal	Puffed cereals		
Oleomargarine	Sweet potatoes		
Rolled oats	Turnips		
Peas, dried	Walnuts		
Potatoes			
Raisins			
Pork, salt fat			
Prunes			
Rice			
Suet			
Sugar			
Tapioca			

Inspection of this table shows that if we can afford only one cent per 100 Calories for food, we must get a large share from Group I, and a few from Group II; if we wish to use foods in Group III, we shall have to do so sparingly, or offset them with some of the very cheapest in Group I, to keep the average as we wish it.

When we plan an attractive menu and find it is too expensive for us, we may often carry out our plan by substituting cheaper foods of the same sort. Thus in the dietary on page 313 we may substitute as follows:

Bananas for oranges.
Top milk for cream.
Oleomargarine for a part of the butter.
Bean loaf with tomato sauce for creamed salmon and peas.

Stewed apricots for pears.
Rump roast instead of rib roast.

Doing this, omitting the soup and crackers and the salad for dinner, and increasing bread and potatoes, flaked wheat, and other cheaper foods to prevent any deficiency in fuel, we can still prepare palatable and digestible meals with the right food values, and save perhaps 25 per cent on the total cost for the day.

Feeding the sick.—When illness is serious enough for a physician to be consulted, he will give directions concerning the diet, and these should be scrupulously followed. If the case is so severe as to demand a trained nurse, she will have charge of the feeding, under the physician's guidance. Many times, however, a member of the family is temporarily 319
indisposed and needs food different from the ordinary family bill of fare. It is well to remember that in the first day or two of illness, fasting or taking of very little food does no harm, and may be an excellent help toward recovery, as it gives the digestive tract a chance to rest, if it has been disturbed.

Nevertheless, the internal work of the body goes on, 0.4 Calorie per pound per hour being expended during sleep, and about 0.6 Calorie per pound per hour during waking hours in bed. A person in bed for twenty-four hours will require about 0.5 Calorie per pound per hour to prevent use of body material for fuel. A man of average weight, lying in bed, will thus need about 1850 calories per day. Hence we must see to it, that after a person has been sick for more than a few days (during which he can afford to burn body fat) enough fuel is given to satisfy his energy requirements if he can possibly digest it.

Food for an invalid must always be given in its most digestible forms. Milk is one of the most valuable foods in sickness, not only because it supplies so many body needs, but because it can be used in so many ways,—hot, or cold, flavored or plain, made into junkets or sherbets, combined with eggs in eggnogs and custards, fermented as in kumyss or soured as in buttermilk or zoolak. In some form or other milk can almost always be made digestible. Eggs are also of great value, not only poached or dropped and served on toast, but as dainty omelets, or in beverages, as eggnog, egg lemonade, and orangeade. Mild fruit juices, as orange, grape, or pineapple, are not only refreshing but of considerable fuel value. If there is no fever, chicken, lamb chops, tender broiled steak or roast beef may serve to add variety to the menu. Broths stimulate the appetite and help digestion, though they are of little or no 320
food value themselves. Cereals, eggs, and milk may be added to increase their food value. Cereals in the form of gruels or delicate puddings, as cornstarch blancmange and tapioca cream, are easily digested. Vegetables are best given rather sparingly, and only delicate, mild-flavored ones, such as spinach or asparagus, if digestion is much disturbed. In getting an invalid to take sufficient food, much depends upon the attractiveness of the service. Remember that very little things, like a fingermark on a glass, or coffee spilled into the saucer, may take away appetite and prevent enough food being eaten. Food in small quantities and taken at more frequent intervals than in health helps towards the best results. Knowledge of what particular diet is best in different diseases comes only through careful study of the science of nutrition after much study of chemistry and physiology.

EXERCISES

1. Calculate your own energy requirement.

2. Calculate the energy requirement of your family group.

3. Find the cost for your locality of the dietary arranged from Menu No. 1.

4. Make a dietary yielding 10,000 Calories, from ten to fifteen per cent of which shall be protein calories, from Menu No. II, and calculate its cost.

5. Find out the lowest sum for which a balanced dietary could be obtained in your locality.

6. Revise the dietary from Menu No. I, so that it shall not cost over one cent per hundred Calories.

7. Plan an ideal day's dietary for yourself.

8. Plan a day's dietary for an invalid which shall yield 2000 Calories, 300 of which shall be protein Calories.

CHAPTER XIX

THE HOUSEHOLD BUDGET

The divisions of the income for which we should provide are food, shelter, including taxes and operating expenses, clothing, and the "higher life," including recreation, education, and savings. The size of the income determines largely the proportion of money allotted to each division. We must be nourished and protected from the elements by shelter and clothing, and an income must at least provide for these necessities to be a living wage. Yet we justly claim something more from our income than mere existence.

In most families there is a fairly definite income. When the amount is not known it is wise to estimate upon the minimum income and have a surplus, rather than to expend too much. Seventy-five years ago things cost less and incomes were less, to-day the incomes have increased and cost of living is growing higher. The question is one to be studied relatively, and the cost of living will depend on the ratio between income and one's methods of living.

Just what other satisfactions than the merely physical are to be gratified is the great question for the woman who divides the income. The problem is naturally hardest with the smallest income, where the "must be" crowds out the "may be." But there is room for choice even with the small wage.

This work of dividing the income and deciding on the ideals should be shared by the family. When the home is first started the husband and wife should discuss frankly the problems of division and should agree on the methods of expenditure. This common understanding between members of a family forms a bond of union, and each feels a greater pleasure and pride in doing his part. The fact that there is a budget and a system brings orderliness in methods of work and freedom from worry and anxiety as well as a saving of money. And this saving of money and strength is the same as an increase in income. This budget or division of expenses acts as a sailing chart and can be referred to from month to month. It should not, however, become a burden, and one should not worry if every penny is not accounted for.

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Statisticians tell us that about 75 per cent of the male adults of our country earn somewhat less than $600 a year. That in large cities $900 to $1000 a year is necessary to bring up a family to live decently and enjoy human happiness. Much depends upon how this income is divided as to whether results will tend to develop efficiency in the members of such a family. As the income increases from $1000 to $5000 it is possible to apportion the income and indicate certain percentages which represent wise family expenditures so as to include the higher intellectual and emotional life as well as the physical welfare of the family.

From comparison of many budgets statisticians have worked out certain percentages that are helpful in making our decisions, although they are not to be taken as fixed rules.

Expenditure for food.—On examining the budgets of families having incomes from $500 to $5000, it is found that the percentage spent for food increases as the income decreases, amounting sometimes to at least 50 per cent of the income. This means that there is a limit to the money spent per capita per day for food, below which we cannot go and maintain life with even sufficient efficiency for unskilled labor. Figure 77 shows that a $900 income gives about 45 per cent to food. An expenditure of thirty cents per capita per day for food in a family of five with an income of $1500, is 36.5 per cent; *i.e.* more than one third of the total income. Suggestions as to allowance for food in families of different incomes are contained in the tables of budgets given farther on in this chapter.

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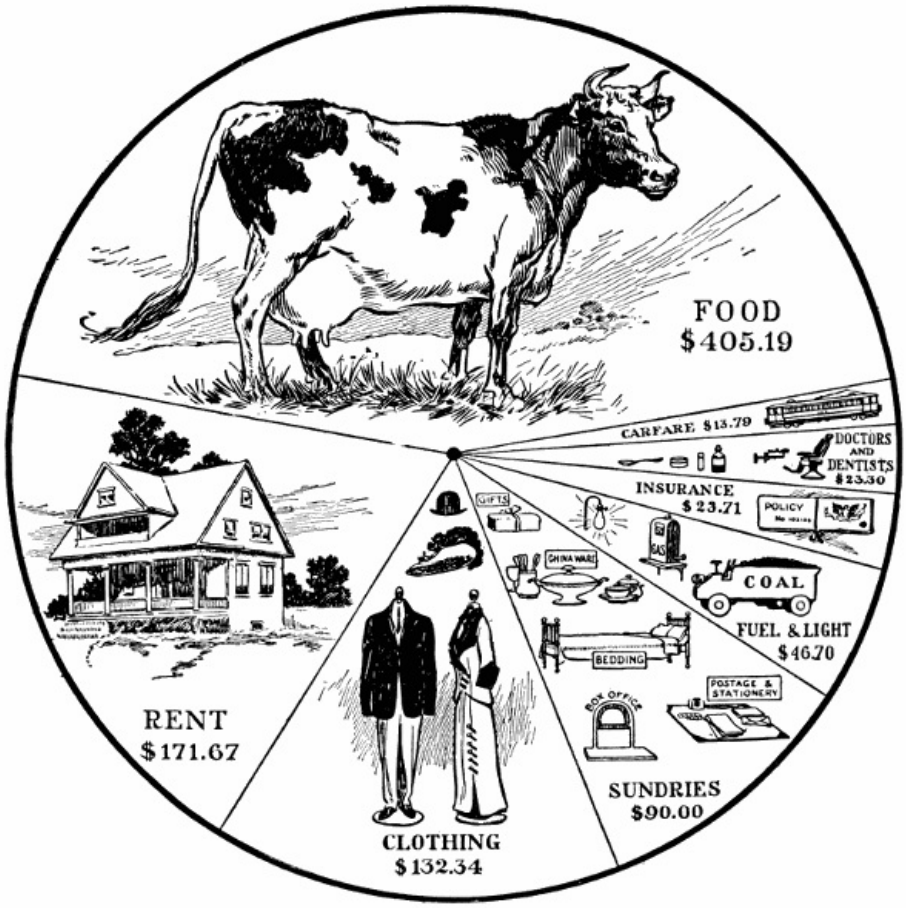

Fig. 77.—Typical division of a small income. ***Courtesy of Ladies' Home Journal, Oct., 1912.***

324 Thrift in buying and using is necessary with the small income, and highly important with the larger where we are prone to yield to a foolish impulse to please a whim of the palate.

Expenditure for shelter.—The increased cost of building and the general advance in rentals make the expenditure for shelter a large one.

The question whether homes should be owned or rented is a vital one. Ownership is possible for comparatively few, but there is probably nothing that contributes more to the upbuilding of a community and the development of good citizenship than the permanent residence of families in localities. The pride of the members is enlisted in the home, its surroundings and general community welfare. This sense of ownership makes a house *more* a home although real home spirit is not confined to ownership of buildings. There are of course advantages and disadvantages of ownership, and these should be carefully weighed. Preference for fresh air, more space, less crowded conditions even if they necessitate daily travel, have driven people of limited incomes and certain ideals from the crowded cities to the suburbs in search of homes. When it is possible it is certainly much more advantageous to own than to rent a home, when living means the attainment of certain ideals in the lives of the members of the family.

In deciding upon the proper expenditure, we must take into account the location, whether convenient to business, school, and church, sanitary conditions in surroundings and in the house or apartment, the appearance of the house and the attractiveness of the neighborhood as well as its convenience and healthfulness. The house should be adapted to the needs of the family and selected with this thought in mind. See the companion volume, "Shelter and Clothing," Chapters II and III.

325 It has been estimated that 20 per cent of incomes ranging from $500 to $5000 will secure a home, not including operating expenses, with the proper sanitary conditions and one which will contribute to a right standard of living. If necessary to secure healthful surroundings more than 20 per cent may need to be spent, but 25 per cent of the income is the limit of the amount to be spent upon rent unless this also includes heat (as in many apartments) when as much as 28 per cent may be so spent. If more than this is paid, it is practically impossible to avoid debt when any unforeseen contingency arises. One thrifty German woman used 30 per cent of the small family income for rent, in order to have more bedrooms than most tenement-house dwellers can afford. She did make ends meet by working until midnight at the family sewing, and tailoring; but though she was the very soul of thrift in regard to food, and had never called in a doctor, she could not save money until the children began to earn.

Operating expenses.—The question of operating expense is closely associated with the selection of shelter and should be carefully considered with it in the division of the income. They are the expenses necessary to keep the house clean, warm, lighted, insured, and in constant repair. To these must be added in a suburban community water tax, property tax, perhaps even a fire tax.

In city apartments, heat and hot water are often furnished, and this must be taken into account in deciding between apartment and house, and between renting and ownership.

Labor is an important item in the running of the house. The close connection of selecting and operating a home will be seen. Should the administrator divide the family income in such a way that little is left for operating, the little things of everyday life become a constant source of worry.

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The questions of the number of rooms, and their care, relative expense of heating by furnace, steam, or hot water, the cost of regular service in wages per week in order to attain one's ideals, the cost of extra service, the lighting by gas, oil, or electricity are all problems of operating. Knowledge of sanitary science will make the homemaker demand cleanliness in her surroundings, quick disposal of waste, and the prompt removal of dust. Much care in planning is necessary here in order that there may be no leakage and that there may be the full share of comfort for each member.

For the income of from $500 to $5000 it has been estimated that a proportion of from 10 to 20 per cent must usually be spent for operating in order to secure comfort. Much must necessarily depend upon the amount of hired service required, which, in turn, depends largely upon whether the homemaker is to give her time chiefly to the care of her children or chiefly to the conduct of the housework.

Clothing.—A large proportion of the family income is spent on clothing. A knowledge of textiles and of purchasing is necessary in order to do this wisely and economically. Clothing is as necessary an expense as food, for it conserves the heat which the food furnishes and thus maintains body temperature. Health is the main factor in efficiency, and health is preserved by clothing which protects the body from sudden changes in temperatures, and conserves the energy for other purposes. Money should be spent on clothing to secure health, but too often more than the right percentage of income is expended because of love of display. The instinct for show, color, ornamentation is a primitive one, and the æsthetic "want" is, in one sense, as real as the physical and should be considered in expenditures for this purpose. It is a duty to look well, but it is not necessary, nor does it show good sense, to sacrifice the health, happiness, and higher life of the family by economizing on food and other essentials in order to secure hats, shoes, gowns, and accessories that cater to a mania for show. If the income be limited so that the essentials of clothing only can be purchased, the margin of income which can be spent for pleasure may, if taste so dictates, be spent on clothing instead of pictures, books, or some recreation. That is a matter for the individual or family to decide. In the typical budgets cited below it will be seen that the expenditure for clothing was usually between 10 and 18 per cent.

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The higher life.—There are other needs of family life for which money must be spent besides the material ones of food, shelter, and clothing. In the division of some family incomes little thought is given to this phase of living. After the income reaches a certain amount, it is possible so to plan that education, recreation, philanthropy, and savings all figure in the division of expenditures. Some writers say that 25 per cent of the income of $1000 to $5000 should be spent in this way. If thought is given to this, it would mean opportunities for books, periodicals, lectures, and membership in societies; some travel and vacation, social clubs, theaters and concerts; charity and church expenditures; life insurance and other savings. It is the idea of ownership of property, of homes, of possessions of all kinds that has led from primitive living to advanced civilization. And with advanced civilization comes the need for the higher life which should be satisfied and can be through wise division of funds. The choice of things to satisfy this higher life rests with the individual; it may be music, it may be the cultivation of altruistic feeling in the help given to neighbors; it may be a bank account for some future good, or money spent on excursions, lectures, or theater. Whatever it is, it satisfies the emotional, spiritual, and intellectual life of man and distinguishes him as one of advanced civilization.

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Savings.—Something should be saved yearly even if at first it is but little. Small amounts put away regularly in a savings bank mount up to a considerable sum at compound interest, for regular saving is the only kind that counts. Life and sickness insurance are other forms of saving.

Allowances.—Each member of the family should have a personal allowance, even though it is small. One mother gave each of her children five cents a week, beginning at five years of age, and increasing a cent a week each year, until they were old enough to be trusted with more. Even at this age opposite characteristics showed themselves. One boy saved his allowance until he had a quarter to spend at one time; another was in debt before the end of the week. Each had a bank, and kept accounts, as well. It is sometimes better for

a child if he “earns” his allowances by performance of such household duties as seem best adapted to promote his development.

Suggested and typical budgets.—In preparation for the division of one’s income it is helpful to study the budgets of other families or individuals. Mrs. Richards in her book on “The Cost of Living” gives a theoretical division of incomes, which is shown in the accompanying table headed Suggested Budgets. It is interesting to study this account and then those of families who have worked out their problems (either with or without the preparation of definite budgets in advance) as shown in the table of Typical Budgets.

In New York City it has been estimated by those studying the problems of the cost of living of to-day that it is impossible for the average family of mother, father, and three children under 14 years to get food enough to keep the body in good condition with clothing and shelter to meet the most urgent demands of decency for less than $900. This amount in other localities would probably buy more. This means that in New York City for $900 a family of five can have a very bare existence, and that with $1000 this family can begin to maintain a decent standard of living unless there is long sickness or other catastrophe. At $1200 a normal family standard can be maintained so as to preserve health, and so that the family will have opportunities to develop in a self-respecting manner. When one considers that many families subsist on $500 or $600 a year, it is necessarily under conditions of shelter and with limitations of food and clothing, not conducive to the best development.

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Suggested Budgets[23]

Key:
F Food
R Rent
O Operating expenses, Wages, Fuel, Light, ETC.
C Clothes
H Higher Life, Books, Travel, Church, Charity, Savings, Insurance

Family Income	Percentage for F	R	O	C	H
Two adults and two or three children (equal to four adults):					
Ideal division	25	20±	15±	15	25
$2000 to $4000	25	20±	15±	20	20
$800 to $1000	30	20	10	15	25
$500 to $800	45	15	10	10	20
Under $500	60	15	5	10	10

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Typical Budgets[24]

Family Income	Percentage for Food	Rent and Car Fares to and from Work	Operating Expenses; Fuel, Wages, etc.	Clothes	Higher Life, Savings, Charity, etc.
$3098, three adults, two children	27.5	21.1	16.8	10	24.6
$2500 (Mass.), three adults, no children	25	25	13	12	25
$2500 (Mass.), two adults, one child, much company	32	18	18	10	22
$1980 (St. Louis), four adults, two children	36.3	24.2	20.9	18.60	
$950 (Mass.), two adults, three children	20	19	16	15	30
$600 (Boston), two adults, two children	23	26	4	5	26.1 Travel, sickness, and sundries: 15.9
$535 (N.Y.), two adults, three children	55.2	22.4	5.3	9.4	7.7
$312 (“mean” Englishman) two adults, three children	55.2	15.5	8.9	13.1	7.3

$300, Dr. Engel's estimates	62	12	5	16	5.0

TYPICAL BUDGETS[25]

	AVERAGE INCOME $650	AVERAGE INCOME $748	AVERAGE INCOME $846
Rent	$154	$161	$168
Carfare	11	10	16
Fuel and light	38	37	41
Furniture	6	8	7
Insurance	13	18	18
Food	279	314	341
Meals eaten away from home	11	22	17
Clothing	83	99	114
Health	14	14	22
Taxes, dues and contributions	8	9	11
Recreation and amusement	3	6	7
Education	5	5	7
Miscellaneous	25	32	41
Total	$650	$735	$811

EXERCISES

1. What definite aims should the wise homemaker have in mind in dividing the income?

2. What ideals should affect the amount spent for food?

3. What should determine selection of the house whether owned or rented?

4. What is meant by the operating expenses of a house?

5. What ideals should determine the amount spent for clothing?

6. In what ways should the "higher life" of the family or individual be considered in the division of the income?

7. Plan to keep account of every penny of spending money for one year. Look over and criticize at the end of the year.

8. Plan a budget for a family of five in your community having $1000. Suppose they have $2000, how would you change your budget?

9. Work out with your parents a budget or schedule of probable household expenditures for your home for the next month; the next year.

CHAPTER XX

SYSTEM IN MANAGEMENT

The housekeeper should learn to use the labor-saving devices for her records that are now employed so largely in the world of business. This equipment should include a desk with fittings for systematized and rapid work. A roll-top desk, with pigeonholes and drawers is convenient, but a flat-topped desk with drawers below gives a larger space for writing, although it has to be supplemented by boxes to take the place of pigeonholes. Such desks may be purchased for twenty dollars and upward, in woods to match other furniture. It is a pleasure to have artistic desk furnishings, but a large amount may be spent on these, and the desk still be unequipped for practical purposes.

Files and loose-leaf books.—A card file is as advantageous to the housekeeper as to the business man. Some desks contain a place for the card file in the upper right-hand drawer.

Guide cards are furnished in several colors to indicate divisions of the file, and these are plain, or with printed numbers and letters. The record cards also are made of several colors, to indicate different uses. The suggestions here cover only a few of the possibilities. Visit some office furnishing department or shop to see what an array of conveniences has been devised for the dispatch of business. If you once form the habit, you will find new uses for the card file almost daily, and will keep on the cards, addresses, engagements, cash accounts, shopping lists, inventories of clothing and furnishings, menus and recipes. A loose-leaf book is preferred by some people for inventories and accounts. 333

A letter file shaped like a pocketbook can be purchased for only twenty-five cents, and will serve the purpose for a small correspondence. Large files with guide cards are made for a larger correspondence.

The small file will answer for filing bills and is useful also for clippings. Some desks have bill files in the pigeonholes, and a letter file in one of the large drawers.

Have regular hours daily for attending to work at the desk, stated times for planning menus, making shopping lists, looking over the inventories, recording expenditures, and balancing accounts.

Order in time and place are studied further in the chapter on Housewifery.

Keeping of accounts.—This has been called by many, drudgery and tedious routine. Many business men go through much such drudgery to attain their goals, why should not the housewife be willing to make a similar sacrifice in her home for the sake of the service she is rendering the members of her household? The aim in keeping the accounts is to register the amounts spent for various purposes so that all phases of life will be considered and so that the manager will be able to profit the second year because of the experience of the first year. This makes housekeeping interesting and businesslike. The expenditure is made to produce the maximum of value received and is accompanied by the greatest possible pleasure.

In keeping accounts there should be some method of showing the receipts and expenses, the income and the outgo, so that a balance can be made at any time. The items should be so listed, too, that it is possible to tell what expenditure has been made for any one item, as rent, or food, or other necessities. It is only in this way that the accounts become of value for future use. 334

There are many ways of keeping such accounts. The simplest one for the housewife is the best if it shows the points mentioned above. The envelope system is used by some when the income is small, and a certain amount of money according to budget plan is put in labeled envelopes for various purposes, as rent, food, operating expenses, etc. As sums are drawn from the various envelopes, a slip of paper put in the particular envelope registers the amount drawn. It is easy at the end of the month to balance the accounts. This system necessitates the presence of a good deal of money on hand, and sometimes of confusion of accounts, if money is borrowed from one envelope for use in another.

	Butcher	Grocer	Baker	Milk	Ice	Light	Service	Fuel and Other Headings According to Expense
January								
Jan. 1								
Jan. 5								
(Dates of expenditures)								
Totals								

Various systems of card catalogues, journals, and ledgers are in use, and all have more or less value. The simplest form for the average young woman or housewife can be kept in an ordinary blank book and the spaces ruled according to one’s need. The account book can be started in somewhat the following manner, with the dates of expenditures in the first column and the respective amounts opposite under their proper heads. In this way it is possible by using double pages of the blank book to keep all the items for each month in horizontal series. The columns for items of expenses should be ruled as needed, but it is desirable to keep them under as few heads as will suffice to give the information which may be desired. The use of the double page is advisable, for then the outer edge of the left-hand page can be used for the dates of purchase and plenty of room for columns of expense left across the two pages. The total in the various columns can be easily calculated at the end of the first month and a new set of pages ruled for the second. The expenditures should be entered daily so as not to be forgotten. A slip of paper kept in one’s purse is of help if amounts are jotted down while one is shopping. The totals for each month should be entered 335

in another part of the blank book. Rule spaces for the year with columns for the months across the page and items of expense corresponding to those in the daily entry at the left-hand side. In this way at the end of twelve months the totals for each item of expense can be easily found. If one desires to know from day to day of a month how the balance stands, it is possible to add to Form I two columns for this purpose. One column should show the income or amounts received with dates, and the second the total sum expended each day. This sum is found by adding the expense of each item across the page for the day and entering in the expense column.

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Form II

	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Totals
Butcher													
Grocer													
Baker													
Milk													
Ice													
Light													
Service													
Fuel													
Clothes													
Rent													
Dentist													
School													
Sundries and other items													
Totals													

Somewhere in the book there should be kept an account of the receipts from all sources. The balance of the yearly expense account with the sheet of receipt can be easily made.

Some plan must be made for showing which purchases are paid for in cash, and which are charged. A simple method is to record the articles charged, with the place, date, and price on a card in the card file in a division kept for this purpose, and labeled “Purchases charged.” When the bill is rendered, it can be checked up from these cards, and the purchases entered in the permanent account book. The record in the account book gives thus the date of payment, but not the date of purchase, unless this is added too. The date of purchase can be recorded in the inventory of household goods (see Chapter XXII).

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This simple method of keeping accounts enables one to look over the monthly and yearly expenses and to see if the expenditure is apportioned to the different divisions as it should be. If some of the needs of the physical or intellectual life are being neglected, it should be possible to cut down or readjust the next year to the satisfaction both of the housewife and of her family.

It is wise for all girls before they have homes of their own to keep account of their own small incomes. In many families daughters are given money for clothing and daily expenses. Some such system of keeping accounts as the above can be used. It is astonishing in examining accounts for clothing, to see how few maintain a correct balance. One girl found, by keeping accounts, that she spent entirely too much for hats and gloves and did not have the proper underwear to protect her body and maintain the correct temperature for health. Accounts help us to determine whether our methods of living measure up to the ideals or standards of life which we have established in order to live rightly.

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Methods of payment.—Payment is either immediate, known as “spot cash,” or deferred. If deferred, the articles purchased are charged by the dealer, and a bill rendered the first of each month. When a charge account is opened, a good business reference must be given. According to another system, articles may be paid for in installments,—that is, so much each month, according to some agreement. Of this method it may be said that it is unsafe, or at least unwise, always. Remember that more is always paid in the end.

In either case the payment may be made in bills, specie, or by checks; although in ordinary shopping immediate payment is usually made in bills and specie.

The advantage of immediate payment is that the buyer spends only what she has, and does not count on future money. This method of payment enables one to keep the balance well in hand. It necessitates, however, keeping bills and specie in the house, and in one’s pocketbook, with the possibility of theft or loss; and cash payment takes more time in the shop, with the long wait for change. Sending “collect on delivery” (C.O.D.) is a way of making cash payment and saving time at the shop. Be sure that in this case there is the exact change at home, and some one ready to receive the goods.

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Charging goods makes for economy of time. If you can remember that an article charged means money spent, this is a safe plan. One careful buyer says that she is too optimistic to

have a charge account; too sure that while she has not cash enough to-day for something that she wants, she will surely have it by the first of next month.

There is another method of payment introduced by a few large department stores. The firm requires a monthly deposit at the first of each month and charges up purchases against this. This is good in so far that the customer is spending money that he really has, but it restricts purchases to that one shop, and this is inadvisable in the case of a small income.

The bank account and check book.—Whether payment is immediate or deferred, payment by check is a great convenience. It saves time and is also a record of money paid.

Select a bank, conveniently located, and recommended by a conservative business man. Take to the bank a letter of introduction, with the sum for deposit. The bank will record your signature, and give you a bank book in which is recorded the amount deposited. A check book will be given you that contains blank checks, and provides for keeping account of deposits and checks drawn. Each check has to be filled in, and signed with your name exactly as recorded at the bank, when you make a payment. This must be recorded in the proper place when the check is made out, stating date, amount, and payee. The sums paid out are added, usually for every three checks, and this sum deducted from the deposit, and the balance carried forward. In this way you may always know your balance in the bank, provided you are accurate. Great care must be taken to fill in the blank spaces correctly so that the check cannot be easily altered by any one.

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If a check is made out to you, and you wish to cash it, or deposit it, you “indorse” it by writing your name on the back across the left-hand end of the check. The name must be written exactly as it appears on the face of the check. If by chance the name is misspelled, write it in with the correct spelling below.

The checks that you make out are indorsed by the payee in the same way, and cannot be cashed until so indorsed. Therefore, if a check is lost in the mail, you do not lose the money. The bank should be notified to “stop payment” on the lost check, and you can then send another check in place of the first one.

When you wish bills or specie, you go to the bank and present to the paying teller a check made out to “Cash” and signed by yourself. It is wise not to make out or sign such a check until you reach the bank, because if such a check is lost on the way, there is danger of its being cashed by the finder.

Once a month you should leave the book with the teller to be balanced. In a few days you may call for it, and will receive with it the checks that you have drawn, and that have been returned to the bank by the date to which the book is balanced. These checks are called vouchers. With these there is also a list of the amounts showing the total paid out on them by the bank. Check up the vouchers with the list, then check up the vouchers with your check book to see if all in your check book had been returned to the bank by the date of balancing. If there are some still out, add that sum to your check book balance, and then compare the bank book balance with your check book.

Deposits may be sent by mail, either with or without the check book. If the book is sent, it should go by registered mail. If you do not send the book, the bank will send a receipt, which you return with the book the next time the balance is made. In either case, write “For deposit” above your signature on the back.

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EXERCISES

1. Of what value is business equipment in household management?

2. Suggest ways in which a card file might be used in the household.

3. Suggest a system for filing household letters; bills.

4. What should be one’s aim in keeping household accounts?

5. Estimate the cost of your clothing for the last year.

6. Name different methods of payment of bills. Which do you consider the best for the family with $1200 income?

7. Describe fully payment by check.

8. How should a check be indorsed?

9. How can one deposit checks by mail?

CHAPTER XXI

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HOW TO BUY

The first rule in good buying is to know standard quality in your intended purchase, for then you need not be dependent upon the salesman. The second is to know your own needs, that you may not be beguiled by the clever advertisement in the daily paper, or the well-displayed bargain, and will not need to ask the salesman's advice about quantity. Keep lists of articles needed in the card file, and make your shopping lists from these. The third rule is to apportion your purchases to your income and the divisions of your budget.

Where to buy.—Patronize reliable firms. There are in any community shops of different grades, and you will not find the best return for your money always at those houses where there is the greatest parade of cut prices and bargains. In the end the reliable places are the cheapest. Sometimes a firm trades on its reputation and a degree of fashion it has attained, but on the whole it is true that if one house has goods uniformly cheaper than another, it is because the quality is inferior.

One fact that a good shopper learns is this—that certain articles may be purchased to greater advantage at one place than another. One firm excels in silks, another in household linen, another in coffee, and so on.

Almost every community now has a "white list" and a branch of the Consumers' League, the significance of which was explained in "Shelter and Clothing," p. 202.

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How to shop.—Know the shops you patronize, first by personal inspection, unless, of course, you are ordering from a distance.

Mail orders and the telephone are helps to the buyer. These should not entirely take the place of personal visits to the shops, but, if well used, save many weary hours. The parcel post makes possible buying by mail even perishable articles direct from the producer. Many country dwellers do a large part of their shopping even for clothing and furniture by mail, and there are reputable firms who cater largely to this trade, and send out well-illustrated price lists as guides. However, this method should be used very cautiously, and it may be unsatisfactory for articles where the æsthetic element is important, as well as the quality.

Bargains, sales, and advertisements.—Here the buyer matches her wit against the wiles of the seller. Bargain sales may be made up of sweat shop goods. Many women ignorant of textile production, flock to the sales of materials and garments, helping the storekeeper to dispose of silk which is rotting on his shelves, or garments which have been poorly or cheaply constructed and which go to pieces the first time laundered. Remnants are often cut from materials on the regular shelves, and sometimes are offered at an advance in price at the so-called bargain sales. In reliable shops one can sometimes find bargains during clearance sales. It pays to wait and buy out of season, as much can be saved in this way. A "best" hat in January, or a white dress in August, may often be purchased to advantage. In order to do this, one must plan the wardrobe systematically.

Trading stamps and prizes.—Remember that nothing is given away, and that you pay for everything that you receive. It is well to deal with a firm that sells standard goods at standard prices. A discount is sometimes allowed for cash.

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Buying on installments.—Methods of payment are discussed in Chapter XX. The installment plan is important to consider, since it is so common for people of small means. How tempting for a young couple, who have no savings, to furnish the new home in this way? It is a "gambling on futures," however, as much as are some methods in the Stock Exchange. If the income stops, because the position is lost, or if sickness comes, and the installments cannot be paid, the whole outfit may be lost. There have been real household tragedies of this kind. The better way is to save until a small amount of simple furniture can be purchased outright. The installment method is also used by established firms of sound reputation to tempt one to buy the latest encyclopædia, or the new musical instrument, or some other much-desired possession. This is safe if one is absolutely sure of a fixed future income; but here again it is better to save first and buy outright. You may say that the installment plan gives the use of the encyclopædia at once, and this is true. But if you have the saving habit, there will already be a fund on which to draw.

The ethics of shopping.—There is no greater test of good breeding and kindness than the tour of a crowded shop; and sometimes the silken thread is strained to the snapping point. Remember that tired human beings are at the counter.

Time your shopping that you may not help to crowd business at the closing hour. If the shop closes at five, leave several minutes before the hour. As a matter of fact it is only to the shopper that the shop closes at the stated hour; some of the hardest work of the day comes after hours. Avoid shopping at the luncheon hour, and on Saturday afternoon at the time of the week when the salespeople are most tired. This is also a hard time for delivery men and boys. Consult here the pamphlets of the Consumers' League.

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In times of stress, the shopkeeper asks you to carry small bundles home with you, and this you should cheerfully do. Some women carry the C.O.D. privilege to an extreme, ordering in this way with the intention of sending certain articles back, thus creating much unnecessary labor.

Purchasing of clothing and household textiles.—Experience is a good teacher, but knowledge so gained is often paid for at high price. It seems an easier way, with much saving of time, money, and energy, for girls to learn beforehand what to guard against in purchasing their household textiles for both clothing and furnishings. Our great-grandmothers were sure their household textiles would wear, for they followed every step of their manufacture and knew they were durable and honest. Conditions changed with the factory system of manufacture, and to-day women know very little about textile fabrics or the making of garments. This ignorance of manufacturing processes results in the increased cost of living by the wasteful expenditures made for household textiles. Women rely on the information given by clerks in stores, often to their sad disadvantage. As we have learned, about 15 to 20 per cent of the family income is usually spent on clothing and household furnishings for a family of four. Is it not necessary then that girls should learn to make the dollars earned buy just as much as possible?

There is need of a pure textile law in order that the adulterations of textiles may be defined. Some of us cannot afford to buy pure linen or all wool, but we do wish to know the percentage of adulterant in order that we may judge whether the materials will meet our needs. It is beyond the power of women now to control the making of fabrics, and the government, therefore, must help to maintain standards and proper supervision of textile labeling. Women can, however, study this problem, and with a knowledge of the manufacture and composition of textiles will come the power to choose wisely, for manufacturers have been able to perpetuate these frauds chiefly because of ignorance. (See the companion volume, "Shelter and Clothing.")

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Some things to remember in purchasing household linens.

1. Design is important. French designs are the most beautiful in damasks, Scotch and Irish are good, and German patterns perhaps the least attractive. Weave often affects the wearing quality of linen as well as the appearance. The satin stripes and long threads on surface are apt to wear off quickly and they are sometimes introduced to cover defects beneath. They cannot stand heavy ironing as the closer, more even, weaves.

2. Linen is sometimes adulterated with cotton; if bought as union goods one may expect it. If bought for pure linen, ravel the material and untwist warp and woof threads. Do the threads appear long and lustrous? The round threads are best. If cotton has been used, the ends will fly apart and fuzz, if linen they will appear more parallel and pointed at the ends when separated. The cheaper "all linens" are sometimes made from the tow or short refuse. If the fiber is short, it will not last as well as the long. Moistening with the finger was an old-fashioned test. A better one is to use a drop of olive oil. This test must be made at home. Water spreads more rapidly on linen than on cotton. The oil makes the linen fibers more translucent than cotton.

3. Cost is a guide. Linen is expensive. Is the price that which should insure a good article? If cheap, beware.

4. Feel the cloth. Is it cold and does it feel rather heavy when crushed in the hand? Many buyers in department stores judge by weight. In purchasing table linen less than $4\frac{1}{2}$ oz. to the square yard is not worth buying. Above that it improves. Reliable firms will tell the weight. Custom house inspectors judge by the picks or throws of woof to the inch.

5. Notice the finish. Is it full of starch and sizing which can be picked off? If so, in washing that will all disappear, leaving a loosely woven instead of a smooth satiny surface. Calendering and beetling make the material smooth and lustrous and reduce the thickness. Do not be deceived. It is better to buy a soft linen than one stiff with starch which will crack.

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6. In buying table linen the goods received in December and January are apt to be the bleach of the previous summer. Remember that poor bleaching affects the wearing quality. One can sometimes tell by tearing a sample.

For quality, beauty, and variety of patterns, Scotch, French, and Irish linens are the best. German damask is excellent. The unbleached will wear much longer, is less expensive, and is bought by many housewives and bleached as used.

Damask by the yard for tablecloths is slightly cheaper. Tablecloths from $2\frac{1}{2}$ to 3 yards are good size for a medium family of five or six. One dollar a yard is a fair price for everyday linen. The cloth should about equal 1 dozen napkins in cost, and a cloth will usually wear as long as $1\frac{1}{2}$ to 2 dozen napkins. Napkins come in three sizes, $\frac{5}{8}$, 17-22 inches; $\frac{3}{4}$, 23-27 inches; $\frac{7}{8}$, 29-31 inches.

7. For family towels, huckaback is the most serviceable, although damask is used a great deal (see Fig. 78). Linen towels vary in price from three dollars a dozen up, according to size and quality. Dish towels of linen crash are very serviceable.

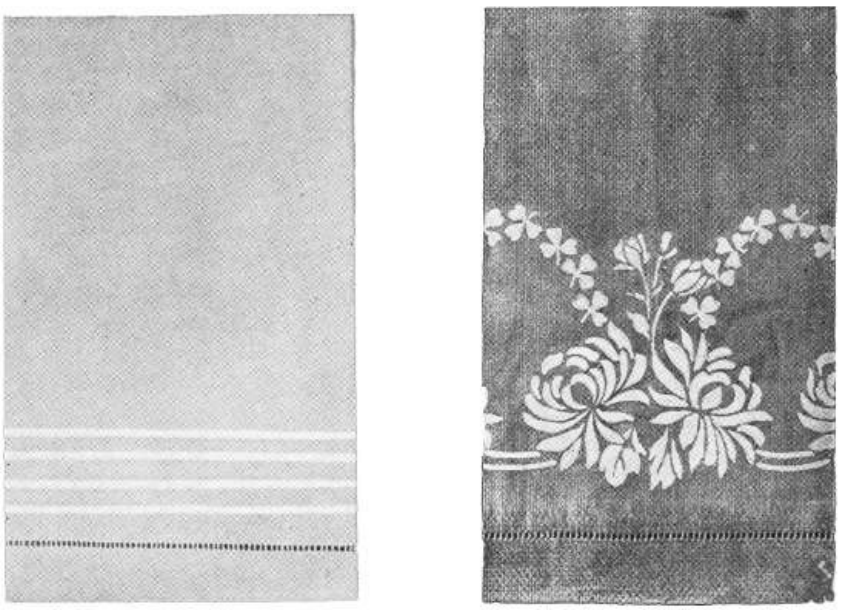

Fig. 78.—Huckaback towels. ***Courtesy of J. McCutcheon Co.***

8. Bedding. Sheets can be purchased ready made in linen or cotton in various sizes. If they are to be made at home, buy sheeting that can be obtained for single, two thirds, or full-sized bed. If cotton, buy in bleached or unbleached condition. Purchase sheets which are long enough to fold over at the top and protect the blankets. There are several good brands of cotton sheeting. “Fruit of the Loom” is one of the best known.

Tubing for pillow cases may also be bought. It has no seams, and comes in several widths.

9. It is better to purchase a certain amount of new linen annually and gradually supplement that worn than to wait and have all wear out at once.

Some things to remember in purchasing silk.

1. That pure silk is seldom manufactured. It is nearly always weighted, and a large proportion of weighting is to be guarded against, as it weakens the wearing quality. Up to 30 per cent is not harmful and helps the silk to take the dye. The fact that it is heavy in the hand does not always mean that it is a good piece of material and will wear well—the weight may be due to artificial “weighting” and not silk. Choose rather a softer pliable silk.

2. Try the test for strength with the thumb (see “Shelter and Clothing,” page 199) to see if the warp and woof threads are equally strong, or stronger one way than the other. If the latter, it will not wear well.

3. Fray out the threads. Do they break easily? If so, the silk is not of good quality. If the warp threads are weak, the silk will split across, if the woof is weak, the silk dress will go in ribbons.

4. If you have time before purchasing, test a sample of silk by burning. Place in a porcelain dish and heat gently for thirty minutes. The silk will vanish and the weighting remain.

Burn the threads to see if there is cotton in warp or woof. Burn end of sample.

If it is the same shape after burned, it is probably weighted.

5. Close weaves wear better than more loosely woven ones and soft silks better than stiff. Guard against buying soft silks, however, that are so woven as to pull in the seams when worn.

6. Are you buying material made of reeled or spun silk? Bargains are seldom found at silk sales. Should you expect to find pure silk at 50 or 60 cents a yard or as many yards of silk thread B as A on a spool? Remember that the demand for a cheap product means the production of cheap products. Wear something else rather than cheap silks.

7. Is the silk adulterated with mercerized cotton or artificial silk? Try the tests. (See “Shelter and Clothing,” page 196.)

Some things to remember in purchasing wool.

1. Wool mixed with cotton makes a cheaper fabric and should not be sold for all wool. It wears well, but is not as warm as all wool. Garments made of it do not keep their shape as well. Woolens are often adulterated in felting. Pull the closely woven fabric apart and untwist the fibers to see if cotton is present.

2. The burning test will help in deciding on the composition. (See “Shelter and Clothing,” page 198.)

3. A good woolen or worsted fabric can always be remade. The inexpensive is not cheap unless you wish something which costs little but does not look well or wear well. One should not expect to get blankets of all wool for two dollars a pair. They cost five or six.

4. Shoddy is one kind of recovered wool and is used to cheapen cost of all-wool material. It can be detected because of shortness of the staple of wool, but when mixed is difficult to see.

5. The weave of material affects the wearing quality. A close twill weave is more durable than a basket weave.

Some things to remember about color.

1. *Blue.* Dark blue in woolen material or gingham usually fades little. Light blue is not as durable in color.

2. *Red.* Woolen material of this color wears well and usually fades little. Red cotton when washed looks less brilliant. It soon fades by washing.

3. *Black and gray.* Woolen materials of gray, white, and black or in combination are generally satisfactory. Cotton materials of gray or black are apt to show starch in washing.

4. *Lavender.* This is a poor color to buy. It fades easily in cotton goods.

5. *Pink.* Fades with washing. If a deep shade be bought it may be satisfactory.

6. *Green.* Usually very unsatisfactory. In good high-priced ginghams it may not fade, but in cheap ones it is apt to turn yellow.

7. *Brown.* Good usually in ginghams, but likely to fade in woolen materials.

8. See chapters on costume design and dressmaking in “Shelter and Clothing,” for suggestions in relation to colors one should wear.

The above brief suggestions must be considered in the light of the knowledge gained from the study of the chapters on textiles in the companion volume, “Shelter and Clothing.”

In purchasing any materials for clothing or household furnishings, remember that demand causes production and those who are intelligent will make the right demands in the right places. Insist on the honest labeling of goods and demand that for which you pay. Why should cotton manufacturers label handkerchiefs which are cotton “pure linen,” and sell them at ten cents? We too should know linen cannot be bought at that price. The United States government employs experts to examine the standards of textiles used in making army, navy, and other uniforms, and will accept only those materials from the contracting manufacturers which stand their tests. If a fuller discussion of the buying of textile materials is desired, see Woolman and McGowan’s “Textiles,” particularly the chapters on consumer’s judgment of textiles, on social and economic conditions, and on clothing budgets.

EXERCISES

1. What rules should be borne in mind in planning to buy the furnishings for a home?
2. What should guide one in relation to where to buy?
3. What methods of ordering facilitate shopping?
4. What is meant by the ethics of shopping?
5. What important facts should you have in mind in buying table linen?
6. What knowledge should you have before going to purchase a silk dress?
7. What will you think about in selecting colors for your garments?
8. Mention five important facts to remember in purchasing wool fabrics.
9. How does the United States government protect itself in the purchase of textiles?
10. What knowledge should a wise shopper possess?

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CHAPTER XXII

HOUSEWIFERY

This old-fashioned word is used here to include the methods and processes connected with the actual work of the house, excepting the cookery, sewing, and laundering, which have fuller treatment elsewhere. This department of household management is a combination of sanitation and the economics of labor.

Order in place.—Keep articles of a kind together conveniently arranged in places set apart for them, these places to be easily accessible. Make an inventory of household goods in a card file,—household linen, personal apparel, including lists of clothing put away for summer or winter, dishes, and valuables. Each housekeeper must make a scheme that suits her own needs, but a few suggestions may be helpful.

Keep *bed linen* and *towels*, piled preferably on shelves, near bedrooms and bathrooms, marked and numbered. Put the clean underneath when they come from the laundry.

Clothing should be kept in an orderly way by each member of the family. Winter clothing and furs should be cleansed for putting away, protected from moths by wrapping in paper, hanging in tar bags, putting in cedar chests, or in trunks with some strong odored substances,—moth balls or cedar oil. Camphor is too expensive. Summer clothing should be washed and put away unstarched and unironed.

Dishes and silver should be carefully arranged in very definite places, and counted often enough to keep account of breakage and loss.

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Fig. 79.—Madam, who keeps your house? ***Courtesy of the Woman's City Club, Chicago.***

354 *Brooms*, *brushes*, *dusters*, and *cleansing materials* should have a place of their own, well ventilated when possible, and all articles put away clean.

Order in work and division of labor.—This depends so largely upon the number of workers, and upon the equipment of the house that no definite plan can be made for all. The question must be differently answered for the woman who has a helper one day a week, or with one or two, or with a large staff of workers. However, there should be some definite plan for the days of the week and the hours of the day, and some division of work among the members of the family or between the family and paid helpers. The young people of the family should each have some regular piece of work, at least in their own rooms; and the paid helpers should have a definite plan given them, including some hours to themselves, as regular as possible. There are emergencies that upset even the most perfect system, and these must be met as they come, but a fair amount of work at regular times should be the system.

"Domestic service" is too large a social and economic problem to discuss at length here. Miss Jane Addams calls it "belated industry," meaning that in domestic work we are far behind the productive industries of commerce in organization. We are trying experiments in putting work out, and having helpers come in, and in time we may bring order out of chaos when employers and employees are all properly trained and have the right relation to each other.

Processes of housewifery.—Good working equipment, including labor-saving apparatus, is an essential; and we must have knowledge of the effect of different cleansing materials on fabrics, wood, paint, glass, and metal.

Equipment.—*Brooms* should be made of pliable straw (broom corn), be evenly made, with a light and comfortable handle.

355 *Brushes* may include the whisk broom, soft brush of bristles both short and long handled for floors, a long handled brush of wool or soft material for walls, ceilings, and cornices, a soft brush for furniture, a thin brush for radiators, a silver brush, and stiff scrubbing brush. The variety of brushes at a furnishing shop is very large, and interesting to study. It is

economy to buy good quality when you can, and if cleaned and not abused they last a long time. Wash the brushes in soapsuds and water, drain and dry before putting away. A bamboo beater is convenient. The dustpan should have a narrow cover at the handle side, and a strong handle.

Carpet sweepers prevent dust from flying and are easy to use, but inclined to wear off the pile of the carpet.

Vacuum cleaners are a necessity in crowded city quarters, where we cannot beat and shake dusty carpets and rugs out of windows, on the roof, or in the street, on account of our neighbors. That we cannot all have them does not make them less necessary. While they may involve no less muscular exertion they remove dust and old dirt in a remarkable way from fabrics, and are very useful for taking dirt from cracks in the floor and woodwork and from upholstered furniture. The principle of operation differs with different makes, and some are less effective than others, but there are several patterns that do good work and are not expensive. Experiment with one at the first opportunity. A room cleaned in this way is markedly different in odor from a room that has been swept with a broom, even when this is well done.

A good vacuum cleaner must have an air conveying system, a separator or other means of disposal of the material picked up, and a vacuum producer. They may be divided, according to the method employed, into those worked by bellows, by fan, by rotary pump and piston pump. This is a problem to take to the class in physics.

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Cleaning cloths.—Have a good supply of cheesecloth dusters, and heavier cloth for work on the floors. A sponge and chamois are useful. The mop, which is a cloth or fiber fabric on a handle, is something that we ought to banish when we can, for it is hard to keep clean, and is a trap for bacteria. A substitute for the common mop is a long handle with a cross bar covered with corrugated rubber, which is held down on the cloth, and rubbed back and forth but not fastened to the cloth. Avoid the use of linty old cloths, because the thread and lint clog the traps and drains.

Cleaning cloths should be boiled in strong soap suds, rinsed, and thoroughly dried before putting away. This is a difficult rule to enforce, for it is a temptation to tuck such things away where they will not show. Watch this matter as you do the garbage pail. When a cloth is too dirty to wash clean, burn it or send it away with paper refuse.

Cleaning materials.—Air, sunshine, and water are the great purifiers, plus muscular energy or the power of machinery, but we frequently use chemical aids. These should all be kept in stock.

Soaps and alkalies.—White and yellow soap, some washing powder, sal soda, caustic soda, household ammonia. Buy these in quantities if you have room to store them, and if they will not be used too lavishly because the supply is large. The soap is not much cheaper by the box, but it hardens with age, and then it wastes less rapidly when used.

Oils and polishes.—Crude oil, kerosene, a mixture of linseed oil, vinegar, and turpentine, one part each, cottonseed oil, alcohol.

Acids.—A solution of oxalic acid marked poison. Vinegar is on hand among kitchen supplies.

Gritty substances.—Rotten stone, whiting, some gritty soap of a kind that does not scratch, a gritty powder, or fine sand for coarse work.

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Disinfectant and deodorizers.—A weak solution of carbolic acid marked poison, chloride of lime, or some reliable preparation[26] (though these are rather expensive), rock salt, and coarse common salt.

Methods of cleaning.—We must first consider what the substance is that has to be removed. The fabrics and upholstery used in furnishing catch dust which contains lint, grit, organic material from our bodies, and bacteria. Fabrics also become spotted (see next chapter). The walls and ceilings, floors and cracks, catch dust. All wood and glass surfaces become soiled from the touch of even clean fingers, and the moisture of the air mixed with dust dulls them. Metal surfaces oxidize, and this oxidized layer must be rubbed off.

To clean fabrics.—If you live in a suburb or in the country, brush, shake, and beat articles to be cleaned out of doors, noticing the way of the wind that the dust may not be carried back into the house.

To cleanse a rug, spread it on the grass, rub with a medium stiff brush with white soap solution on the wrong side, turn it over, and rinse with water from the hose; or better still, tack it by two corners to a wooden wall, and then wash with hose. The city dweller must resort to the vacuum cleaner, or rely upon a cleaning establishment. The other alternative is to shake out the dust in the room, remove

each article as it is cleaned, let the dust settle, and take it out as well as it can be. One apartment dweller heard this remark rise from the window below her: “Shut the window quick. Those dirty people upstairs are brushing a rug out the window!”

Painted surfaces and woodwork should be wiped off with a soft cloth wrung out of tepid water. A small amount of neutral white soap solution in the water can be used for paint if it is greasy, but alkalies are ruinous.

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A highly polished surface (piano) is cleaned by washing with a sponge and tepid water, and rubbing until dry with a wet chamois wrung out of cold water. This method was learned from a piano polisher, and it works excellently. A dry chamois streaks the surface.

The wood of furniture is kept clean by rubbing with a soft dry cloth, but once in a while needs cleaning with crude oil or the mixture of oil, turpentine, and vinegar. Bureau drawers need watching for finger marks.

Glass is best cleaned by rubbing on a mixture of whiting and water. Leave it to dry and rub off with a dry cloth. A fine gritty soap comes for this purpose. Ammonia and water and a soft cloth work well, the success depending upon the final polishing. Very soft tissue paper is satisfactory for polishing.

Marble, porcelain, and enamel need little more than white soap suds, rinsed off and the surface dried. If spotted, use the finest kind of metal soap.

Metals.—Fine silver and plated ware should be kept polished by the daily careful washing, rinsing in hot water. Silver will spot and tarnish. Use whiting and alcohol, let it dry on, and rub off with a clean cloth or chamois.

The silver powders sold at the silversmith’s are very good, but the patent powders and liquids should not be used, as they remove too much of the silver.

Brass and copper are polished with rotten stone and oil. If the metal is spotted, use oxalic acid solution with the rotten stone. After rubbing well, the metal should be washed off in hot soap suds and finished with a dry cloth.

Nickel plate keeps bright if kept clean by daily dry rubbing.

Care of rooms.—*The bedroom.*—The daily care includes airing the room and its closets, airing and making the bed, dusting, removing lint and threads from the floor, and removing slops and bringing fresh water if bathing apparatus is in the room.

To make the bed.—The amount of airing of the bedclothes depends somewhat upon the weather; bed linen absorbs too much damp if placed by the window on a rainy or foggy day. Pull back the bedclothes and hang them over a chair set front to the foot of the bed, seeing that the bedclothes do not drag on the floor. On a bright, fresh day remove all the clothes and hang them singly near the window. If there is a screen in the room, this is convenient for this purpose. The blankets should be hung out on the line once in a while, and washed twice a year. One important point in the cleanliness of the bed is a pad or thick cloth placed on the mattress under the sheet. The mattress should be sunned and aired often, and beaten or cleaned with the vacuum cleaner.

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To make the bed, place the cover on the mattress, lay the under sheet straight, tuck in firmly at top and bottom, and fold the sides under straight, making angles at the corners. Put each piece on separately, turning the upper sheet down over the others. The cover is sometimes placed over all, and a strip to match over the pillows.

Care of the washstand.—This is all important, and cannot be neglected a day, without causing an unpleasant odor. The jars containing slops should be rinsed in cold water, washed out in warm soap suds, dried, and aired. If the ware is china, hot water may crackle the glaze, and then it is impossible to remove odors. Wash and dry all the small articles and wipe out and refill the water pitcher.

Care of the bedroom at night.—Fold back, or remove the covers, and lay the bedclothes partly back. See that drinking water is in the room, and lighting conveniences.

The living room, dining room, and halls.—The daily care consists in setting furniture and such small articles as the pictures and ornaments straight, removing lint and dust from the floor, dusting wherever needed.

The weekly cleaning of all rooms.—Whether a thorough cleaning is needed weekly, depends upon the situation of the house, and the number of people who use the rooms. The rooms in a country house set in wide green spaces do not need cleaning so often as those of a city house.

General order for all rooms.—Dust all small articles, place them together and cover them. Dust and clean off furniture and take the lighter pieces from the room. Cover what remains. Clean the textile fabrics in the best way available. Brush the walls, with a special brush, or soft cloth on a broom. Dust and cover pictures. Brush the rugs, or use vacuum cleaner. If the floor is hardwood, brush it with a soft brush, taking long, steady strokes from corner and sides to center. Take up dust in pan, and carry away to burn, or put in dust can at once. Wipe the floor with moist cloth, or with oiled cloth. 360

If there is a carpet and a broom is to be used, scatter pieces of wet paper over it, moisten the broom, and sweep as directed for brushing, using steady strokes and not allowing the dust to fly. The broom should be washed and dried. If dust flies, allow it time to settle. Dust the surfaces left exposed. Wipe off the woodwork if necessary, remove covers, and replace all articles. To have the room perfectly clean, windows should be washed, but if this is not convenient at the time, or the weather is bad, rub them and dust the sashes. Wash mirrors and the glass of pictures. This means much labor, and some people cannot accomplish it every week; and different rooms should have different cleaning days. But such thorough cleaning occasionally is necessary for keeping all articles in good condition and also for the health of the family.

The old-fashioned yearly house cleaning seems hardly necessary if cleaning is well done through the year, but in both fall and spring some extra freshening may be necessary in the way of thorough cleansing of textiles and furniture. All closets should have everything removed from them and the whole closet cleansed. Drawers should come out, be emptied, washed and aired, and fresh white or brown paper put in all.

The bathroom and toilet.—This needs very particular care, no matter what the type may be. All drains and traps should be flushed daily, and a solution of caustic soda put down weekly. If there is an odor about the water closet, try salt first, and then some chloride preparation. The basin, the tub, and the seat and basin of the toilet should be thoroughly washed daily. When the bathroom is used by more than one person, all should be taught to leave all the toilet equipment perfectly clean. If the toilet is not of the water-closet type, even greater care should be taken. Everything must be kept scrubbed clean, and chloride of lime should be put down daily, if there is not a removable pail with earth. (See “Shelter and Clothing,” p. 48.) 361

Care of lamps.—If kerosene is used, this is an important feature of housework.

Have a tray for holding necessary articles, soft cloth, paper, strong, sharp scissors, lamp chimney brush. When the lamp is to be cleaned, set it upon this tray. Take off all the easily removable parts. Fill the lamp through a funnel, and do not let the kerosene run over. Wipe off the charred wick with paper, and wipe the burner. Wash off the lamp in warm soap suds, wash and polish the chimney and shade, and replace. If you cannot get rid of odor, take the burner apart, boil it in a solution of washing soda, and put in a new wick. Cleaning a lamp is not nearly so disagreeable as many people think it, when it is done with good will. To shirk it means an unpleasant odor in the room and a poor light. Always fill the lamp in the daytime and keep it away from the fire.

Household insects.—Keep out flies and mosquitoes by screens, but see first that your premises are clean, and do what you can in the whole neighborhood.

Flies breed in dirty stables and mosquitoes in standing water. The stables must be cleaned and kept so, and water drained off or kerosene put upon it. Mosquitoes will breed in water in an empty milk bottle or old tomato can. If flies enter the house, kill them in some way. Wire or net fly killers cost only ten cents, and do good work. If the flies are very numerous, catch them in wire traps, or burn pyrethrum powder in the room. At night when they are on the ceiling, catch them in a glass of hot water and soap, not quite full, by holding the glass under the fly and gently knocking the glass against the ceiling. If the ceiling is high, tack an empty can on the end of an old broom stick and set the glass in that.

Clothing moths are kept out by precautions already mentioned.

If bed bugs appear, go over the bed with great care and examine the bedstead. Wash it off with kerosene, putting this well into the cracks. A single insect may be brought in on the clothing. If they continue to appear, all wall paper should be removed, woodwork varnished or painted. It may be necessary to resort to fumigation, but this should be done by an expert. Croton or water bugs are difficult to destroy, if they are once in a house. No garbage should be left about, to attract them at night. There are powders that drive them away, and another remedy is sulphur paste, which comes for the purpose, and which may be spread on slices of 362

potato. The U. S. Department of Agriculture issues free bulletins on the suppression of household insects.

Precautions against fire.—So many disastrous fires occur as a result of a careless act that we need to train ourselves in caution. The matches used should be of the safety type. They should be blown out, never shaken, and never thrown into a basket of papers. When matches are used, always have a small fire-proof receptacle in each room. Smokers are often careless in regard to their matches, cigars, and pipes. Be careful in summer to see that a breeze cannot blow some light curtain over a candle or lamp.

If a kettle of fat catches fire, pour on sand, but never water. As a general rule, extinguish a flame by covering it rather than by throwing on water.

If clothing catches on fire, wrap a rug or any large woolen article tightly around the body. To rush into the air is fatal.

If a towel or apron catches fire, roll it up quickly before the blaze spreads. This can be done without injury to the hands.

Small fire extinguishers are not expensive. Most kinds contain a solution of soda and a bottle of sulphuric acid which mix when the extinguisher is inverted, and throw out a stream of water charged with gas from a small hose. This works well just as a fire starts. Extinguishers arranged to throw a stream of carbon tetrachloride are also on the market.

Repairs.—Too often in planning the budget, and the daily work, the housekeeper forgets to allow for the constant wear and tear on the house itself, and its furnishings; but to preserve the beauty and usefulness of both the house and furniture, as much thought and time are necessary as for the repair of clothing. In addition to the care and cleaning, there must be a constant attention to small repairs.

Inspecting and reporting.—Have a series of cards in the card file, or pages in the notebook, where needed repairs may be jotted down. Have a regular time for looking over different parts of the house; and give a brief daily look as you pass from room to room. Each member of the family should be asked to report whatever goes wrong in his province,—a leaky faucet, a squeaky door, or broken castor, a tear in a curtain, a shade roller that does not work.

For large repairs, like a leak in the water or waste system or shingle on a roof, a trained worker is needed; but for small repairs a special worker from outside is too expensive, and there needs to be a handy person in the house, who can put in a screw, and use a monkey wrench, touch up the paint or varnish, or mend the wall paper. It is pleasant work, and in these days when schools teach so much handicraft, there should be some one in the family glad to do it.

A repair outfit.—Have a shelf somewhere for the repair “kit.” Look at the woodwork of your house, and see what is needed; whether paint, or varnish, an oil mixture or stain, or all of them. Have on hand a small can of each, and bottles of alcohol, turpentine, and glue. Two or three paint brushes of good quality and of different sizes are needed. Keep a bundle of wall paper including pieces of all the patterns on the walls. A box of tools is needed, including a hammer, gimlet, screw driver, monkey wrench, a sharp knife, with boxes of nails and screws of mixed kinds and sizes such as may be found at any hardware store.

EXERCISES

1. What are the reasons for keeping an inventory of household goods?

2. How should winter garments be cared for in summer?

3. Obtain a price list and estimate the cost of an equipment of brooms and cleansing materials.

4. What are the advantages of a vacuum cleaner over a broom?

5. What are the best methods of removing dust? Of cleaning paint and woodwork and glass?

6. How are metals cleaned?

7. What are the most important points in caring for a bedroom?

8. What is the order of work in a thorough cleaning of a room, and why?

9. How should plumbing be cleaned?

10. Is the old-fashioned order of work the best now—Monday, washing; Tuesday, ironing; Wednesday, mending; Thursday and Friday, cleaning; and Saturday, baking?

11. How may all the family help to some extent in household work?

12. Can you plan the best order of work for a day for the home worker who has no help but some one to wash and iron?

13. What are the dangers from different household insects?

14. If a kerosene lamp suddenly blazes up, what should you do?

15. What is the principle involved in putting out a fire?

16. What are some of the simple methods of fire prevention?

17. What simple repairing can be done by members of the family?

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CHAPTER XXIII

LAUNDERING AND DRY CLEANSING

"Washing is a necessity, ironing a luxury." This terse sentence expresses very clearly the relative value of the two large divisions of the laundering process. The thorough washing of clothing is a most important branch of household sanitation, upon which the health of the family and of the whole community depends, for disease is communicable by means of soiled garments and those that are imperfectly cleansed in unsanitary houses and possibly in commercial laundries. The ideal city will have many large and spotlessly clean laundries, where skilled labor intelligently directed will insure clothing as clean as it can possibly be made.

There is an æsthetic element in laundering as well, for good washing methods give a tinted white to fabrics that it is a pleasure to see, and ironing makes a smoothness that is pleasant to the touch, and brings out beauty of design, as in damasks and embroideries. There is an economic feature, too, in that poor and rough methods of work in both washing and ironing injure fabrics and shorten their term of usableness.

"Washing Day" has an ill repute that it does not deserve, for laundering is a science and an art that it is a pleasure to practice, if one has skill. Make it one of the household arts which you must carefully study, and you will find it pleasurable as well as necessary.

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Soil in garments.—The dust and dirt of the street and house that soil our garments contain inorganic particles of earth, lint from textiles, organic matter from animals and human beings, and also bacteria. The material from our bodies consists of particles of skin, skin secretions, and bacteria, which are collected in underwear and bed linen and towels. Spots of grease and stains may fall upon our outer clothing, and fruit stains affect table linen in particular.

Cleansing agents.—Water is the great cleanser, and if it is not available in abundance and used freely, the washing is a failure. All other agents are merely aids to the water or substitutes for it. In primitive outdoor methods, still largely used in some countries, the flowing water is the only agent, and yet the result is fairly good. We aid the process by the use of soap or washing powders or ammonia.

The air and sun are also purifiers, and clothing should be exposed to their action for drying whenever possible. There is a sweetness in air and sun-dried clothing that no artificial drier seems to give. Probably there takes place some oxidation of impurities present in very small amount and, moreover, any bacteria still clinging to the fabric may be killed by the sun's rays. Heat is a purifier, oily substances being more readily removed by hot water and soap than by cold; and the boiling temperature of water renders bacteria and organic matter harmless.

Some mechanical action that forces water through the fabric is necessary, and the method of accomplishing this is one of the important problems in laundering. We seek a method that will be thorough, that will not injure the fabric, and that will economize the muscular energy of the worker. Beating, pounding, and rubbing are the old methods, the use

of a machine the new, and that is the best machine that meets all the requirements of the properly conducted washing process as described below.

367 The *water* should be soft and clean. Rain water is a perfectly soft water and excellent for laundering if the cistern is kept clean, and free from the dust of the roof. Lake, river, and well water are sometimes soft. Strainers may be used on the faucets if at any time the water from these sources becomes muddy. (See Chapter V for discussion of soft and hard water.)

Hard water prevents the soap from lathering, and this must be counteracted for laundering. *Temporary hardness* is removed by boiling. *Permanent hardness* is not affected by boiling and can be overcome only by the addition of some substance like ammonia, borax, or soda. Only enough of these should be used to allow the soap to do its work, since they may injure fabric and the skin of the worker.

Soap is the most useful of the cleansing agents added to water. It may have been accidentally made in the first place by some housewife who put a greasy pot to soak with a solution of lye made from the ashes of her hearth fire. Heat and alkali break up the fat into two parts, glycerin and a fatty acid. The fatty acid combines with the alkali, giving soap, and the glycerin remains free. Both animal and vegetable fats are used, and different forms of alkali, usually potash or caustic soda, the former for soft, the latter for hard, soap.

In these days soap is much better made in the factory than it can be at home. In the factory the alkali is proportioned by weight, so that as little free alkali is left as possible. Such a soap is called “neutral.” Resin is added, in yellow laundry soaps, and is supposed to aid in forming suds. When there is an excess of resin, as in some cheap soaps, it is hard to rinse out and colors the clothes. Borax is sometimes added to soap, and is useful when the water is hard, but not necessary in soft water. Naphtha or some other petroleum oil in soap increases the cleansing property of soap, by dissolving fatty or greasy impurities.

368 A *soap solution* is essential for use in the boiler and in washing machines and is useful for rubbing on spots before washing.

> To make soap solution, cut up the soap and dissolve it in hot water, one pound soap to one gallon of water. It should be strong enough to jelly when cool, and may be kept in jars ready to use. Even more convenient are soap chips which come by the barrel, but may be bought at pound rates.

Bleaching and bluing agents.—The sun, as it bleaches white fabrics, may be counted in this group. Chemical bleaches are used to whiten clothes, but should not be resorted to unless clothes are yellow from poor washing, as in the end they weaken the fabric. Commercial laundries sometimes use an excess of acid for this purpose. Cream of tartar is a harmless bleach. Javelle water is another household bleach, chloride of lime being the bleaching substance. This is also a good disinfectant.

> *To use cream of tartar.*—Dissolve cream of tartar in hot water, 1 teaspoonful to each quart. After the yellowed fabrics have been thoroughly washed and rinsed, lay them overnight in a solution of this strength, rinse, blue, and dry in the morning.
>
> *Javelle water.*—$^1/_4$ pound chloride of lime, 1 pound sal soda, 2 quarts of cold water. Dissolve the chloride in half the water cold, and the sal soda in the other half boiling. Stir together thoroughly, allow the mixture to stand several hours, pour off the clear water with care, and bottle it. Use a tablespoonful of the solution to a gallon of water, and heat the yellow fabric in this mixture after thorough washing, for half an hour, not allowing the temperature to rise above 100° F. Rinse very thoroughly before bluing and drying.

Bluing is used to neutralize the slightly yellowish tint of the fabric, when it cannot be completely bleached.

> Ultramarine blue is sold in small balls and cakes.
>
> 369 Aniline blue is a strong color, and in a very dilute solution gives a pleasing pearly tint to the fabric, especially when the violet tint is used. Mix an ounce of the blue with one gallon water, and bottle for use.
>
> Prussian blue is to be avoided, since it is a salt of iron, and often yellows or spots the clothes. It is usually sold in liquid form. To test, mix the liquid blue with a strong solution of washing soda and heat. If the mixture turns red, and there is a reddish precipitate, the blue is this salt of iron.

Starch is used to fill the interstices of fabrics and give a smoothness and stiffness to the cloth that prevents the rumpling of garments. Both wheat and cornstarch are used for laundry purposes when only the natural starches are available, the wheat starch being better for home laundering, as the cornstarch gives a quality that is too stiff and crackling. Recently, however, the manufacturers have learned to make “thin boiling” starches from corn and have placed on the market a variety of such modifications of cornstarch for laundry

use. Rice starch or “rice water” is used for very thin muslins.

To make starch.—For method of making, see starch experiments, Chapter VIII. The starch must be perfectly smooth, and should be stirred while it is boiling for a few minutes, and strained.

Proportions.

1. For lingerie, 1 teaspoonful of starch to 1 quart water.

2. For medium fabrics, $1\frac{1}{2}$ to 3 tablespoonfuls starch to 1 quart water.

3. For stiff work, 5 tablespoonfuls starch to 1 quart water.

Ironing.—The ironing process is the most difficult art in laundering, and requires good tools, practice, and patience. In the summer it is an exhausting labor unless an electric or gas iron is available. Much energy may be saved in hot weather by omitting the ironing of certain articles. Dish towels, even toilet towels, and soft underwear may be stretched and folded, and are perfectly comfortable to use. Some women who do their own work even fold sheets and pillow cases without ironing.

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The smoothing of the fabric is accomplished by heated irons, or by pressing between rollers in a mangle.

To summarize.—The essential steps in laundering are: the forcing of clear water through the fabric; loosening of the soil and stains by soap and appropriate chemicals, sterilization by boiling temperature, drying and sweetening in the air if possible. The less essential are bluing, starching, and in some cases ironing.

Laundry equipment.—We are beginning to realize that a separate room for laundering purposes is an essential in a well-equipped home. Such a laundry will be light and well ventilated, will have washable floors, walls, and ceilings, running water and hot water supply, sanitary tubs and conveniences in the shape of machinery. We shall not have perfect laundries until electric power is available at a fair price. Much is said about electricity on the farm, and the progressive farmer who has his own engine should not fail to use the power for all laundry work. Trolley power should be available, and this use of electricity should be made cooperative when practicable. In a few communities abroad and at home, the power available in a creamery is used for laundering purposes as well.

Where there cannot be a separate laundry, take pains to have the equipment as good as space will allow.

The tubs.—If possible, have three tubs, for this makes for economy of time. Enameled tubs are the most sanitary, and be sure that they are white. You cannot tell whether or not the clothes are clean and blued to the proper tint in a buff-tinted tub, which you may be tempted to buy because it is cheaper.

Round portable tubs, to be set upon a bench, should be of galvanized iron, which is sanitary and light. Wooden tubs are things of the past, unsanitary and heavy.

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Equipment for forcing water.—The rubbing board is the old-time method, yet it wears the fabric and wears out the worker, and should be used as little as possible. If still considered necessary, it should be of glass set in wood. The wooden board is unsanitary and the metal board may at any moment develop a tiny crack that will tear the fabric.

Fortunately, many women are learning that the washing machine, properly used, is a great economy of fabric, time, and strength. Many machines are on the market, and we need to discriminate and to select the machine constructed to force the water through the fabric without injury to the fabric, and with the smallest amount of muscular energy and that properly exerted without strain. Of course, if machine power is available, the problem is easy. These many washers may be classed in four groups. One is a revolving arrangement, sometimes consisting of two corrugated boards set in the center of a tub of clothes, one objection being that the clothes are sometimes torn. Another type has a revolving perforated inner cylinder for the clothes, and an outer one for the soap and water. This is much more expensive. Still a third rocks the clothes in soap and water and is very effective. A fourth type makes use of suction.

The principle of cleansing by pressure and suction is used in several machines and hand washers, and these are, on the whole, inexpensive and practical for home work. The work is accomplished by an inverted cone, pushed down on the clothes, and lifted. Such a washer is seen standing on the floor in Fig. 80. The same figure also shows another of this type standing on the table, and still another to be used in the boiler.

Most of these devices can be used with power.

The boiler.—A portable boiler is convenient. It should be made of good quality tin with copper bottom and must be thoroughly washed and dried after using.

The wringer is of great assistance to good work. It should be a good machine having hard rubber rollers, ball-bearing action, and strong springs at the side. It must be cleaned after using, dried, the pressure loosened, and the whole kept covered.

The drier.—If clothesline or heavy wire is used, this must be of good quality, and well cared for. The clothesline should be taken in after each using. A revolving drier is convenient, and may even be used in apartment houses. The steam drier has a rack on which clothes are hung, and economizes space and time.

Fig. 80.—Simple laundry equipment for the home. *A. Fowler, Photographer.*

Irons.—The hand iron is heated in several different ways. The old-fashioned iron heated on the stove, and the electric iron are the most satisfactory. In buying hand irons, select those of good weight, for this makes the work easier. Three or four will suffice for ordinary work, and they should weigh from 4 or 5 to 7 pounds. A small pointed iron is necessary for fine work, and for sleeves there is a special, narrow iron. The irons must be kept clean, and perfectly dry when not in use. Wax tied in a cloth is a good cleaner, and should be at hand during the ironing process. A stand is necessary on which the iron may rest, and paper or cloth on which to rub the iron when it comes from the stove.

Electric irons are proving very satisfactory, and although the first cost is high, they should be used wherever possible.

The mangle.—Small mangles, used either cold or heated, are now made for family use, and are great labor savers in flat work. Towels and small flat pieces may even be put through the wringer, while they are still damp, with very good effect.

The ironing board.—This should be firm, well padded, and covered with clean cloth. The cover may be made to tie on so that it can be easily changed. Ironing boards should be placed in a good light. Boards may be attached to the wall, and these have firm support. In a small room, the board can be made to turn up.

Other apparatus.—A hamper or bag for soiled clothes, a basket for clean, pail and dipper, a clothes stick, a large pan, a small and a large saucepan, a teakettle for boiling water, a knife, wooden spoon, common spoons and measures, a sprinkler or brush for sprinkling clothes, a clotheshorse, clothes hangers for waists and dresses. The soiled clothes bag should be washed weekly, and the hamper should have a removable lining also for weekly washing.

Monday and Tuesday are the traditional days for washing and ironing, but the woman who does her own work, or perhaps has a helper, or one maid, may find it a good plan to do no more on Monday than the mending, removing of stains, and sorting. This gives time to

make the house orderly, after Sunday, and to prepare food, some of which may last over the next two days. Some of the clothes may then be soaked overnight.

Order of work.—Mending, sorting the clothes, removing stains, soaking, washing, boiling, rinsing, bluing, starching, drying, sprinkling and rolling, ironing, folding, airing, sorting, and distributing.

Methods.—Mending and removing spots from fabrics are discussed in “Shelter and Clothing.” A few common stains are removed as follows:

Fruit and coffee stains.—Hold the spotted fabric tightly over a bowl and pour boiling water through it. Of course, remove stains at once if possible.

Peach stains are removed by Javelle water. Apply a few drops and pour boiling water through at once.

Cocoa and chocolate stains are helped by borax, and by soap and cold water.

Ink.—Liquid ink removers provided for the library table are convenient. Wet the spot, use 1, dry with a blotter, and use 2, and rinse at once. The same thing is done by wetting, applying an oxalic acid solution first, then Javelle water and rinsing.

Blood stains are removed by soaking in lukewarm water, and washing in a soap solution with a little ammonia and kerosene, or with a naphtha soap.

Sorting.—Separate the fabrics, wool from cotton and so on, and colored cotton from white; also separate body linen from bed linen and from table linen.

Soaking.—This hastens the process since it loosens dirt, and one laboratory experiment seemed to show that soaked clothes are freer from bacteria, than those that are not.

Shrinkable fabrics cannot be soaked. Body and table linen should be soaked separately. The water should be cold, softened with a little ammonia.

Washing.—Wash woolens and silk underwear first, in warm, not hot, soap suds, wring out, rinse, and hang to dry. Use a white, neutral soap. Have the same temperature for both washing and rinsing. Boiling water shrinks wool, and yellows silk. Hand-knit wool, as shawls and jackets, stretch in drying. If dried in a bag or pillow case, this is partly obviated, or lay them on a pad on the table.

Prepare hot water in the tub, with dissolved soap in it, either for handwork or a washer. Wash table linen first, then bed linen and towels, and next the body clothes. Soap the articles well, and rub or use a washer. It is well to wash handkerchiefs by themselves, boiling in a pail for half an hour. If one of the family has a cold or influenza, soak his handkerchiefs in a solution of salt and water and perhaps a little bleaching powder before washing and boiling.

Make fresh suds often. This means heavy labor in the case of portable tubs, but clothes cannot be cleansed in dirty water.

Colored cotton and linen articles may be washed last. They should be put first into salt and water to set the color, washed in tepid water with white soap, rinsed thoroughly and hung in the shade, wrong side out.

Boiling.—Boil the washed clothes in soap solution for ten minutes. In case of infectious disease, all the patient’s linen should be boiled an hour,[27] and of course exposed clothing is kept separate through the whole process.

Rinsing.—This must be thorough and two or three waters must be used. This is the stage where many laundresses fail. The suction washers are very useful here.

Wringing.—This must take place between every two stages of the process.

Bluing.—Add the bluing solution to clean water to the desired shade, shake each piece, put it through the water, and wring out at once. Do not use bluing in excess.

Starching.—Next the fabrics that need a little thin starch may be starched. *Starch* for stiff collars and shirts is rubbed in at the time of ironing.

Drying.—Hang out the clothes, having pieces of a kind together, and the threads straight. If out of doors, hang in such a way that the air will have easy access.

Take down, when dry, and *fold* lightly in a basket.

Sprinkle, roll tightly, and leave them until ironing time. Thin fabrics should be

very moist, as they dry quickly.

Ironing.—This art must be acquired by watching the expert and by practice. 376

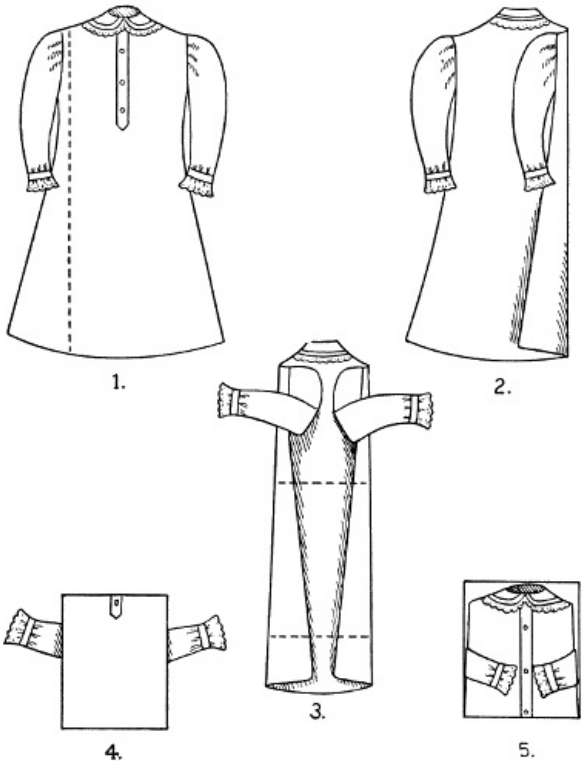

Fig. 81.—Folding of nightdresses. ***Courtesy of Balderston and Limerick.***

Shake or stretch the article, and lay it straight upon the board. Iron from right to left, arranging the material with the left hand, and iron with the long thread of the material. Bring the article on the board toward you. Iron first the parts that will wrinkle least, such as ruffles and trimming and sleeves. Embroidery and damask should be ironed on a very soft material like a Turkish towel, right side down. Always iron until the fabric is dry.

All tucks and folds must be carefully straightened, and if ironed crooked, they must be made very wet and done over again. When ironing a waist will you do the sleeve or the body first? 377

Large flat pieces, towels, and napkins are folded in the ironing. Doilies and centerpieces should not be folded.

Folding is necessary in order to make the garments of convenient shape for putting away. Figures 81 and 82 will suggest the method for some garments.

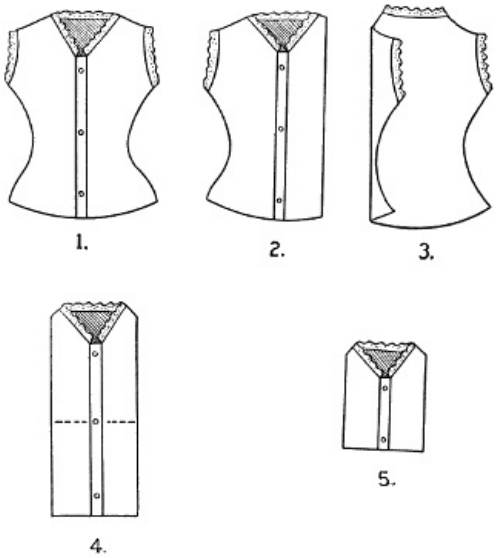

Fig. 82.—Folding of corset covers.

Courtesy of Balderston and Limerick.

Commercial laundries.—The convenience of these has been suggested already. When we can make them all sanitary, and when methods are used that will not injure the fabric, we can safely put this kind of work out of the house, but at present many commercial laundries are unsanitary and ruin the clothes.

Cost of laundering.—We cannot have good service without paying for it, and one cause of poor laundry work is the public demand for cheap work, and this too has its effect upon the laundry worker. The housekeeper often fails to have the laundry ready when the wagon calls, and yet demands a quick return, which also results in poor work. 378

If you have never done any laundering and expect a laundress to do up fine lingerie at a low rate, it will be a revelation to you to attempt to iron a shirt waist or lingerie dress, and then decide what remuneration you would yourself like to receive. One class of high school girls, after a course of six laundry lessons, decided that a dollar a dozen was fair pay for *ordinary* work! This is an interesting question for class and home discussion.

Dry cleaning.—This is accomplished by gasoline, naphtha, or benzine, and should not be attempted by the city dweller. In the country or suburbs, it should be done out of doors, far from any source of fire. Use a basin or tub, and immerse the article in the liquid, using as much as if water, lifting gently up and down. Rinse in a second portion. A suction washer may be used with large garments. Do not rub the fabric in the liquid. Lift, drain, and hang to dry. Keep the can in a safe place, safety being insured by coolness.

Powdered French chalk may be rubbed into delicate silk and wool, where there is a grease spot, or an oiliness from the skin. Leave for twenty-four hours, then shake, and brush out.

Ether and chalk may be used, but the ether affects some people unpleasantly, and dissolves out some delicate colors. *Meal* may also be used for cleaning wool, especially knitted fabrics, but it is difficult to shake out, and it needs blowing out on the clothesline.

> *Laboratory management.*—A few lessons can be given in laundering where there is no complete equipment. Dish towels, doilies, and napkins can at least be washed in dishpans in the school kitchen, and a few irons provided. A few such lessons are helpful at least in developing an appreciation of what good laundering means at home and to the community.

379 The following order of practical work is suggested, when there is a school equipment. (From “A Laundry Manual,” courtesy of Balderston and Limerick.)

FIRST COURSE

I. Make Javelle water, detergent, soap, and give general notes.

II. Removal of stains.
Wash.
Table linen.
1 tablecloth for every four students.
1 napkin for each student.
1 doily for each student.

III. *Wash.*
Bed linen.
1 sheet for every four students.
1 pillow case for each student.
Iron.
Tablecloth, napkins, and doilies.

IV. *Wash.*
Drawers and stockings.
Iron.
Sheets and pillow cases.

V. *Wash.*
Towels and plain colored pieces.
Iron.
Drawers and stockings.

VI. *Wash.*
Nightdress and corset covers.

Iron.
Towel and colored clothes.

VII. *Wash.*
Flannel underwear.
Iron.
Nightdress and corset covers.

VIII. *Wash.*
Embroideries.
Iron.
Embroideries and flannels.

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Second Course

I. *Wash.*
White skirts.
Wash and iron.
Doilies and drawn work.

II. *Wash.*
Shirtwaists.
Iron.
White skirts.

III. *Wash.*
Knit and crocheted articles and flannel waists.
Iron.
Shirtwaists.

IV. *Wash.*
Woolen dress goods, down quilt, and blankets.
Iron.
Flannel waists.

V. *Wash.*
Collars and cuffs, child's dress, ribbons.
Finish quilt and blankets.

VI. *Wash.*
Silks.
Iron.
Silks, collars and cuffs, child's dress.

VII. *Wash.*
Laces, lace curtains.

VIII. *Wash.*

Collarettes, stocks, handkerchiefs.
Iron.
Collarettes, stocks, handkerchiefs.
Finish lace curtains.

EXERCISES

1. Why is ironing less necessary than washing?
2. What are the chief cleansing and purifying agents?
3. Explain the difference between hard and soft water. Remedies for hardness?
4. What is soap, and how does it act?
5. Why do we blue and starch clothes?

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6. Describe the methods of forcing water through clothes.
7. Why are clothes boiled?
8. What are some of the labor saving devices and methods in washing and ironing?

9. Why must clothes be sorted according to fabrics?

10. What are the essentials of a good washing machine?

11. Make a list of the cleansers and chemicals necessary to have on the laundry shelf.

12. Obtain price lists and estimate the cost of simple but sufficient laundry equipment.

13. Obtain a laundry list from a commercial laundry. Make a list of the articles washed at home, and compare cost with the cost of putting out clothes, estimating fuel, cleansers, labor, and some wear and tear of apparatus.

APPENDIX

CLASSIFICATION OF FOODSTUFFS

Elements required by the body

Carbon
Hydrogen
Oxygen
Nitrogen
Sulphur
Phosphorus
Iron
Calcium
Magnesium
Potassium
Sodium
Chlorine
Iodine (traces)
Fluorine (traces)
Silicon (traces)

Foodstuffs furnishing these elements

Proteins—furnish carbon, hydrogen, oxygen, nitrogen, sulphur, and sometimes phosphorus and iron
Fats—furnish carbon, hydrogen, and oxygen
Carbohydrates—furnish carbon, hydrogen, and oxygen
Mineral matter—furnishes phosphorus, iron, calcium, magnesium, sodium, potassium, chlorine, iodine, fluorine
Water—furnishes hydrogen and oxygen

General functions of these foodstuffs

To supply energy
To supply building material
To regulate body processes

Special functions of each foodstuff

Proteins—supply energy; also nitrogen, sulphur, and sometimes phosphorus for body building
Fats—supply energy in the most concentrated form
Carbohydrates—supply energy in the most economical form
Mineral matter—supplies building material and helps to regulate body processes
Water—supplies necessary material (about 60 per cent of body being water) and helps to regulate body processes

Examples of food materials rich in each of the foodstuffs

Proteins
Eggs
Milk
Cheese
Lean meats
Fish

Fats
Cream
Butter
Meat fats
Vegetable oils
Nuts
Yolk of egg

Carbohydrates
Cereals and cereal products
Potatoes and other starchy vegetables
Chestnuts
Sweet fruits
Sugar

Mineral matter
Milk
Green vegetables
Fruits
Whole wheat and other whole cereal products
Egg yolk

Water
Fresh fruits
Fresh vegetables
Milk
Beverages, including water as such

Digestion of the foodstuffs

Having seen what each of the foodstuffs does in nourishing the body, we may now see how they are prepared for the use of the body in the digestive tract.

Digestion of carbohydrate.—The simplest carbohydrate is a sugar which cannot be broken up into other sugars. Such a simple sugar is called a monosaccharid. There are two common in foods, glucose and fructose; a third, galactose, is derived from more complex sugars. Two simple sugars united chemically make a double sugar or disaccharid; thus cane sugar or sucrose will yield glucose and fructose, while milk sugar or lactose will yield glucose and galactose, and maltose will yield two portions of glucose. These three disaccharids are the only common ones. Starches, dextrins, and cellulose or vegetable fiber are made of many simple glucose groups, and are hence called polysaccharids. All carbohydrates to be used by the body must be reduced to simple sugars. Glucose needs no digestion therefore, but the double sugars must be split by enzymes into two simple sugars

in the intestinal juice, one for each kind, namely, sucrase (sucrose-splitting), maltase (maltose-splitting) and lactase (lactose-splitting). The digestion of starches and dextrins begins in the mouth, where amylase (starch-splitting) changes starch first to dextrin and finally to maltose, and maltase may change a little of the maltose so formed into glucose. In the stomach there are no enzymes acting on carbohydrates, but the digestion may continue under the influence of swallowed saliva for a time. In the pancreatic juice there is another amylase, which completes the splitting of starch to maltose, and then the intestinal maltase can reduce this to glucose, which will be absorbed. Cellulose cannot be digested and simply serves to add bulk to the diet.

Digestion of fat.—A fat is made up of two parts, one a fatty acid, the other glycerol. Fat cannot be absorbed by the body until it is split into these two parts. A fat splitting enzyme is called a lipase. There is none in the mouth; one in the stomach works only on fat in the state of emulsion; the most powerful is found in the pancreatic juice. Since fat cannot be digested in the mouth nor to any great extent in the stomach, it is bad to have food coated with it, for the protein and carbohydrates will have to wait till the fat is digested away, before they can be digested; that is, till the intestine is reached. This is one reason why pastries and fried foods are hard to digest.

Digestion of protein.—There are no enzymes in the mouth acting on protein. In the stomach, the hydrochloric acid helps to make it soften and swell, and then pepsin begins its digestion. Protein, like fat and carbohydrate, can be subdivided into smaller and smaller portions, finally being reduced to a form which the body can absorb, namely, amino acids, of which there may be 17 or 18 kinds from a single protein.

The digestion in the stomach produces chiefly large fragments of the original protein, called proteoses. In the pancreatic juice is a powerful enzyme called trypsin, which digests proteins, first to fragments, next smaller than proteoses, called peptones, and finally breaks these peptones into amino acids. In the intestinal juice is another enzyme called erepsin, which also forms amino acids from proteoses and peptones, thus finishing any digestion of protein left incomplete by the trypsin.

Fate of the absorbed foodstuffs

Carbohydrates, absorbed as glucose or other monosaccharids, are carried by the portal blood to the liver, and thence passed into the blood, to be burned in the muscles, if needed for fuel, or stored temporarily in the liver and muscles as glycogen (a polysaccharid yielding glucose) for future conversion to sugar when required as fuel.

Fats, passing through the intestinal wall as fatty acids and glycerol, enter the lymph largely as fat again, and finally pass to the blood to be burned in the muscles for fuel, or to be stored as fat until needed.

Proteins pass into the blood as amino acids. Those needed for building material are taken up by the cells (especially cells of the muscles) and those not required for this purpose are freed from their nitrogen (in the liver or muscles) and then burned for fuel.

For a fuller discussion of the fate of the absorbed foodstuffs see Chapter IV of Sherman’s “Chemistry of Food and Nutrition.”

APPENDIX

TABLE I

Edible Organic Nutrients and Fuel Values of Foods

Note 1.—Adapted from Table I, Appendix, “Chemistry of Food and Nutrition,” Sherman. See this volume for more complete list. Also Bulletin 28, Office of Experiment Stations, U. S. Department of Agriculture.

Note 2.—E. P. signifies edible portion; A. P. signifies as purchased.

Food		Protein (N×6.25), Per Cent	Fat, Per Cent	Carbo- hydrate, Per Cent	Fuel Value Per Pound, Calories	100-Calorie Portion, Grams
Apples	E. P.	.4	.5	14.2	235	159

	A. P.	.3	.3	10.8	214	212
Asparagus, fresh	A. P.	1.8	.2	3.3	100	450
cooked	A. P.	2.1	3.3	2.2	213	213
Bacon, smoked	E. P.	10.5	64.8	——	2840	16
	A. P.	9.5	59.4	——	2372	19
Bananas	E. P.	1.3	.6	22.0	447	101
	A. P.	.8	.4	14.3	290	156
Beans, dried		22.5	1.8	59.6	1565	29
lima, dried		18.1	1.5	65.9	1586	29
string, fresh	E. P.	2.3	.3	7.4	184	241
	A. P.	2.1	.3	6.9	176	259
baked, canned		6.9	2.5	19.6	583	78
Beef						
fore quarter, lean	E. P.	18.9	12.2	——	842	54
	A. P.	14.7	9.5	——	655	69
hind quarter, lean	E. P.	20.0	13.4	——	907	50
	A. P.	16.7	11.2	——	757	60
porterhouse steak	E. P.	21.9	20.4	——	1230	37
	A. P.	19.1	17.9	——	1077	42
roast	A. P.	22.3	28.6	——	1576	29
round, lean	E. P.	21.3	7.9	——	694	64
sirloin steak	E. P.	18.9	18.5	——	1099	41
	A. P.	16.5	16.1	——	960	48
Beets, cooked	E. P.	2.3	.1	7.4	180	252
Bluefish	E. P.	19.4	1.2	——	402	113
Bread, graham		8.9	1.8	52.1	1189	38
toasted		11.5	1.6	61.2	1385	33
white, homemade		9.1	1.6	53.3	1199	38
average		9.2	1.3	53.1	1182	38
whole wheat		9.7	.9	49.7	1113	41
Butter		1.0	85.0	——	3491	13
Cabbage	E. P.	1.6	.3	5.6	143	317
	A. P.	1.4	.2	4.8	121	376
Carrots, fresh	E. P.	1.1	.4	9.3	204	221
	A. P.	.9	.2	7.4	158	286
Celery	E. P.	1.1	.1	3.3	84	542
	A. P.	.9	.1	2.6	68	672
Cheese, American pale		28.8	35.9	.3	1990	23
Full cream		25.9	33.7	2.4	1890	24
Chicken, broilers	E. P.	21.5	2.5	——	493	92
	A. P.	12.8	1.4	——	289	157
Chocolate		12.9	48.7	30.3	2768	16
Cocoa		21.6	28.9	37.7	2258	20
Cod, dressed	A. P.	11.1	.2	——	209	217
Corn, green		2.8	1.2	19.0	455	102
Corn meal		9.2	1.9	75.4	1620	28
Crackers, butter	A. P.	9.6	10.1	71.6	1887	23
soda	A. P.	9.8	9.1	73.1	1875	24
water	A. P.	10.7	8.8	71.9	1855	24
Cream		2.5	18.5	4.5	883	50
Cucumbers	E. P.	.8	.2	3.1	79	575
	A. P.	.7	.2	2.6	68	666
Eggs, uncooked	E. P.	13.4	10.5	——	672	68
	A. P.	11.9	9.3	——	594	76
Farina		11.0	1.4	76.3	1640	28
Figs, dried		4.3	.3	74.2	1437	32
Flour, wheat, average						
high & med. grades		11.4	1.0	75.1	1610	28

Fowls	E. P.	19.3	16.3	——	1017	45
	A. P.	13.7	12.3	——	752	60
Gelatin		91.4	.1	——	1660	27
Grapes	E. P.	1.3	1.6	19.2	437	104
	A. P.	1.0	1.2	14.4	328	138
Haddock	E. P.	17.2	.3	——	324	140
	A. P.	8.4	.2	——	160	283
Ham, fresh, lean	E. P.	25.0	14.4	——	1042	44
	A. P.	24.8	14.2	——	1030	44
Hominy		8.3	.6	79.0	1609	28
Honey		.4	——	81.2	1481	31
Kumyss		2.8	2.1	5.4	234	194
Lamb, chops, broiled	E. P.	21.7	29.9	——	1614	28
leg, roast		19.7	12.7	——	876	52
Lemons	E. P.	1.0	.7	8.5	201	226
	A. P.	.7	.5	5.9	140	323
Lettuce	E. P.	1.2	.3	2.9	87	525
	A. P.	1.0	.2	2.5	72	633
Lobster, whole	E. P.	16.4	1.8	.4	379	120
	A. P.	5.9	.7	.2	139	326
Macaroni		13.4	.9	74.1	1625	28
Milk, condensed,						
sweetened		8.8	8.3	54.1	1480	31
skimmed		3.4	.3	5.1	167	273
whole		3.3	4.0	5.0	314	145
Mutton, fore quarter	E. P.	15.6	30.9	——	1543	29
	A. P.	12.3	24.5	——	1223	37
hind quarter	E. P.	16.7	28.1	——	1450	31
	A. P.	13.8	23.2	——	1197	38
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Olives, green	E. P.	1.1	27.6	11.6	1357	33
Onions, fresh	E. P.	1.6	.3	9.9	220	206
	A. P.	1.4	.3	8.9	199	228
Oranges	E. P.	.8	.2	11.6	233	195
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Oysters	E. P.	6.2	1.2	3.7	228	199
Pea soup, canned	A. P.	3.6	.7	7.6	232	196
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Peas, canned	A. P.	3.6	.2	9.8	252	180
green	E. P.	7.0	.5	16.9	454	100
Pies, apple		3.1	9.8	42.8	1233	37
squash		4.4	8.4	21.7	817	56
Potato chips	A. P.	6.8	39.8	46.7	2598	17
Potatoes, white, raw	E. P.	2.2	.1	18.4	378	120
	A. P.	1.8	.1	14.7	302	149
sweet, raw	E. P.	1.8	.7	27.4	558	81
	A. P.	1.4	.6	21.9	447	102
Prunes, dried	E. P.	2.1	——	73.3	1368	33
	A. P.	1.8	——	62.2	1160	39
Radishes	E. P.	1.3	.1	5.8	133	341
	A. P.	.9	.1	4.0	91	488
Raisins	E. P.	2.6	3.3	76.1	1562	29
Rice		8.0	.3	79.0	1591	29
Salmon, dressed	A. P.	13.8	8.1	——	582	78
Shad, whole	E. P.	18.8	9.5	——	727	61
	A. P.	9.4	4.8	——	367	127
Shredded wheat		10.5	1.4	77.9	1660	27
Spinach, fresh	A. P.	2.1	.3	3.2	109	417
Squash	E. P.	1.4	.5	9.0	209	217
	A. P.	.7	.2	4.5	103	443
Strawberries		1.0	.6	7.4	169	269

Succotash, canned		3.6	1.0	18.6	444	102
Sugar		——	——	100.0	1815	25
Tomatoes, fresh	A. P.	.9	.4	3.9	104	438
canned	A. P.	1.2	.2	4.0	103	443
Turkey	E. P.	21.1	22.9	——	1320	34
	A. P.	16.1	18.4	——	1042	43
Turnips	E. P.	1.3	.2	8.1	178	256
Veal, cutlet	E. P.	20.3	7.7	——	683	66
	A. P.	20.1	7.5	——	670	68
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FOOTNOTES:

[1] Teacher's Note.—The term "foodstuff" is used in place of "food principle," as being the later and better term.

[2] This is the "greater calorie" or "kilogram calorie," and is written Calorie to distinguish it from the "lesser calorie" or "gram calorie," largely used in physics and chemistry.

[3] Teacher's Note.—The machines operating with a crank are examples of the "wheel and axle," or the windlass, or both. The mechanical advantage can be worked out mathematically,—a good problem for the physics or mathematics class. See "Household Physics," C. J. Lynde.

[4] Teacher's Note.—A good way to study utensils is to begin with the school kitchen equipment. Utensils for the home kitchen can be listed in the notebook, as these are used in the school kitchen, having the list grow by degrees throughout the year. For reference, have a price list and illustrated catalogue from some good firm.

[5] *Laboratory management.*—In the school kitchen the dish-washing may be done at the sink by housekeepers appointed for the day, or if equipment allows, the work may be done in twos with some definite plan for dividing the work.

[6] These terms perpetuate the names of scientists famous for their work in electricity. Volta was an Italian who invented an electric battery; Ampere was a French electrician; and Watt a Scottish engineer and electrician.

[7] Teacher's Note.—The teacher of physics can coöperate here, and indeed throughout the whole topic of apparatus and cooking processes.

[8] Teacher's Note.—If a meter can be used, very exact problems can be worked out with gas and electricity.

[9] Teacher's Note.—These experiments may be performed as each food material is used. In this case a page should be kept in the notebook for the table of weights and measures, and each observation recorded as it is made. It may be that the perishable articles will not be on hand, except as they are used in order. The weighing and measuring should be dwelt on all through the course.

[10] Both these methods were taught by French cooks connected with well-known chocolate firms, and both give good results.

[11] "Cereal" is derived from the Latin word "cerealis," pertaining to Ceres, the Roman goddess of agriculture.

[12] The manufacture of flour is discussed in the chapter on bread making.

[13] U. S. Department of Agriculture, Farmers' Bulletin 389, p. 16.

[14] Several of the large firms manufacturing flour issue pamphlets descriptive of the whole process, to be mailed free on application.

[15] "Some Points in the Making and Judging of Bread," 1913. Isabel Bevier, Univ. of Ill. Bulletin No. 25.

[16] For Furnishing the Dining Room, see "Shelter and Clothing," p. 88.

[17] U. S. Department of Agriculture, Farmers' Bulletin 487.

[18] Contributed by Mary Swartz Rose, Ph.D., Assistant Professor, Department of Nutrition, Teachers College.

[19] Observations of the food eaten by individuals or groups of people are also called dietary studies, whether the observed dietary is such as to satisfy the food requirement or not.

[20] One quart of milk yields $6\frac{3}{4}$ portions.

[21] Rose, "Laboratory Handbook for Dietetics."

[22] The apportionment of the income to the different expenses of living (food, clothing, shelter, etc.) is discussed in Chapter XIX. It will be found that the smaller the income the higher is the percentage of it which must be allowed for food.

[23] Printed by permission of J. Wiley & Sons, publishers of "The Cost of Living," by Ellen Richards.

[24] Published by J. Wiley & Sons, publishers of "The Cost of Living," by Ellen Richards.

[25] From Chapin's "Standards of Living." By permission Russell Sage Foundation.

[26] Some of the widely advertised disinfectants are rather ineffective. Those interested should look up the tests of commercial disinfectants published from time to time by the United States Public Health Service.

[27] Depending upon the nature of the infection, it may be possible to substitute the use of a proper disinfectant, followed by short boiling.

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82	chocolate, and beat vigorously.{[10]}[]
141	these {deficiences}[deficiencies] should be reported
170	foundation for all {bon bons}[bonbons]
203	1 cake dissolved in $1/4$ cup {luke warm}[lukewarm] water
209	wild animals of {herbiverous}[herbivorous] habits
216	{}[Left:]Chuck rib roast, 9th and 10th ribs. {}[Right:]
216	{}[Left:]1st cut prime rib roast. {}[Right:]2d cut
336	{Total expenditure for year}[Totals]

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