SCHOOL
AND
HOME
COOKING

GREER

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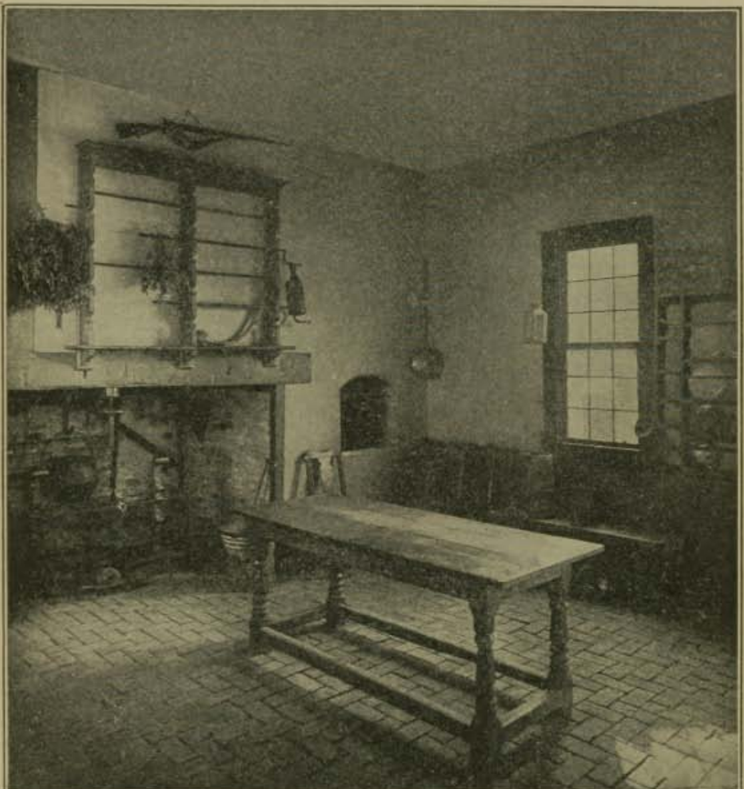

By permission of *Harrison H. Dodge, Superintendent.*

A corner of Washington's kitchen at Mount Vernon.

SCHOOL AND HOME COOKING

BY

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CLEVELAND, OHIO

REVISED EDITION

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PREFACE

School and Home Cooking is a text which can be placed in the hands of the pupils and used by them as a guide both in the school and home. Its use eliminates note-taking (which in reality is dictation) and thus saves much time.

The *psychological* method of education, which treats first of material within the experience of the beginner and with that as a basis develops new material to meet the needs of the pupil, was kept in mind in preparing this text. Although the grouping of foods rich in each foodstuff may be considered a logical arrangement, the method of arrangement of the content of each division and the method of approach of each lesson is psychological. The manipulative processes and kinds of dishes are sufficiently varied to arouse and sustain the interest of a pupil.

Experience with pupils in the classroom shows that their interest in any subject cannot be awakened by using a list or classification involving technical terms in introducing the subject. For this reason a classification of the foodstuffs is not placed at the beginning of the text; they are classified after each is considered.

At the close of each division of the text there is placed a group of lessons called *Related Work,* which includes table service lessons, home projects, and meal cooking. *Table service* lessons are introduced in this way to emphasize the fact that a complete meal should be prepared before all types of foods are studied and manipulative processes are performed. The *cost* and *food value* of meals are considered in conjunction with their preparation. Wise *selection* and thrifty *buying* of foods are also treated in these lessons.

Home projects which progressive teachers have found effective in making home economics function in the home — one of the goals to be attained in democratic education — contain suggestive material which may be adapted to the particular needs of the pupils in their homes.

An adaptation of the "meal method," *i.e.*, *meal cooking*, is used both for the purpose of reviewing processes of cooking, and also for gaining skill and speed in the preparation of several foods at the same time.

Experiments regarding food preparation and composition and processes of digestion are found in this book. Special care has been taken to state these experiments in terms within the understanding of the pupil and to intersperse definite questions so that a pupil can follow directions, make observations, and draw helpful deductions.

The *recipes* have been adapted from various sources. Where it is possible, without a sacrifice of flavor or food value, the least expensive food materials are used. The more expensive materials are used as sparingly as possible. Definite and practical methods of preparing foods follow the list of ingredients. The recipes have proved satisfactory in the home kitchen.

Special thanks are due to Mrs. Mary Swartz Rose, Assistant Professor of Nutrition, Teachers College, Columbia University, for criticizing portions of the text regarding dietetics; to Miss S. Gertrude Hadlow, Head of the Department of English, Longwood High School of Commerce, Cleveland, for valuable suggestions of material formerly prepared which aided in the preparation of this work; to Mrs. Jessie M. Osgood for painstaking reading of the manuscript; and to the following for the use of illustrative ma-

terial: The Macmillan Company, D. Appleton and Company, William Wood and Company, *The Journal of the American Medical Association*, *The Journal of Home Economics*, and the United States Department of Agriculture.

Cleveland,
July, 1920.

PREFACE TO THE REVISED EDITION

During the War the canning of non-acid vegetables in the ordinary water bath was advocated in various official pamphlets. Several years after the War careful investigation showed that, in districts where bacillus botulinus existed, it was unsafe to can non-acid vegetables in a water bath whose temperature did not exceed 212 degrees F. Authoritative bacteriologists interested in canning now advocate the canning of fruits and tomatoes only, in the ordinary water bath. The pressure cooker should be used for the home-canning of non-acid vegetables. In this edition of School and Home Cooking, material regarding home-canning has been revised to conform with the foregoing ideas.

With the more general use of a portable oven thermometer or of a thermostatic device for controlling the heat of the oven, exact baking temperatures are useful additions to recipes for baked foods. This new edition of School and Home Cooking contains not only directions for testing the heat of the oven without a thermometer or other device, but also exact baking temperatures.

Much scientific research work is being done constantly on the subject of vitamines. Material regarding vitamines, in this edition of School and Home Cooking, has been revised so as to embody the results of the most recent investigations.

Cleveland,
April, 1925.

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FOREWORD

One of the slogans of the World War, — "Food will win the War," — showed that food was much more important than many persons had believed. It confirmed the fact that food was not merely something that tastes good, or relieves the sensation of hunger, but that it was a vital factor in achieving one of the noblest ideals of all time.

The subject of food is a broad one, — one that is growing in interest. Many present-day scientists are finding a life-work in food study. "Tell me what you eat and I will tell you what you are," was spoken many years ago. The most recent work in science confirms the fact that the kind of food an individual eats has much to do with his health and his ability to work. If you would be well, strong, happy, and full of vim choose your food carefully.

A study of food means a knowledge of many things. Before purchasing foods one should know what foods to *select* at market, whence they come, how they are prepared for market, by what means they are transported, and how they are taken care of in the market. There is a great variety of foods in the present-day market; some are rich in nutrients; others contain little nourishment, yet are high in price. It has been said that for food most persons spend the largest part of their incomes; it is a pity if they buy sickness instead of health. Whether foods are purchased at the lunch counter or at market, it is necessary to know what foods to choose to meet best the needs of the body.

Meal planning is an important factor of food study. The matter of *combining* foods that are varied in composition or that supplement one another in nutritious properties deserves much consideration. Not only nutriment but flavor enters into food combination. It is most important to combine foods that "taste well."

In learning to *prepare* foods, the experience of those who have cooked foods successfully is most helpful. Hence the pupil is told to follow directions for cooking a type of food or to use a recipe. Following a direction or recipe in a mechanical way, however, does not result in rapid progress. Keen observation and mental alertness are needed if you would become skilful in food preparation.

One class of food or one principle of cooking may be *related* to another or *associated* with another. For example, the method of cooking a typical breakfast cereal may be applied to cereals in general. There may be some exceptions to the rule, but when the basic principle of cooking is kept in mind, the variations can be readily made. If a pupil has learned to prepare Creamed Potatoes she should be able to apply the principle to the cooking of Potato Soup. In making chocolate beverage, the pupil learns to blend chocolate with other ingredients. The knowledge gained in making chocolate beverage should be applied to the flavoring of a cake or of a dessert with chocolate. In all the thousands of recipes appearing in cook books, only a few principles of cooking are involved. The pupil who appreciates this fact becomes a much more resourceful worker and acquires skill in a much shorter time.

The *results* of every process should be observed. Careful observations should be made when work is not successful. There is no such thing as "good luck" in cooking. There is a cause for every failure. The cause of the failure should be found and the remedy ascertained. The same mistake should never be made a second time. Progress is sure to result from such an attitude towards work. Moreover, confidence in the result of one's work is gained. This is of incalculable value, besides being a great satisfaction, to the home-keeper.

A dining table with carefully laid covers is always inviting. Graceful *serving* of food at such a table is an art. The ability to serve food in an attractive way is an accomplishment that no girl should fail to acquire.

Considerations regarding success in learning to cook may be summed up as follows:

(*a*) Know what foods to select from the standpoint of economy, nutriment, and flavor.

(*b*) Observe and think when working. Relate or associate one class of foods with another and one principle of cooking with another.

(*c*) Note the results of your work; know why the results are successful or why they are unsuccessful.

Food selection, food combination, and food preparation are all important factors of good cooking. It is to be hoped that the pupil will realize that the study of food and cooking means the ability not only to boil, broil, and bake, but to select, combine, use, and serve food properly. All this demands much earnest thought and effort.

SCHOOL AND HOME COOKING

DIVISION ONE

INTRODUCTION

LESSON I

Baked Apples — Dish-washing

BAKED APPLES (Stuffed with Raisins)

6 apples	6 tablespoonfuls brown sugar
Seeded raisins	6 tablespoonfuls water

Wash the apples; with an apple corer or paring knife, remove the core from each. Place the apples in a granite, earthenware, or glass baking-dish. Wash a few raisins and place 6 of them and 1 level tablespoonful of sugar in each core. Pour the water around the apples.

Bake in a hot oven until tender. Test the apples for sufficient baking with a fork, skewer, or knitting needle (see Figure 1). During baking, occasionally "baste" the apples, *i.e.* take spoonfuls of the water from around the apples and pour it on the top of them. The time for baking apples varies with the kind of apple and the temperature of the oven. From 20 to 40 minutes at 400° F. is usually required.

Dish-washing and Efficiency. — There is almost invariably a waste of effort in both the washing and the drying of dishes. This may be due to:

(*a*) Poorly arranged dish-washing equipments.

(*b*) Inadequate utensils for dish-washing.

(*c*) Lack of forethought in preparing the dishes for washing and too many motions in washing and drying them.

Since dish-washing is one of the constant duties of housekeeping, efficiency methods, *i.e.* methods which accomplish satisfactory results with the fewest motions and in the least time, should be applied to it. The washing of dishes, invariably considered commonplace, may become an interesting problem if it is made a matter of motion study.

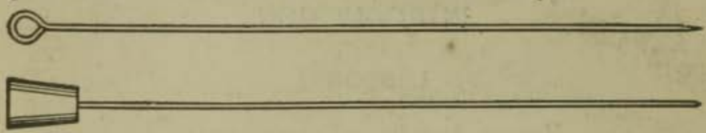


FIGURE 1. — SKEWER AND KNITTING NEEDLE FOR TESTING FOODS.
Note that the knitting needle has one end thrust into a cork, which serves as a handle.

For thorough and rapid dish-washing, the following equipment is desirable:

A sink placed at a height that admits of an erect position while washing dishes,[1] and equipped with two draining boards, one on each side of the sink, or with one draining board on the left side; dish and draining pans; dish-drainer (see Figures 4 and 5); dish-rack (see Figures 6 and 7); dish-mop (see Figure 3); wire dish-cloth or pot-scraper (see Figure 3); dish-cloths (not rags); dish-towels; rack for drying cloths and towels; soap-holder (see Figure 3) or can of powdered soap; can of scouring soap and a large cork for scouring; tissue paper or newspapers cut in convenient size for use; scrubbing-brush; bottle-brush (see Figure 3); rack made of slats for drying brushes (see Figure 2).

Preparing Dishes for Washing. — If possible, as soon as *serving dishes, i.e.* dishes used at the dining table, are soiled,

[1] In case it is necessary for one to wash dishes at a sink which is placed too low, the dish-pan may be raised by placing it on an inverted pan or on a sink-rack, which may be purchased for this purpose.

scrape away bits of food from them. The scraping may be done with: (*a*) a piece of soft paper, (*b*) plate-scraper (see Figure 3), (*c*) a knife or spoon. The latter is doubtless the most commonly used for dish scraping, but it is less efficient

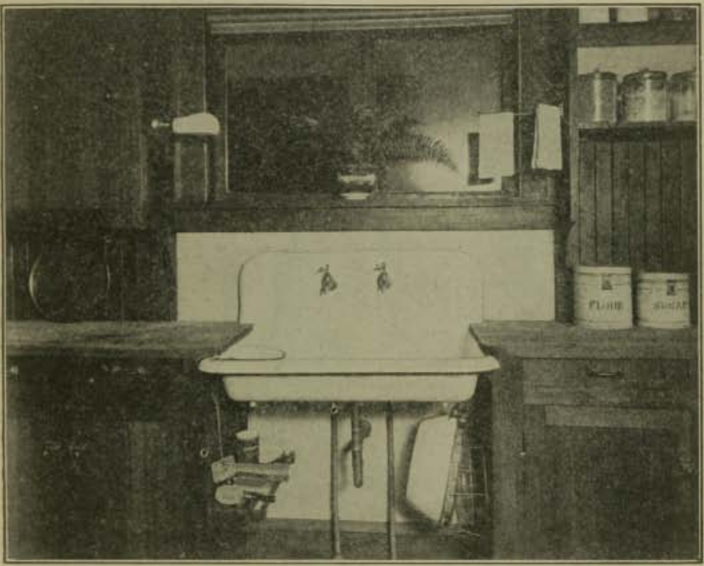


FIGURE 2.—A SINK ARRANGED FOR EFFICIENCY IN DISH-WASHING.

Note the draining board on each side of the sink, the dish-cupboard in the upper left corner, and the rack for drying brushes below the sink.

and may scratch china. If it is impossible to wash dishes soon after soiling, let them soak in water until they can be washed.

Cooking utensils need special care before washing, especially if they have held greasy foods. "Oil and water do not mix!" The grease from dish-water often collects in the drain-pipe and prevents or retards the drainage of waste water. This often means expensive plumber's bills and great inconvenience. Bear in mind the following cautions: Before putting a utensil which has held fat into the dish-water, always wipe it carefully with a piece of paper. After wiping most of the grease from a pan or kettle, the remaining fat can be entirely removed by filling the utensil

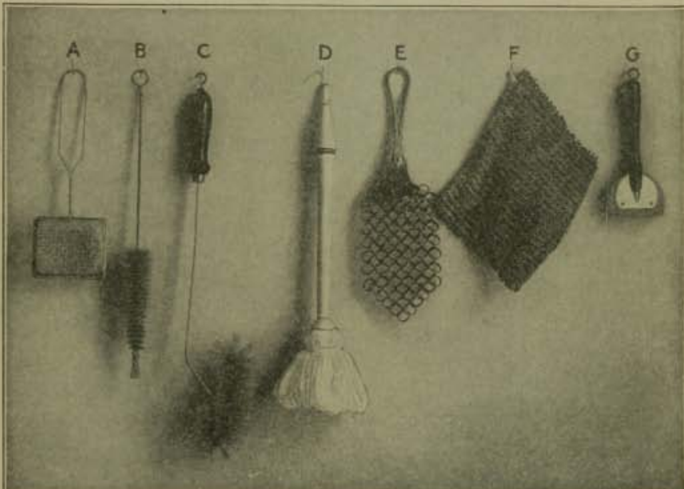


FIGURE 3. — UTENSILS FOR DISH-WASHING.

A, soap-holder; B, C, bottle-brushes; D, dish-mop; E, F, wire dish-cloths; G, plate-scraper.

with hot water and then adding washing-soda. Boil the solution a few minutes. Fat and washing-soda react and form soap; hence the effectiveness of this method. (See Experiment 34, p. 135.) (This method should not be applied to aluminum utensils; washing-soda or any alkaline substance makes a dark stain on aluminum.)

Utensils used in cooking can generally be washed with greater efficiency if they are soaked before washing. Fill each dish or pan with water, using cold water for all utensils which have held milk, cream, eggs, flour, or starch, and hot water for all dishes having contained sugar or sirup.

Arranging Dishes. — Arrange dishes and all the requisite dish-washing utensils in convenient order for washing, placing all of one kind of dishes together. Also place the dishes to be washed at the *right* of the dish-pan. Wash them and place the washed dishes at the *left* of the pan. A dish-washer invariably holds a dish that is being washed in her left hand and the dish-cloth or mop in her right hand. That there may be no unnecessary motions, the dishes should be placed to drain after washing at the left of the dish-pan. In this way there is no crossing of the left hand over the right arm as there would be if the washed dishes were placed at the right of the dish-pan. A cupboard located above the draining board at the left makes the storing of dishes an efficient process (see Figure 2).

Washing and Scouring Dishes and Utensils. — Fill the dish-pan about two thirds full of hot water. "Soap" the water before placing the dishes in the pan; use soap-powder, a soap-holder, or a bar of soap. If the latter is used, do not allow it to remain in the water. Fill another pan about two thirds full of hot water for rinsing the dishes. A wire basket may be placed in the rinsing pan.

Place the dishes, a few at a time, in the dish-pan. Wash the cleanest dishes first, usually in the following order: glasses, silverware, cups, saucers, plates, large dishes, platters, cooking utensils, then the soap-dish and dish-pan. In washing decorated china, use soap sparingly. Do not wash glassware in very hot water. Use slices of potato, finely torn bits of blotting paper, or egg shells to clean the inside of water bottles or vinegar cruets. Wooden-handled utensils or the cogs of the Dover egg beater should not soak in water.

If the cogs of the egg beater are soiled, wipe them with a damp cloth. Change the dish-water occasionally, not allowing it to become cold or greasy.

Wash steel knives and forks and place them without rinsing on a tin pan to scour. With a cork apply powdered bath brick or other scouring material to the steel. Again wash the scoured utensils, rinse, and dry.

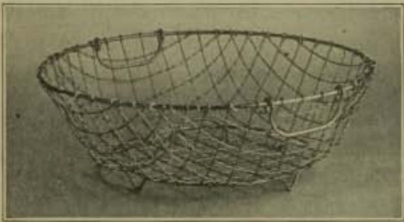


Figure 4. — Dish-drainer.

If there are any stains on tin, iron, or enamel ware, remove with scouring soap. Apply the latter with a cork, or wring out the dish-cloth as dry as possible, rub scouring soap on it, and apply to the utensils. Scrub meat, pastry, or bread boards, wooden rolling pins, and wooden table tops

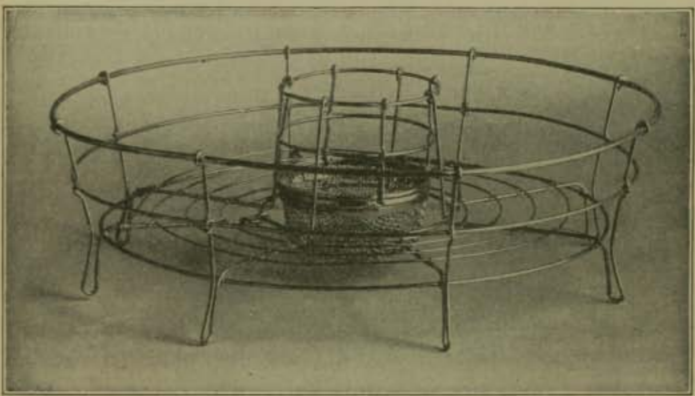


Figure 5. — Dish-drainer.

with cold water and scouring soap. Then rinse and wipe the scoured wood with a cloth which is free from grease. If it is not necessary to scrub meat, pastry, or bread boards on both sides, they should be rinsed on the clean side to prevent warping.

Rinsing and Draining Dishes. — Place the washed dishes in wire baskets (see Figures 4 and 5) or in dish-racks (see Figures 6, 7, and 8). If the former has been placed in the rinsing pan, the basket may be lifted out of the water to drain the dishes. In case the washed dishes are placed in dish-racks, rinse them by pouring hot water over them and let them drain again.

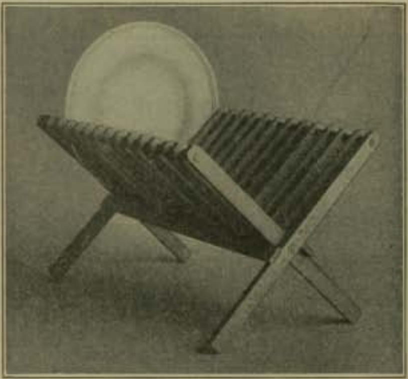


FIGURE 6. — DISH-RACK.

Drying Dishes and Utensils. — If such dishes as plates, platters, and saucers are placed upright to drain and are rinsed with very hot water, no towel-drying is required. Glassware and silver should be dried with a soft towel. Towels made from flour sacks or from glass toweling are good for this purpose.

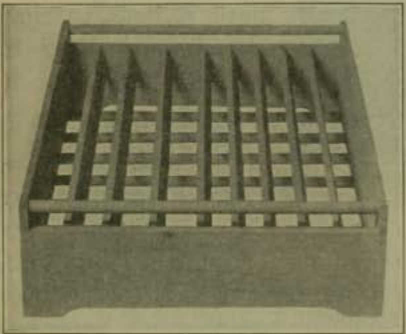
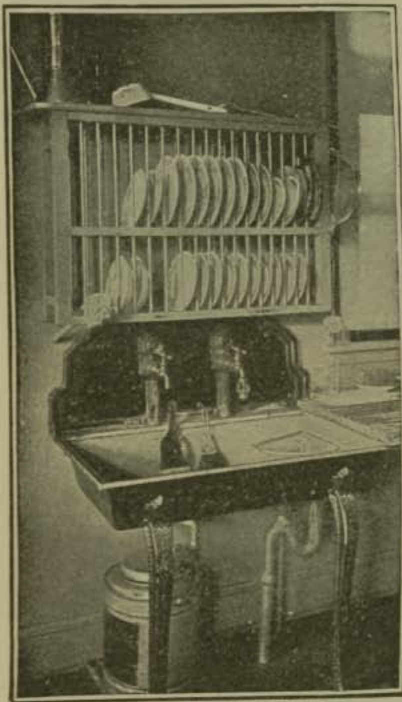


FIGURE 7. — DISH-RACK.

Coarser towels may be used to dry cooking utensils. To prevent rusting, dry tin, iron, and steel utensils most thoroughly. After using a towel on these wares it is well to place them on the back of the range or in the warming oven. Woodenware should be allowed to dry thoroughly in the open air. Stand boards on end until dry.

Care of Dish-towels and Cloths. — Use dish-towels and cloths for no other purpose than washing and drying dishes. It is a matter of much importance to keep dish-towels and cloths clean. To clean the towels and cloths soak them in cold water. Then wash in hot soapy water and rinse them well. Wring, stretch, and hang to dry on a rack, or preferably in the sun. At least once a week boil the towels. First soak, wash, and rinse them as directed above. Then place them in cold water and heat the water until it boils. Wring, stretch, and hang to dry.



From *Home Furnishing*, by Alice M. Kellogg.

FIGURE 8. — A RACK FOR DRYING DISHES.

Care of the Sink. — If the sink is of porcelain or enamel, it may be cleaned with soap, but not with scouring soap or powder. The latter wears away the smooth finish, makes it slightly rough and hence more difficult to clean. Before applying soap to a sink, wring out the cloth used in cleaning it as dry as possible and then with the hand push any water standing in the sink down the drain-pipe. Then apply soap to the cloth and wash the sink. *Do not let the water run from the faucet while cleaning the sink.* If the dirt and grease on a sink do not yield to soap, apply a small quantity of kerosene. After cleaning, rinse the sink by opening the hot-water faucet, letting a generous supply of water flow down the drain-pipe so as to rinse the trap.

The drain-pipe and trap of a sink need special cleaning occasionally. This is often done by pouring a solution of washing-soda down the drain. If this is used, special care should be taken to rinse the drain with much hot water. As previously explained, grease and washing-soda form soap. If the latter is allowed to remain in the trap, it may harden and stop the drain-pipe. Because of the formation of soap and the possible stoppage of the drain-pipe when washing-soda is used, kerosene is advised. To use this, first flush the drain with about half a gallon of hot water. Immediately pour in one half cupful of kerosene. Let the kerosene remain in the trap for at least 5 minutes. Then rinse with another half gallon of water. Kerosene emulsifies grease and makes it easy to rinse away.

Suggestions for Personal Neatness in the School Kitchen and at Home. — For both comfort and cleanliness a washable gown should be worn in the kitchen or the gown should be well covered by an apron. It is advisable to cover the hair with a hair net or cap. Rings are an inconvenience when worn in the kitchen. The hands should be washed *before* preparing or cooking food, and *after* touching the hair or handkerchief. It is desirable to have a hand towel conveniently placed.

Clean cooking means *clean tasting.* This can be done by taking some of the food with the cooking spoon and then pouring it from the cooking spoon into a teaspoon. Taste from the teaspoon.

QUESTIONS

Are apples sold by weight or by measure, *i.e.* by the pound or peck?

What is the price per pound or per peck of apples?

Why should dishes which have held milk, cream, egg, flour, or starch be rinsed with *cold* water?

Why should dishes having contained sugar or sirup be soaked in *hot* water?

Why should greasy dishes and utensils be wiped with paper and then rinsed with hot water before washing?

Why should not a bar of soap "soak" in dish-water?

Why not *fill* the dish-pan with soiled dishes?

Why should glass be washed in warm (not hot) water?

Why should not wooden-handled utensils and the cogs of the Dover egg beater "soak" in dish-water?

Why should glass and silver be wiped with a soft towel?

Why should tin, iron, and steel utensils be dried most thoroughly?

Why should woodenware be allowed to dry in the open air? (See Experiment 87, p. 476.)

Why should dish-towels be placed in boiling water during laundering?

Why should scouring soap or powder not be used in cleaning a porcelain or enamel sink?

What is the purpose of wringing out dry a sink-cloth and letting no water run from the faucet while cleaning a sink?

LESSON II

Measurements — Stuffed and Scalloped Tomatoes

Experiment 1[1]**: Measurement Equivalents.** — In measuring solid materials with teaspoon, tablespoon, or standard measuring cup (see Figure 9), fill the measuring utensil with the material and then "level" it with a knife.

Use both water and flour or sugar for the following measurements:

[1] The pupil should record each experiment in a notebook in a methodical way, giving (*a*) the aim of the experiment, (*b*) the process, (*c*) the result, and (*d*) the conclusion or practical application.

(*a*) Find the number of teaspoonfuls in one tablespoonful.

(*b*) Find the number of tablespoonfuls in one cup.

(*c*) Find the number of cupfuls in one pint.

Half a spoonful is obtained by dividing through the middle lengthwise.

A quarter of a spoonful is obtained by dividing a half crosswise.

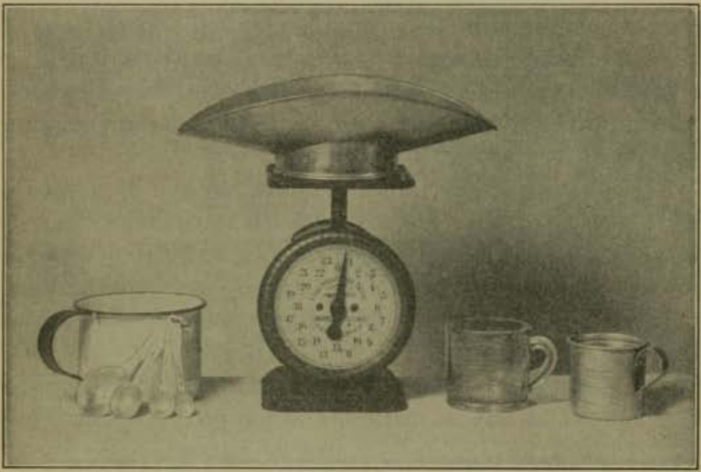


FIGURE 9. — UTENSILS FOR MEASURING AND WEIGHING FOODS.

An eighth of a spoonful is obtained by dividing a quarter diagonally.

A third of a spoonful is obtained by dividing twice crosswise.

A set of measuring spoons (see Figure 9) is most convenient for measuring fractional teaspoonfuls.

Need of Accuracy. — When learning to cook, it is necessary to measure all ingredients with exactness. Experienced cooks can measure some ingredients for certain purposes quite satisfactorily "by eye." The result is satisfactory, however, only when the cook has established her own standards of measurements by much practice. Even then many housewives are not *sure* of success. For certain foods the ingredients should always be measured accurately, no matter how skilful the cook. As far as possible, the exact quantity of a recipe is given in this text. When the quantity of an ingredient is too small for practical measurement, merely the name of the ingredient is given and no definite quantity indicated. When large quantities of materials are to be measured, a quart measure on which the pint and half pint quantities are indicated usually proves more convenient than a measuring cup. Many foods, especially fats, are more conveniently weighed than measured. Kitchen scales are a useful equipment for cooking (see Figure 9).

The amateur should, however, train her eye to approximate measurements. She should learn to estimate the size of saucepans and other cooking utensils, and also of serving dishes. Measure by cupfuls the capacity of several utensils in constant use and thus establish a few standards of measurement.

Also it is well to be on the alert to learn the proper quantity of food to buy at market, and the proper quantity of food to cook for a stated number of persons. She would make a sad failure who would prepare just enough rice to serve four persons when six were to be seated at the table. She might be able to cook the cereal well and to tell many interesting facts concerning its growth, composition, and preparation, yet for the lack of a little homely knowledge the meal would be disappointing. A thrifty housekeeper would not buy enough lettuce or spinach for ten people when there were only six to be served. In the school kitchen always note the quantity of the materials used, and then observe the quantity of the finished product.

Experiment 2: Use of the Wooden Spoon. — Place a tin and a wooden spoon in a saucepan of boiling water. After the water has boiled for at least 5 minutes grasp the handles of the spoons. Which is the hotter? Which would be the more comfortable to use when stirring hot foods? What kind of spoon — tin or wood — should be used for acid foods? Why? (See *Suggestions for Cooking Fruits*, p. 65.)

Explain why it is that the handles of teakettles, knobs on covers for saucepans, etc., are of wood.

STUFFED TOMATOES [1]

6 ripe tomatoes	Dash pepper
2 cupfuls soft bread crumbs	$\frac{3}{4}$ teaspoonful mixed herbs
$1\frac{1}{2}$ teaspoonfuls salt	2 tablespoonfuls butter or substitute

Wash the tomatoes, remove a slice from the tops, and take out most of the seed portion. Add the seasoning to the bread crumbs, melt the fat, then add the seasoned bread crumbs to the fat. Fill the tomatoes with the prepared crumbs, place them in an oiled baking-pan, and bake at 400° F. for about 30 minutes or until the tomatoes are soft but not broken, and the crumbs brown. Test the tomatoes with a knitting needle or skewer (see Figure 1) rather than with a fork.

For mixed herbs use equal parts of marjoram, savory, and thyme.

Soft bread crumbs are prepared from stale bread, *i.e.* bread that has been out of the oven for at least twenty-four hours.

Vegetables, such as corn and canned peas, may be used instead of bread crumbs to stuff tomatoes. Use salt, pepper, and butter with these vegetables.

Use a granite, glass, or earthenware utensil for cooking tomatoes. (See *Suggestions for Cooking Fruits*, p. 65.)

SCALLOPED TOMATOES [1]

1 can or 1 quart tomatoes	Dash pepper
1 tablespoonful salt	3 cupfuls bread crumbs

3 tablespoonfuls butter or substitute

[1] Note to the Teacher. — Recipes for both fresh and canned vegetables are given so that a selection depending upon the season can be made.

If fresh tomatoes are used, plunge them into boiling water, then drain and peel and cut into pieces.

Mix the salt and pepper with the tomatoes and pour into a buttered baking-dish. Cover with buttered crumbs (see Stuffed Tomatoes, p. 17) and bake at 400° F., 30 to 40 minutes. Cover during first part of baking to prevent the crumbs from browning too rapidly. Serve hot. A scalloped dish should be served from the dish in which it is baked.

Green tomatoes may be scalloped in the same manner as ripe tomatoes.

Soft or dried bread crumbs (see p. 176) may be used in scalloping tomatoes. Use only 1 cupful of the dried crumbs.

To Grease or Oil a Pan or Baking-dish. — Heat slightly the pan or dish to be oiled. Put a bit of fat on a small piece of clean paper. Then rub the heated pan or dish with the paper. This is a most satisfactory method because little fat is required and the utensils used for oiling do not have to be cleaned. Often a spoon or cup that has contained fat may be wiped with a piece of paper and the latter used for greasing a pan. It is well for a housekeeper to have a boxful of pieces of paper in the kitchen for this purpose. Some authorities consider a pastry brush a satisfactory means of applying melted butter for oiling. Much fat, however, clings to the bristles of the brush and the brush needs frequent and careful cleaning.

Butter, oleomargarine, lard, vegetable fats, or oils may be used for oiling pans or baking-dishes.

QUESTIONS

In stuffed tomatoes, note that the seasonings are added to the crumbs before they are buttered. Why?

Why test the tomatoes with a knitting needle or skewer rather than with a fork?

What kind of baking-pan — tin, granite, or earthenware — is best to use for Stuffed or Scalloped Tomatoes? Why? (See *Suggestions for Cooking Fruits*, p. 65.)

Are tomatoes sold by weight or by measure, *i.e.* by the pound or peck?

What is the price of tomatoes per pound or peck?

How many slices of bread are required to make 2 cupfuls of crumbs? How many slices in one loaf of bread?

LESSON III

FUELS AND COMBUSTION — SAUTÉD AND BAKED SQUASH

Fuel. — In order to cook foods, heat in some form must be applied. This heat is obtained usually by burning some substance. Thus the first requisite for obtaining heat is something to burn, *i.e.* a fuel. The fuels commonly used in households are, — wood, coal, kerosene, and gas. Although electricity is not a fuel, its use in cooking is so well established that it should be mentioned as a source of heat.

Heat; Kindling Temperature. — There are fuel substances everywhere, — paper, cloth, wood, etc. These materials do not burn unless heated; even gas does not burn by simply turning on the stopcock. But if a piece of paper is placed in contact with glowing iron, the paper burns. It burns because it is heated. If the blazing paper is placed in contact with kindling wood and coal, the kindling wood soon begins to burn because it is heated by the burning paper. The coal burns when it is heated by the burning wood. All fuels must be heated before they will burn.

When one thinks of the ease with which paper "catches fire" and of the difficulty of making hard coal burn, it becomes evident that some substances require only a small amount of heat before they will burn, while others require much heat. Different materials, then, require different degrees of heat to burn. The phosphorus and other substances on the tip of a match ignite readily. The heat that is developed by rubbing the tip over some surface is sufficient to make the phosphorus burn. The burning phosphorus and other substances heat the match stick to the temperature at which it begins to burn; the burning match stick applied to paper heats the latter to the temperature at which it burns. The temperature to which a substance must be heated in order to burn and continue to burn is called the *kindling temperature* of that substance.

Draft; Oxygen. —

Experiment 3: Lack of Draft. — (*a*) Place a short candle on a pan. Light the candle and put a tall slender lamp chimney over it. Does the candle continue to burn? Why?

(*b*) Again light the candle and replace the chimney, but this time support it on two sticks of wood or on the handles of a knife and fork so that it will not rest directly on the pan. Place a saucer or a piece of cardboard over the top of the chimney. Does the candle continue to burn? Why?

Experiment 4: Presence of Draft. — Remove the cover from the top of the chimney, and again light the candle. Does it continue to burn? What substance necessary for combustion is present in the chimney? Explain why the candle soon went out in Experiment 3, but continued to burn in this experiment.

If a blanket is thrown upon a burning stick of wood, the wood soon ceases to burn. The wood stops burning because the oxygen of the air is excluded from it. *The act of burning,* i.e. *combustion, is the union of any substance with oxygen, with the result that heat and light are produced.* We have learned that a fuel cannot unite with oxygen until heated to a certain temperature. And, no matter how hot it is, the fuel will not burn unless it unites with oxygen. Oxygen, then, is the third requisite for combustion.

The necessity for a draft, *i.e.* a continuous supply of fresh air which furnishes oxygen, is shown by Experiments 3 and 4.

SAUTÉD[1] SUMMER SQUASH[2]

Wash summer squash. Cut it in slices $\frac{3}{4}$ inch thick. (Do not remove the skin or the seeds.) Dip each slice in flour. In a frying pan put some fat and heat it. Add the squash and cook each slice on both sides until golden brown in color. Sprinkle with salt and pepper. Then place a cover over the frying pan and continue to cook the squash until it is tender. Serve at once.

BAKED WINTER SQUASH[2]

Wash a squash and cut or split it into pieces of suitable size for serving. Remove the seeds from each piece and make several gashes (at right angles to one another) cutting through the pulp down to the shell. Place the pieces (shell down) on the grating in the oven and bake in a hot oven (500° F.) for 1 hour or until the pulp is tender. Serve hot, with butter, salt, and pepper.

QUESTIONS

Name the three requisites for combustion.

Which has the higher kindling temperature, wood or coal? Explain your answer.

What is the price of summer and of winter squash? How much of each kind of squash is required to serve 6 persons?

[1] To sauté is to brown in a small quantity of fat (see p. 140).

[2] See "Note to Teacher," p. 17.

LESSON IV

Coal Ranges[1] — Corn Dishes

Examination of a Coal Range. — Remove the lids from the coal range. Note the location of the fire box. What is its purpose? How is the floor of the fire box constructed? Where is the check damper? What is its purpose? Where is the ash pan? Where is the front damper? What is its purpose? Note the place where the stovepipe joins the range. What is the purpose of the stovepipe? Note the damper in the stovepipe. What is its purpose? Note the location of the oven. By what is the oven surrounded? Find the oven damper. Open it. In what direction do the hot gases pass out when the oven damper is open? What part of the range is heated when the oven damper is open?

An open damper permits a direct draft to pass through the range (see Figure 10).

Close the oven damper. Trace the direction of the hot gases when the damper is closed. What parts of the range are heated when the oven damper is closed?

A closed oven damper permits an indirect draft to pass through the range (see Figure 11).

How should the front, oven, check, and chimney dampers be arranged when the fire is kindled?

Products of Combustion. — What is found deposited on the inside of the stovepipe of a coal range? To what is the upper end of the stovepipe joined? What does one often see coming from the top of a chimney?

[1] Note to the Teacher. — The principles of building a coal fire and of regulating dampers may be applied to furnaces and heating stoves as well as to kitchen ranges. In case there are no cooking or heating stoves or furnaces in which coal is burned in the homes of the pupils, this lesson may be omitted.

In the previous lesson it was found that when a material burned, it united with oxygen. It is a matter of common observation that when all solid fuels — coal, wood, paper — burn, they decrease in size, and that fuel gas is consumed. Apparently only a few ashes remain when solid fuels have

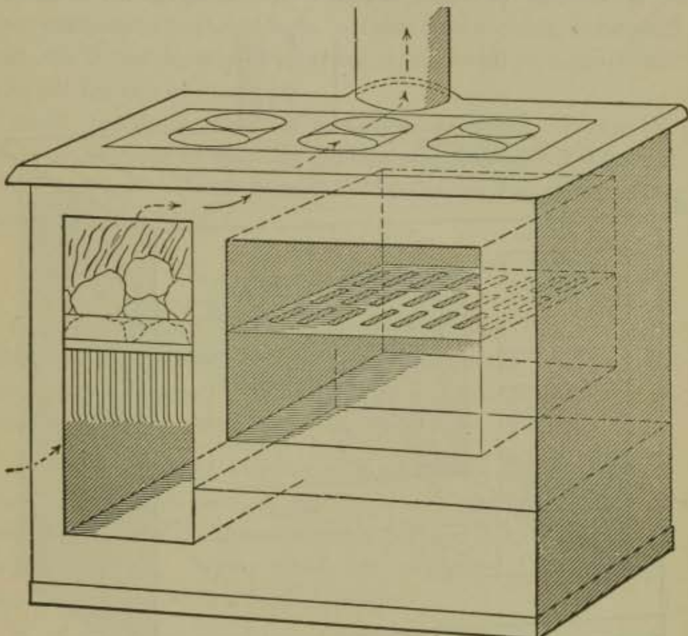


FIGURE 10. — COAL RANGE SHOWING COURSE OF DIRECT DRAFT.

been burned, and only a disagreeable odor remains when gas has been burned. Yet soot is deposited in the stovepipe and smoke issues from the chimney. Both solid and gaseous materials, such as ashes, soot, and smoke, are formed when fuels burn. Such materials are called *products of combustion.*

Fire Building in a Coal Range. — It is necessary to have the fire box, ash pan, and other parts of the stove clean before building a fire. After cleaning, place a generous layer of loosely crumpled paper over the bottom of the fire box, then about four layers of kindling wood, placed so that there are air passages between the pieces, and on top of the wood put two shovelfuls of coal. Regulate the dampers for a direct

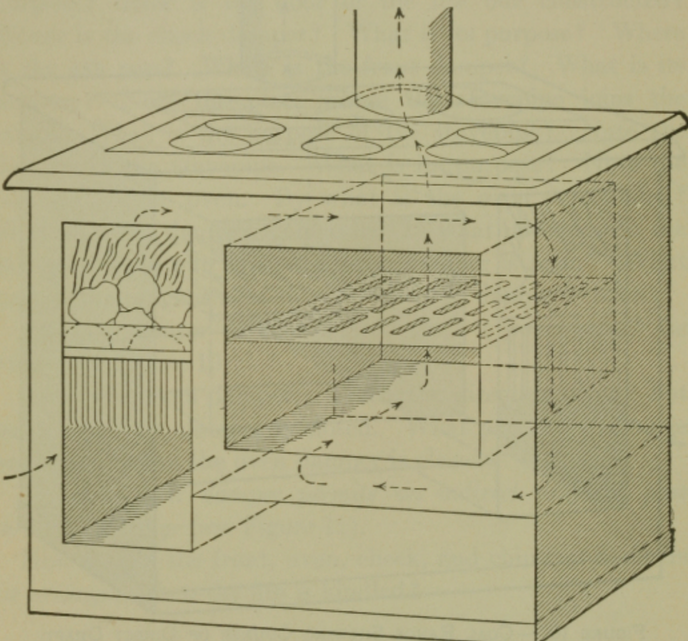


FIGURE 11.—COAL RANGE SHOWING COURSE OF INDIRECT DRAFT.

draft, replace the stove-lids, and brush the surface of the stove.

Before lighting the fuels, polish the range in the following manner:

To the nickel of the stove apply whiting and ammonia or any satisfactory metal cleanser.

To the iron of the stove apply oil rather than "blacking." Light paraffin oil may be used for this purpose. Apply the oil with cotton waste, or a soft cloth. (Care should be taken not to apply an excess of oil.) Polish with soft cotton or woolen cloth. One should remember, however, that oil must be used with caution. *It should never be applied to a stove containing burning fuels.* If the stove cloth, saturated with oil, is not destroyed after using, it is well to keep it in a covered tin can or stone jar.

After polishing the stove, light the fuels. When the wood is reduced to glowing embers and the coal is burning, add more coal. If this burns well, change the dampers to make an indirect draft.

GREEN CORN

In selecting corn for cooking, choose those ears that are filled with well-developed kernels, from which milky juice flows when pressed with the thumb. Cook as soon as possible after gathering.

To boil green corn remove silk and husk from the corn, place the ears in boiling water. Cook the corn until no juice flows from the kernels when pressed (usually from 12 to 20 minutes). Serve whole on a platter. The platter may be covered with a folded napkin.

To bake green corn select 6 ears. Remove the corn from the cob as follows: Cut through the center of each row of grains, slice off the tops of the kernels, and then scrape the pulp thoroughly from the cob. Put in a baking-dish, add:

¾ cupful milk	1 teaspoonful salt
1 tablespoonful butter or substitute	Pepper

Bake in a hot oven (400° F.) 45 minutes. Serve hot.

Green corn which has been cut from the cob may also be cooked on top of the range. To the corn cut from 6 ears, add the same ingredients, using less milk. Cook at simmering temperature until tender.

SCALLOPED CORN

1 can corn	Dash pepper
⅔ cupful milk	2 tablespoonfuls butter or substitute
1¼ teaspoonfuls salt	2 cupfuls soft bread crumbs

Mix the corn, milk, and seasonings. Mix the crumbs and fat, and place one fourth of them in the bottom of a buttered baking-dish, add one half of the corn mixture, then another fourth of the crumbs, the remainder of the corn mixture, and finally the remainder of the buttered crumbs. Bake at 400° F., for 45 minutes.

QUESTIONS

Explain why it is necessary to have the fire box, ash pan, and other parts of a coal range clean before building a fire.

If both hard and soft woods are used in building a fire, which should be placed next to the paper? Explain your answer.

What is the advantage in using oil rather than blacking in cleaning a range?

Explain why a stove cloth, saturated with oil, should be kept in a covered tin can or stone jar.

Compare the method of mixing the crumbs in Scalloped Tomatoes (see p. 17) and in Scalloped Corn. Which contains the more moisture, — corn or tomatoes? From this explain the difference in mixing.

What is the price of 12 ears of green corn or of 1 can of corn?

LESSON V

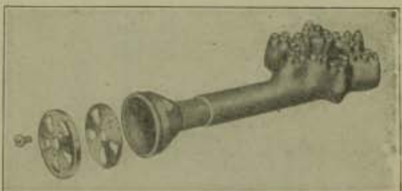
GAS RANGES — SCALLOPED FRUIT

Examination of a Gas Burner. — Inspect a gas burner and find the following parts:

(*a*) Supply pipe.
(*b*) Stopcock.
(*c*) Burner.
(*d*) Mixer (see Figure 12).

To light a gas burner, observe the following directions, and in the order named:

(*a*) Strike the match.
(*b*) Turn the stopcock.
(*c*) Apply the match to the open burner.
(*d*) If necessary, regulate the stopcock and mixer, so that the flame is blue in color.



Courtesy of *Clark Stove Co.*

FIGURE 12.—GAS BURNER SHOWING MIXER.

Experiment 5: The Regulation and Purpose of a Gas Mixer. — Light a gas burner and then completely close the mixer of the burner. If the mixer is stationary, it may be closed by wrapping a piece of paper about it. What is the color of the flame? Now open the mixer. What is the color of the flame? What substance has been "mixed" with the gas by opening the burner? What is the purpose of the mixer?

Examination of a Gas Range. — Inspect a gas range and find the following parts:

(*a*) Top burners — regular, giant and simmering (see Figure 13).
(*b*) Stopcocks of top burners.
(*c*) Oven burners.
(*d*) Stopcocks of oven burners.
(*e*) Pilot (if there is one).
(*f*) Baking oven.
(*g*) Broiling oven.
(*h*) Warming oven and its burner (if there is one).
(*i*) Supply pipe.
(*j*) Stovepipe.

The method of lighting oven burners varies in different ranges, and for this reason it is impossible to give directions for lighting which will apply to all oven burners. There is, however, one important direction that should always be borne in mind. *Always open the oven door before lighting the oven burners.* If such caution is not observed, the gas may escape into the oven and cause an explosion. In case there is a pilot-lighter, open the oven door and see that the oven burners are turned off before lighting the pilot.

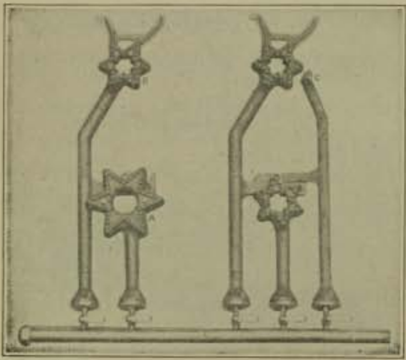

Courtesy of *Clark Stove Co.*

FIGURE 13. — GAS BURNERS.

A, giant; B, regular; C, simmering.

Adjusting a Gas Burner.—The products of combustion of fuel gas that most interest the housekeeper are carbon and carbon dioxide. Carbon dioxide is not a poisonous gas, but it does not support animal life. Air containing much carbon dioxide does not contain enough oxygen for perfect respiration, hence the need of an outlet for the products of combustion of a gas stove; good flue construction is quite as necessary for a gas range as for a coal range (see Figure 14).

When gas burns with a yellow flame, it deposits soot on cooking utensils and does not give as much heat as it should. This is caused by incomplete combustion. Moreover, *carbon monoxide*, which is present in some gas, may escape without burning. This is an exceedingly poisonous gas and when inhaled even in small quantities may cause serious effects. Hence it is specially necessary for a housewife to see that the gas burner is clean, well regulated, and properly constructed, so that sufficient air can mix with the gas to produce a blue flame.

Conserving Gas. — According to authoritative information,[1] "the demands for natural gas are now greater than the

Courtesy of *New Process Stove Co.*

FIGURE 14. — GAS RANGE SHOWING DIRECTION OF DRAFT.

available supply. Food and trees can be grown. Water supplies are constantly replenished by nature, but there is no regeneration in natural gas." It is thought that natural gas forms so slowly that millions of years will be required

[1] United States Fuel Administration Bulletin, "Use and Conservation of Natural Gas."

to make the present concentrated supply. As far as we are concerned, when the present supply is used up, it is gone forever. Since natural gas is a most efficient fuel, every housekeeper and householder should feel obligated to waste none of it. Suggestions for conserving gas follow:

(1) See that the mixer is properly adjusted so that the flame is light blue in color.

(2) In selecting a gas stove, see that the burner is so located that the cooking surface is the correct distance above the burner. The tip of the flame should touch the bottom of the utensil. If it is necessary to have a long flame in order to bring this about, there is considerable waste of gas.

(3) If the flame is long, the gas pressure is greater than necessary. Regulate the gas pressure by adjusting the valve in the supply pipe. A short flame will save gas and produce satisfactory results, provided the cooking surface is the proper distance above the burner.

(4) After the contents of a cooking utensil boils, turn the gas cock so that only "gentle" boiling takes place. A food becomes no hotter in rapidly boiling than in gently boiling water.

(5) When possible, use the simmering burner rather than the regular or giant burner.

(6) Let the flame touch only the bottom of the cooking utensil. There is a wastage of gas when the flame streams up the sides of the cooking utensil.

(7) Turn off the gas immediately when fuel is not needed. Matches are cheaper than fuel gas.

Care of Gas Range. — *Daily Care.* — If any substance on the stove cannot be removed easily, loosen it with a knife, and then wipe the stove with a newspaper. Clean the stove with waste or a cloth having a little light paraffin oil on it. Polish with soft cotton or flannel cloth. Remove the tray that is beneath the top burners, and wash.

Weekly Care. — Wash the inside of the oven and the movable tray with water to which washing soda solution has been added. It is well to light the oven burner to dry the stove after washing the ovens. Polish the nickel, if necessary. Clean the stove with oil as directed for a coal range. (*Since oils ignite most readily, care should be taken not to apply the oil when the stove is lighted!*) Wipe the burner with the oil. Clean the small holes of the burners by using a knitting needle or wire kept for this purpose; or, if the openings in the burners are slots, use a knife to clean them.

SCALLOPED APPLES

2 cupfuls soft bread crumbs
2 tablespoonfuls butter or substitute
3 cupfuls apples
½ cupful sugar
¼ teaspoonful cinnamon
½ teaspoonful nutmeg
½ lemon, — juice and grated rind
¼ cupful water

Mix the bread crumbs with the fat as directed for Stuffed Tomatoes (see p. 17).

Chop or cut the apples in small pieces, and add the remaining ingredients to the apples. Arrange the crumbs and apple mixture in a baking dish as directed for Scalloped Corn (see p. 26). Bake 40 to 60 minutes (until the apples are tender and the crumbs brown), in a moderate oven (375° F.). Cover during first 20 minutes of baking. Serve hot with sugar and cream or Hard Sauce. Care should be taken in grating *lemon rind.* Only the thin yellow portion should be used as flavoring.

HARD SAUCE

⅓ cupful butter
1 teaspoonful vanilla
1 cupful powdered sugar

Cream the butter, add the sugar gradually, then the flavoring. Chill and serve over hot puddings.

SCALLOPED BANANAS

In the Scalloped Apple recipe substitute bananas foı apples, omit the water, and use $\frac{1}{2}$ teaspoonful of cinnamon and $\frac{1}{8}$ teaspoonful of cloves for the spices. Bake until the bananas are heated through and the crumbs browned, *i.e.*, at 450° F. for 15 minutes. Serve as Scalloped Apples.

QUESTIONS

Explain fully why the oven door of a gas range should be opened while the oven burners are being lighted.

If a gas stove has no pipe for waste products, what special caution must be observed in ventilating the kitchen?

What are some of the advantages of a gas range over a coal range?

What disadvantage other than gas wastage is there when a flame streams up the sides of a cooking utensil?

What causes pared apples to become discolored?

Give the order of preparation of ingredients for Scalloped Apples so that discoloration of the apples will be avoided.

How many medium-sized apples are required to make three cupfuls of chopped apples?

What is the purpose of covering the Scalloped Apples during the first half of the time for baking?

What is the effect of the air on peeled bananas?

Give the order of preparation of ingredients for Scalloped Bananas.

Why should the banana mixture be baked a shorter time than the apple mixture?

What is the effect of too long baking on bananas?

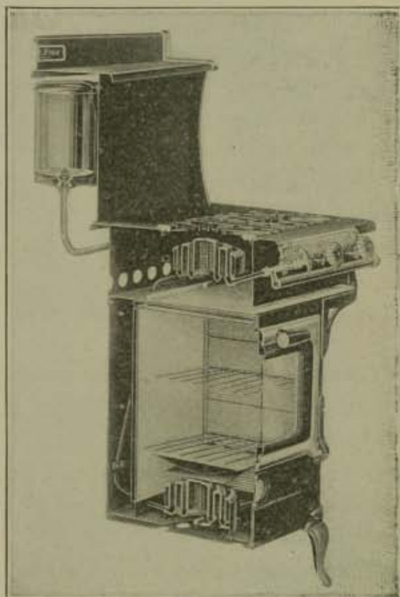
What is the most practical method of cleaning a grater? Why should not the dish-cloth be used in cleaning it?

LESSON VI

STOVES AND HEATING DEVICES — STUFFED PEPPERS, BUTTERSCOTCH APPLES

Kerosene Stoves.[1] — Where gas is not available for cooking, kerosene may serve as a fuel. In case a house is equipped with a coal range, a kerosene stove may also be desirable for use in summer time.

There are two types of kerosene stoves, viz., wick and wickless stoves. The burners of the former type are supplied with cotton wicks which become saturated with kerosene. When a match is applied to the wick, the kerosene on it vaporizes and the vapor burns. The burning kerosene vapor vaporizes more kerosene and thus the burning continues.



Courtesy of *Detroit Vapor Stove Co.*

FIGURE 15. — CROSS-SECTION OF WICKLESS KEROSENE STOVE.

In one type of wickless stove it is necessary to heat the burner so that the kerosene will vaporize when it comes in contact with it (see Figure 15). Such a burner may

[1] NOTE TO THE TEACHER. — In case no kerosene, gasoline, or electric stoves are used in the homes of the pupils, the portion of the lesson regarding these stoves may be omitted.

be heated by pouring a small quantity of gasoline into it. A lighter is then applied to the burner. When the latter is sufficiently heated, the kerosene is turned on. The kerosene then vaporizes as it flows into the hot burner and burns.

In other types of so-called wickless stoves, the burners are equipped with asbestos or other incombustible material. This material becomes saturated with kerosene and carries the fuel to the tip of the burner somewhat as does a cloth wick.

It is especially necessary to keep kerosene burners clean. Bits of carbon collect in them and prevent perfect combustion. This results in "smoke" or soot issuing from the burner. It is well to keep the burners and wicks free from charred material, and to renew the latter when they become short.

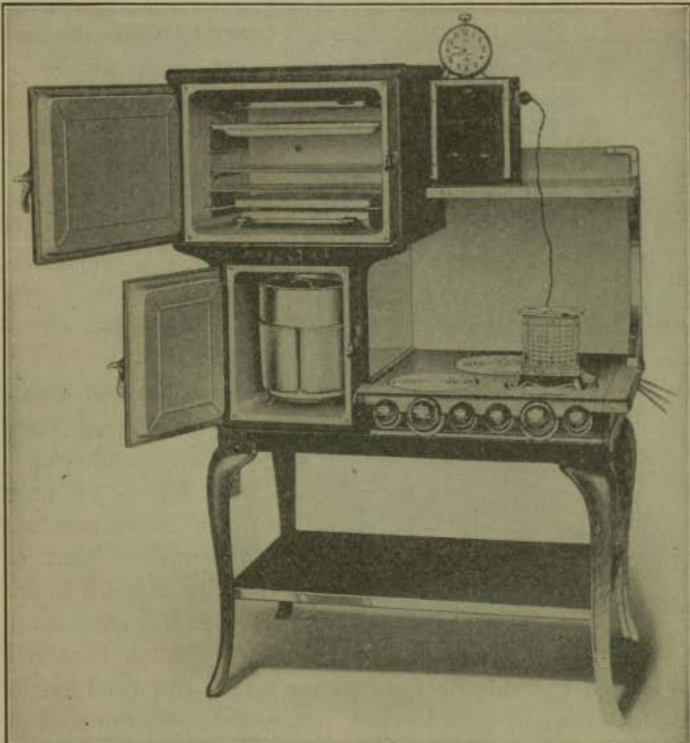
Most kerosene stoves are equipped with removable containers for the fuel. These should be kept filled with sufficient kerosene for burning. A wick burner should never be allowed to burn after all the kerosene in the container is exhausted.

Gasoline Stoves.[1] — Since gasoline is a much more readily inflammable fuel than kerosene, it requires a different type of burner and stove. As a usual thing gasoline cannot be burned in kerosene stoves nor kerosene in gasoline stoves. (In the stove shown in Figure 15, p. 33, however, either fuel may be burned.)

When gasoline is used in a stove, it is necessary to vaporize the gasoline before lighting the burner. This is accomplished in most stoves by letting the gasoline flow into a cup situated underneath the burner, turning off the supply of gasoline, and then applying a match to the cup. By the time the gasoline is burned the burner is heated. Then the stopcock is turned on, a match applied to the burner, and the gasoline vaporizes and burns.

[1] See note to the teacher, p. 33.

Gasoline burners, like those in which kerosene is burned, should be kept clean. When a mixture of gasoline vapor and air is heated, an explosion may result. It is for this



Courtesy of *Westinghouse Electric and Manufacturing Co.*

FIGURE 16. — ELECTRIC RANGE.

reason that *the tank or gasoline container of a stove should never be filled while the burners of the stove are lighted or even hot.*

Electric Stoves.[1] — It was mentioned previously that electricity is not a fuel. Hence electric stoves are not pro-

[1] See note to the teacher, p. 33.

vided with burners. They have heaters which contain coils of wires through which an electric current passes.

Electricity is the cleanest source of heat for cooking. But in order to operate an electric stove economically, it is necessary to utilize the current required for a heating element to its greatest extent. For example, if the current is turned on to heat the oven as many foods as possible should be cooked in the oven (see Figure 16).

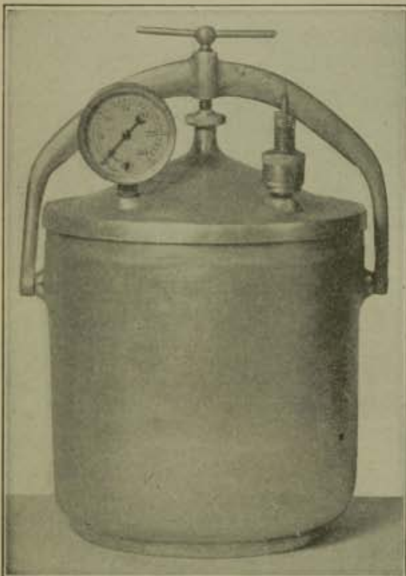


FIGURE 17. — PRESSURE COOKER.

Devices and Utensils for Saving Fuel. — The *pressure cooker* (see Figure 17) in which a temperature higher than that of boiling water is maintained is a great saver of fuel. A food can be cooked in from one third to one fourth the usual length of time in one of these devices. Moreover, pressure cookers are especially valuable for high altitude cooking, where water boils at a temperature lower than at sea level.

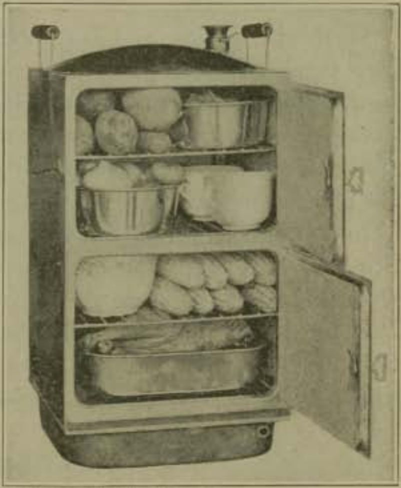
The *steam cooker* (see Figure 18) is a fuel saver, when several foods are cooked at one time in it. Sufficient fuel for only one burner is required to operate it.

The so-called *clover leaf pans* or utensils of such shape that two or three can be placed over one burner or heater save much fuel or current (see Figures 16 and 27, p. 92).

The *fireless cookers* described in Lesson XXII, p. 90, are practical fuel and heat savers.

STUFFED PEPPERS[1]

6 green peppers
1 cupful cooked meat, chopped
1 tablespoonful scraped onion
1 teaspoonful salt
2 cupfuls soft bread crumbs
1 tablespoonful butter or substitute



Courtesy of *Toledo Cooker Co.*

FIGURE 18. — STEAM COOKER CONTAINING VARIOUS FOODS.

Cut a slice from the stem end of each pepper or cut each pepper lengthwise in halves. Remove the seeds.

Mix the chopped meat, onion, and salt. Mix the bread crumbs and fat as directed in Stuffed Tomatoes (see p. 17). Combine the ingredients and stuff the peppers with the mixture. Place the peppers in a baking-dish or pan, and pour enough boiling water into the dish or pan to cover the bottom of it. Bake in a moderate oven (375° F.) for 30 to 45 minutes or until the peppers are tender. Serve hot in place of meat.

If desired, ¼ cupful fresh or canned tomatoes may be added to the stuffing mixture. Cooked rice may be substituted for the

[1] A choice of either Stuffed Peppers or Butterscotch Apples may be made for this lesson.

bread crumbs. A mixture of cooked rice and cheese sauce (see p 87) also makes a tasty stuffing for peppers.

If a slice is cut from the top of the pepper, it may be used as a lid to cover the pepper after stuffing.

BUTTERSCOTCH APPLES[1]

5 apples	$\frac{1}{2}$ tablespoonful corn-starch
$\frac{2}{3}$ cupful brown sugar	$\frac{1}{8}$ teaspoonful salt
$\frac{1}{2}$ cupful water	$\frac{1}{2}$ to 1 tablespoonful butter
$\frac{3}{4}$ cupful milk	$\frac{1}{2}$ teaspoonful vanilla

Wash the apples, and cut them into quarters, pare and core them. Into a saucepan put the sugar and water, and heat. When the sirup boils, add the apples. Cover and boil gently until the apples are tender. Remove the apples from the sirup with a skimmer or a wire egg beater, placing the fruit in sherbet glasses or other suitable dishes for serving.

In another pan, mix the milk and corn-starch thoroughly. Stir and cook until the mixture reaches the boiling point, then add it to the sirup in which the apples were cooked. Boil for a few minutes. Add the salt, butter, and vanilla. Stir these into the mixture, then pour the sauce over the apples. Serve Butterscotch Apples hot or cold for a dessert.

QUESTIONS

State at least two reasons why gas, kerosene, and gasoline are more popular fuels in summer time than coal.

Mention a possible cause for smoke issuing from a kerosene burner.

Why should a wick burner never be allowed to burn after all the kerosene in the container is exhausted?

Carefully explain why the tank of a gasoline stove should never be filled while the stove is lighted or hot.

Why are electric stoves not provided with burners?

Why is a pressure cooker regarded as a fuel saver?

How should a steam cooker be used in order to save fuel?

[1] See footnote, p. 37.

Explain how it is possible to save fuel by using clover leaf pans.

Note that no ground pepper is added to the stuffing for peppers Give the reason for this.

What is the purpose of pouring boiling water in the dish or pan in which peppers are baked?

Did the sirup in which the apples were placed completely cover the fruit? From this explain why it is advisable to cover the apples during the cooking.

NOTE TO THE TEACHER.— If the course in food study is begun in the fall, when fruits are in season, the lessons of Division Seventeen—*The Preservation of Food*—may follow this lesson. The plan of canning fruit in the autumn is desirable, especially if the course in foods covers but one year. If more than one year is devoted to food study, the teacher may find it more satisfactory to can fruits in the autumn of the second year, or at the close of the spring semester of the first year. The pupils at these times will have become more skilful, so that the canning of foods can be accomplished with greater satisfaction. The high cost of fruits and sugar make it imperative that as little spoilage as possible result from food preservation. (Alsc see the note on p. 67.)

DIVISION TWO

BODY-REGULATING FOOD: WATER

LESSON VII

Water and Beverages (A)

Experiment 6: The Dissolving Power of Water. — Put ½ teaspoonful of salt in a test tube, half fill it with water. Cover the mouth of the test tube with the thumb, then shake the tube. Do the contents become clear? Set the tube aside for a few minutes. Does the salt separate from the water?

When a solid substance, by mixing with water, disappears in the water and does not separate on standing, the solid substance is *dissolved.* The salt was therefore dissolved in cold water, or it may be said that salt is *soluble* in cold water, or that water is a *solvent* of salt.

Solution and Digestion. — The change of foods in the body from insoluble to a soluble form is one step in digestion. Foods are dissolved in the digestive juices of the mouth, stomach, and intestines. Some foods such as salt and certain sugars are readily dissolved. Other foods have to undergo changes before they will dissolve. Corn-starch, for example, does not dissolve in cold water. It must be changed into sugar (which is easily dissolved) in the process of digestion. Dissolving then is an important step in the process of digesting.

Use of Water in the Body. — A person might live for a number of weeks without eating food, but he could live only a few days without drinking water. Water has many uses in the body.

(*a*) It is the greatest known solvent. Because of this property, water is extremely important in the processes of digestion. (See *Solution and Digestion.*)

(*b*) It is a great carrier. Water helps carry food materials to all parts of the body; and it aids in carrying off the wastes of the body.

(*c*) It assists in regulating the temperature of the body. Because water is present in blood, and blood flows from the warmer interior of the body to the colder exterior, the water aids in distributing the heat of the body. The evaporation of perspiration, which is largely composed of water, also aids in regulating body temperature.

It is thus readily seen that water is needed to keep the machinery of the body working smoothly. The uses of water may be summed up in the statement: *Water aids in regulating body processes.*

Foreign Materials in Water. — Since water is such a ready solvent, it contains many foreign materials. In passing through the air and in flowing through the ground, it dissolves many substances. Some of these substances are harmless, while some contain disease bacteria and are dangerous. Well water is frequently contaminated. It is often not safe to use for drinking purposes unless boiled.

Experiment 7: Presence of Gases in Water. — Fill a beaker half full of water, and note its temperature. Heat the water, and observe the changes which take place. What appears on the sides and bottom of the beaker? What does water contain which is driven off by heat?

Experiment 8: Simmering and Boiling of Water. — Continue to heat the water of Experiment 7 until the larger bubbles form and disappear at the surface of the water. Note the temperature. Continue to heat the water until bubbling occurs on the surface of the water. Note the temperature. What is indicated by the larger bubbles?

Heating Water. — When bubbling occurs below the surface, water is *simmering*. When the surface is in motion and steam is given off, water is *boiling*.

FIGURE 19. — SCENE ON A TEA PLANTATION.

The loss of gases makes boiled water taste flat or insipid. This flatness can be overcome somewhat by *aërating* the water after boiling, *i.e.* by pouring it from one vessel into another and thus mixing air with it.

Tea and its Selection. — Tea shrubs grow in India, Ceylon, China, and Japan (see Figure 19). The buds and leaves of these shrubs are cut and dried and sold as tea.

In buying tea the size of the dried leaves should be noted. The smallest leaves are those which have grown nearest the tip of the twig and hence are the youngest. These make the choicest tea. The older and larger leaves make tea of less fine flavor. "Flowery Pekoe" and "Orange Pekoe" are choice India teas. These brands consist of the buds and youngest leaves.

Another point to consider in buying tea is its color. Tea leaves are either black or green. The chief difference between black and green tea is that black tea leaves are fermented after picking, while green are not. Tea leaves contain flavoring and stimulating materials and a substance called *tannin* (sometimes called tannic acid) which interferes with digestion. The presence of tannin in both black and green tea can be shown by the following:

Experiment 9: Tannin in Tea. — (*a*) Put ½ teaspoonful of black tea in a cup. Add ½ cupful of boiling water. Let it stand for 5 minutes, then strain the infusion.

(*b*) Repeat (*a*) substituting green tea for black.

(*c*) Into 2 test tubes put 1 teaspoonful of each kind of beverage. To each tube, add ½ teaspoonful of ferrous sulphate solution and let the tubes stand. If a black substance appears in the tubes, tannin is present. Which kind of beverage, — black or green tea, — shows the greater quantity of tannin?

By fermentation, tannin is changed into a *less soluble form*, so the beverage made from black tea contains less tannin than that made from green tea. Hence, black tea is preferable. It is, however, slightly more stimulating than green tea. Good black tea is grayish black in color, not dead black. "English Breakfast" is a black tea. It consists of a mixture of several black teas. "Oolong" is black in appearance, but has the flavor of green tea. This is because it is only semi-fermented. Teas grown in various countries have different flavors.

Tea is sometimes adulterated by using the leaves of other plants or by adding large leaves and stems. It is said the finest brands of tea do not reach this country.

Making the Beverage. — Because tea contains tannic acid, an earthen, enamel, china, or silver teapot should be used; a tin teapot should never be used. (See *Suggestions for Cooking Fruits*, p. 65.) The ingredient in tea that gives it its odor and flavor is a volatile substance. Hence tea leaves should be kept in closely covered jars or cans.

Boiling water draws out substances which give the beverage its flavor and stimulating properties, while water below the boiling point only partially draws out these substances. If, however, the leaves are boiled or are allowed to remain in water for more than five minutes, much tannin is drawn out in the water. Therefore, never boil tea, but pour boiling water over it and in five minutes strain out the tea leaves.

TEA (proportion for one cupful)

$\frac{1}{4}$ to 1 teaspoonful black tea leaves
1 cupful freshly boiled water

Heat the teapot by pouring boiling water into it. Pour out the water and add the tea leaves. Pour over them the freshly boiled water. Place the teapot in a warm place to steep, and in 5 minutes strain out the tea leaves.

Teapots provided with perforated cups or with tea-balls (see Figure 20) for holding the tea leaves are most convenient, as the cup containing the leaves may easily be removed or the tea-ball can be drawn above the surface of the liquid after steeping the tea for 5 minutes. Or two teapots may be used, the beverage being strained from one teapot into the other.

The quantity of tea to be used varies with the strength of tea desired. If the leaves are closely rolled, less tea is required than if they are loosely folded.

Tea may be served with cream and sugar, or with lemon and sugar. The latter is called Russian Tea, and is often served with a preserved cherry.

In warm weather *Iced Tea* may be served. "Left over" tea may be utilized in this way, or hot tea may be cooled quickly by adding ice to it. While the latter method requires more ice, the tea is considered of a finer flavor. Iced Tea is served usually with sugar and lemon. Since sugar does not dissolve as readily in cold solutions as in hot (see Experiments 10 and 11, p. 70) a sirup may be prepared for sweetening Iced Tea.

Courtesy of *Manning, Bowman Co.*

FIGURE 20. — TEA-BALL TEAPOT.

Even though tea is carefully selected and prepared it contains some tannin. This, as has been mentioned, is injurious. The stimulating material in tea also distresses some persons. Children, nervous persons, and those who suffer from constipation are advised not to drink tea.

TOASTED WAFERS AND CHEESE

Spread crackers or wafers with a small quantity of cheese. Season the cheese with a sprinkling of salt and paprika. Brown the wafers in the oven. When the cheese is melted, the wafers are ready to serve.

If thick crackers are used, they may be split open and the broken surface spread with cheese.

QUESTIONS

By what means is flavor extracted from tea leaves?
How can the extraction of much tannic acid be avoided in tea?

Give the reason for using freshly boiled water for tea. (See Experiments 7 and 8, p. 41.)

Which is the better kind of tea to use — black or green? Explain.

Why should tea be strained after steeping 5 minutes?

From your grocer learn the names and prices of two green and two black teas. From what countries do they come?

How many cupfuls in one pound of tea leaves? How many teaspoonfuls in a pound?

Determine the approximate number of wafers in a pound. Also estimate the quantity of cheese needed for one pound of wafers.

LESSON VIII

Water and Beverages (B)

Water as a Beverage. — Most foods contain water. Not only moist foods such as milk and watermelon, but solid foods such as potatoes and rice contain water. The water present in foods, however, is not sufficient for the needs of the body. It is necessary to use water as a beverage.

When one rises in the morning, it is well to drink one or two glassfuls of water. From one to two quarts of water, — either as plain water or in beverages, — should be taken each day. It used to be thought that water drinking during a meal was harmful. Scientific investigations have shown that this is a mistaken idea. Water may be drunk at mealtime. Indeed it has been found that it aids in the digestive processes, provided foods are not "rinsed down" with it and provided very cold water is not used.

Water, a Foodstuff. — The body is nourished by food and there are many different kinds of food. Moreover, most foods are made up not of one substance, but of a number of materials. The chemical substances of which foods are composed are called *nutrients* or *foodstuffs*.[1] (Foodstuffs

[1] The difference between the scientific and popular meaning of the word foodstuffs should be noted. Foodstuffs is defined and used as a scientific term in this text.

were formerly called *food principles.*) A few foods contain but one foodstuff, some contain several foodstuffs, many contain all the foodstuffs.

Water is a foodstuff. There are other foodstuffs about which we shall study later. Each foodstuff has a certain

FIGURE 21. — COFFEE BERRIES.

function to perform in the body. As explained in the previous lesson, water is a *body-regulating foodstuff.*

Use of Water in Cleaning and in Preparing Foods. — Water is a cleansing agent because most soil is soluble in water. It also plays a most important part in the preparation of foods, since it serves as a medium for the cooking of foods, as in the processes of steaming and boiling. Because water dissolves many substances, it acts as a carrier of flavor as in fruit drinks, tea, and coffee. Although there are some foods which can be cooked without a water medium, baked potatoes and roast meat for example, certain foods such as rice and dried beans require water during cooking. It is readily seen that water is indispensable in cooking.

Coffee. — Coffee is the seed of the fruit of an evergreen tree grown in tropical countries (see Figure 21). Each fruit contains two seeds or berries. The fruit is picked, allowed to ferment, and the seeds removed from their pulpy covering. The seeds, which are also called coffee beans, are then roasted and sent to market. The flavor of the coffee bean is due to the variety of coffee tree, the maturity of the fruit when picked, and the time subjected to the roasting process. Mocha [1] and Java are choice brands of coffee. Although originally grown in Arabia and Java, their names are not used to designate the localities in which they grow, but the variety of coffee. Much of our coffee now comes from Brazil.

Coffee is somewhat like tea in composition. It contains tannic acid, and therefore a tin coffeepot should never be used. The flavor can be extracted from coffee by boiling it or by pouring boiling water through it. Coffee should not boil longer than three minutes, as much tannic acid is extracted by long boiling.

Because coffee contains volatile substances, it should not be purchased ground, unless in small quantities, and it should then be kept in tightly covered jars or cans. When freshly roasted, coffee has the best flavor. In this condition, it is crisp and emits a strong aroma.

[1] Mocha is a port in Arabia. Mocha coffee was so called because much of the coffee grown in Arabia was exported from Mocha.

BOILED COFFEE (proportion for one cupful)

1 heaping tablespoonful coarsely ground coffee	Bit of crushed egg-shell or a little egg white
2 tablespoonfuls cold water	1 cup boiling water

(1 egg-shell or $\frac{1}{2}$ egg white is sufficient for 8 heaping tablespoonfuls of ground coffee.)

Into a well-cleaned coffeepot, place the coffee, 1 tablespoonful of the cold water, and egg. Mix; then add the boiling water and boil for not more than three minutes. Remove from the fire; pour out about one half cupful of coffee, in order to rinse the grounds from the inside and from the spout of the coffeepot. Return the coffee to the pot; add the second tablespoonful of cold water. If the spout is not covered, a piece of paper may be inserted so that the aroma will be retained. Allow to stand in a warm place for about 5 minutes for the coffee to become clear.

Cold water may be used instead of boiling water in making coffee.

Care of Coffeepot. — The coffee should never be allowed to stand in the coffeepot, but should be turned out at once after using. If any clear coffee is left, it may be used for spice cakes, jellies, or other desserts. The coffeepot should be washed well, and scoured if necessary. The spout needs special care in cleaning.

FILTERED COFFEE

$\frac{3}{4}$ cupful finely ground coffee
5 cupfuls freshly boiled water

(For the following method of preparing coffee, a *drip coffeepot* is used. A drip coffeepot is provided with a perforated receptacle or a muslin bag in which the finely ground coffee is held. The boiled water is poured through the ground coffee.)

Heat the coffee by steaming it, placing a little boiling water in the bottom of the coffeepot and the ground coffee in the coffee bag or perforated cup. Remove the bag or cup and pour the water from the pot. Return the bag or cup to the coffeepot and slowly pour over it the freshly boiled water. If it is desired to make the coffee stronger, the beverage may be poured over the ground coffee a second time. Care should be taken, however, not to cool the coffee in so doing. Wash the coffee bag in clear cold water and dry in the air. Renew the bag occasionally.

Courtesy of *Manning, Bowman Co.*
FIGURE 22. — COFFEE PERCOLATOR.

"*Black*," or *After Dinner Coffee* may be prepared in a drip coffeepot. Use 1 cupful of finely ground coffee to 5 cupfuls of freshly boiled water.

Filtered coffee may also be prepared in a coffee *percolator* (see Figure 22). A percolator is so constructed that the water is heated in the pot and kept at boiling temperature while passing through the ground coffee. The method of preparing the beverage depends upon the construction of the percolator. Follow the directions that come with it.

OATMEAL COOKIES

1 egg	1 cupful rolled oats
$\frac{1}{2}$ cupful sugar	1 cupful flour
$\frac{3}{8}$ cupful fat *or*	$\frac{1}{2}$ teaspoonful salt
$\frac{1}{4}$ cupful vegetable oil	$\frac{1}{8}$ teaspoonful baking soda
2 tablespoonfuls sour milk	2 teaspoonfuls baking powder

$\frac{1}{2}$ cupful raisins

Break the egg in a mixing bowl. Beat it, then add the sugar. If solid fat is used, melt it. Add the fat or oil to the sugar and egg mixture. Add the sour milk and rolled oats.

Sift the flour, then measure it. Turn it into a sifter, add the salt, baking soda, and baking powder. Sift these dry ingredients into the first mixture. Wash the raisins, dry them on a towel, then sprinkle a little flour over them and add to the other ingredients. Mix well and drop the mixture by the teaspoonfuls on an oiled baking sheet. Bake in a moderate oven (375° F.) until golden brown in color.

These cookies may be served with coffee.

QUESTIONS

How long should coffee boil? Why not boil it longer?

When the coffee is poured from the coffeepot, examine the grounds and then explain the use of the egg white and egg-shell in preparing coffee.

Why is a cupful of coffee poured out and returned to the coffeepot after the coffee is boiled?

Why should cold water be added to coffee after boiling?

In what form, — ground or whole, — should coffee be purchased? Why?

In what kind of jars should tea and coffee be kept? Explain.

How many cupfuls in one pound of coffee? Estimate the number of heaping tablespoonfuls in one pound of coffee.

What is the average price per pound of coffee?

RELATED WORK

LESSON IX

Home Projects [1]

Worthy Home Membership. — Each member of a home has certain obligations to fulfill. The course in foods which

[1] Note to the Teacher. — One of the most insistent ideas of modern educators is that the pupil be taught not merely to get him ready to live,

you are following in school offers an unusual opportunity for you to contribute your share in performing home duties. In a most definite way, it may help you to qualify for "worthy home membership."

but that he be taught to live. It is thought that the processes of present growth will serve as the best training for future needs. If the school girl is living in her home, she is in immediate need of such training as will help her contribute her share to the workings of her home. To a certain degree, success in school activities can be measured by the way they function in the home.

Perhaps there is no more effective way of making the school work function in the home than by the educative process called the *project.* Stevenson defines a project *as a problematic act carried to completion in its* natural setting, while Kilpatrick says *a project is a whole-hearted purposeful activity proceeding in a social environment.*

In order to aid the pupils in their home work, it is necessary to know the needs of the home. If possible, interest and coöperation of the pupils' mothers in this matter should be secured. It is hoped that the afternoon tea suggested in the following lesson may afford means for the teacher to become acquainted with the mother to find out something of the needs of the home and to secure the mother's coöperation for her daughter's work in the home.

In order to assign definite projects to the pupils, it will be necessary to confer with the girl. By discussing plans for home work you can doubtless discover what type of work interests her and what she can contribute with profit to her home. You can thus assign a project which will be performed in a "hearty" manner.

Definite plans should be made for carrying out the work in the home. For successful results it is most necessary that the pupil understand that a project is an act which involves *mental effort,* and that the activity must be *carried* to *completion.* The fact that the project is to be performed in the home carries out one of the premises of the project, viz., that the act be performed in its natural setting or in a social environment. Reports concerning the progress and results of work should be submitted by the pupil. Home visitation on the part of the teacher is most desirable and in most cases necessary for satisfactory results.

The following articles regarding Projects are most illuminating:

Teachers College Record, Volume XIX, Number 4 (Sept. 1918), "The Project Method" by William H. Kilpatrick; The Journal of Home Economics, Volume X, Number 3 (Mar. 1918), "The Project in Home Economics Teaching" by W. W. Charters; School Science and Mathematics, Volume XIX (Jan. 1919), "The Project in Science Teaching" by John Alford Stevenson.

Applying School Activities to Home Work. — There is no more effective way of gaining skill in cooking and house-keeping than by applying the methods learned at school in your home. It is not enough for you to make cookies or cook potatoes once in the school kitchen. If you would become an expert in these processes, repeat them many times in your home. Your efforts will be more than repaid by your own growth and by the satisfaction your achievements will bring to the entire household.

Discuss your school work in food study with your mother. You will doubtless find many things of mutual interest and your mother will be glad to have your coöperation in house-keeping.

Household duties assigned by the teacher and performed in the home with a determination to accomplish a definite aim, we will term " Home Projects." To secure successful results, your home work must be done *thoughtfully*, and *earnestly*, and in a *whole-hearted* way. We shall suppose, for example, that your teacher assigns you the home project of setting the table of the evening meal for one week. She also instructs you to keep in mind the following aims:

(1) To make as few trips as possible from the cupboard to the dining table.

(2) To plan the entire number of dishes, knives, forks, spoons, and other things needed during the meal, and then place these on the dining table or other suitable place where they may be conveniently obtained when the meal is being served.

In order to accomplish these things, you must work with a *determination* to succeed at what you are doing and to keep your mind steadfastly on the work at hand. With such an attitude toward your work you will doubtless have accomplished several things by the end of a week. You will have set the table in an orderly manner, and thus have given real assistance and satisfaction to the members of your family; you will have become more skilful in spreading the table, and you will have made it possible to spend less time in setting the table in the future. You could not have accomplished all this if you had not earnestly thought as you worked.

You will find it interesting and beneficial to make each assignment of home work as complete as possible. If, for example, you are to make cakes, it will be most desirable if you not only mix and bake cakes, but, if possible, select and purchase the materials for them and compute their cost.

Suggestions for Home Projects:

Make the beverages for one or more meals each day.

Wash the dishes of the evening meal.

Prepare a scalloped dish or any of the foods given in Lessons I to V once a week.

Suggested Aims:

(1) To prepare tea or coffee so as to draw out as little tannin as possible.

(2) To wash dishes well but to make as few movements as possible. To note the time required to do the dishes each day and by means of efficiency methods strive to lessen the time.

(3) To utilize left-over pieces or crumbs of bread in preparing scalloped dishes. To prepare seasonable fruits and vegetables so well that the members of your home will find them most palatable.

LESSON X

Afternoon Tea

Planning the Tea. — To entertain friends is a pleasure. Meeting friends or having them become acquainted with one another is also a pleasure. This lesson is arranged that you may entertain your mother at afternoon tea and that she may visit with your teacher and classmates.

In planning for any special occasion, it is necessary to decide upon the day and hour for the party. If the occasion is at all formal, or if a number of persons are to be present, it is also necessary to plan how to entertain your guests, — what you will have them do to have a pleasant time. If it is desired to serve refreshments, you must decide what to serve, how much to prepare, and when to prepare the foods. The method of serving them must also be considered.

The Refreshments for an afternoon tea should be dainty and served in small portions. Tea served with thin slices of lemon or cream and sugar and accompanied by wafers, sandwiches, or small cakes is the usual menu. Sweets or candies are often served with these foods.

The following menu may be prepared for your first tea:

Tea with Lemon (or Cream) and Sugar
Toasted Wafers with Cheese or Oatmeal Cookies
Coconut Sweetmeats

From previous work, estimate the quantity of tea, lemons (or cream), sugar, wafers, or cakes you will need. A recipe for Coconut Sweetmeats follows. It makes 20 sweetmeats about one inch in diameter.

COCONUT SWEETMEATS

$\frac{1}{4}$ cupful powdered sugar	$\frac{1}{8}$ teaspoonful salt
$1\frac{1}{4}$ cupfuls shredded coconut	1 teaspoonful vanilla
2 tablespoonfuls flour	1 egg white

Mix the dry ingredients, then add the vanilla. Beat the egg white stiff. Add the other ingredients and mix thoroughly.

Grease a baking sheet and dredge it with flour. Drop the coconut mixture by the teaspoonfuls on the baking sheet. Bake in a moderate oven (375° F.) for 20 minutes or until slightly browned. Remove from the pan, place on a cake cooler. When cold store in a tin box.

Serving the Tea. — For an afternoon tea, the beverage may be poured in the kitchen and carried into the dining room or the other room where the guests are assembled, or it may be poured in the dining room in the presence of the guests.

When the latter plan is followed, the teapot, cups, plates, spoons, and napkins are placed on the dining table. Seated at the table, one of the pupils[1] pours the tea, and places a filled cup and a teaspoon on a plate. The tea (with a napkin) is then passed to the guests; the lemon or cream and sugar, wafers or cakes and sweets are also passed. The slices of lemon should be placed on a small plate or other suitable dish and served with a lemon fork. Wafers, sandwiches, or small cakes should be placed on plates or in dainty baskets. No article of silver is provided in serving them; the guests take them from the plates with their fingers.

Those who are serving the tea should be watchful and note when the guests have drunk their tea and relieve them of cup and plate. They should also replenish the teapot, and see that the one pouring the tea has all the materials and dishes needed.

[1] If afternoon tea is served in a home to a number of guests, an intimate friend of the hostess or a member of the household usually pours tea. In this way the hostess is free to greet every guest and to see that every one is having an enjoyable time.

DIVISION THREE

BODY-BUILDING AND BODY-REGULATING FOODS, RICH IN ASH (MINERAL MATTER)

LESSON XI

Fresh Vegetables (A)

Ash. — In a previous lesson, it was mentioned that most foods do not consist of one material, but of several substances. *Ash* or mineral matter is a common constituent of food. It is a *foodstuff*. The term "ash" does not apply to one substance; it is used to indicate a group of substances. Milk, eggs, vegetables, both fresh and dried fruits, and cereals are valuable sources of ash. They do not all, however, contain the same kind of ash.

The presence of ash in food is not apparent until the food is burned. The substance that remains after burning, *i.e.* the "ashes," is mineral matter or ash.

Although ash exists in combination with other substances in most foods, a few materials consist almost entirely of ash. Common salt is a mineral substance; another example is the white scaly substance which sometimes forms on the inside of a teakettle or on any pan in which water has been heated. Soda is still another familiar mineral substance. The condiment salt — ordinary table salt — (see *Condiments*, p. 264) must not be confused with the term "salts"; the latter applies to many mineral substances besides common salt.

Use of Ash in the Body. — Ash as well as water does not burn in the body. It is therefore considered an incombustible foodstuff. Bones, teeth, and many other parts of the body contain certain mineral materials. Ash helps to build the body.

Ash exists in the fluids of the body. For example, there is salt in perspiration and in all excretions of the body. The digestive juices also contain mineral materials, and ash aids in the digestive processes of the body. Scientists have shown that ash participates in many ways in the regulation of body processes.

Thus ash has two main uses in the body: (*a*) *it aids in building the body;* and (*b*) *it aids in regulating body processes.* Ash, therefore, is an absolute necessity in diet.

Fresh Vegetables. — It was mentioned above that fresh vegetables are one of the most valuable food sources of ash. The leaves, stems, pods, and roots of certain plants, and also those fruits which are used as vegetables, may be classed as fresh vegetables. Some of these are: cabbage, brussels sprouts, lettuce, water cress, spinach, celery, onions, tomatoes, cucumbers, beets, carrots, and turnips.

Fresh vegetables contain not only the foodstuff ash, but water. Indeed most fresh vegetables contain from 75 to 90 per cent of water.

In addition to these two foodstuffs, vegetables contain *cellulose.* The latter is a fibrous substance which forms for the most part the skins and interior framework of vegetables and fruits. The strings of beans and celery and the "pith" of turnips and radishes, for example, contain much cellulose.

Foods containing both ash and cellulose have a laxative effect. Hence the value of fresh vegetables in diet. The use of fresh vegetables cannot be too strongly urged. Certain vegetables, especially the green leaved vegetables, also contain substances which are necessary to make the body grow and keep it in good health (see Division Seven, p. 245).

Most persons should use fresh vegetables more freely than they do.

Suggestions for Cooking Green Vegetables. — If ash is such a valuable constituent of vegetables, the latter should be cooked so as to retain all the ash. Unfortunately vegetables are not always cooked in such a way that the minerals are saved. Just as salt dissolves readily in water, so many of the mineral materials found in green vegetables dissolve in the water in which vegetables are cooked. Hence if it is necessary to drain off water from vegetables after cooking, it is evident there may be much loss of nutriment.

Ash is also one of the substances which gives flavor to vegetables. Insipid flavors of certain vegetables may be due to improper cooking.

A most important point to consider in the cooking of vegetables is the saving of the minerals. This can be accomplished in several ways:

1. Cooking in water with their skins.
2. Cooking in water and using the water which must be drained away after cooking for sauces and soups.
3. Cooking in such a small quantity of water that none needs to be drained away after cooking.
4. Cooking in steam.
5. Cooking in the oven by means of dry heat.

Cooking Vegetables in Water. — Water in which vegetables are cooked should be salted. Use 1 teaspoonful of salt for each quart of water. The water should be *boiling* when the vegetables are added and should be kept boiling *gently* during the entire cooking. Rapidly boiling water wears off the edges of vegetables and breaks them.

The water in which vegetables are cooked is called *vegetable stock*. When vegetables are pared or scraped before cooking in water, the stock should be utilized in making vegetable sauces.

Test vegetables for sufficient cooking with a fork or knitting needle.

BEETS

Clean beets by scrubbing them with a small brush, using it carefully so as not to break the skin. Leave two or three inches of the stems on until the beets are cooked. Cook them whole in boiling salted water (see *Cooking Vegetables in Water*). Test only the largest beet for sufficient cooking. Use a knitting needle or wire skewer for testing. Drain and cover with cold water and rub off the skin with the hands. Cut the beets into slices, sprinkle generously with salt and pepper, and add a little butter. A small quantity of vinegar may be added, if desired. Serve hot.

Beets may also be served with a *sauce.* Prepare the sauce like White Sauce (see p. 109), using for the liquid three parts of water and one part of vinegar.

Beets may be *pickled* by slicing them or by cutting into cubes and placing in plain or spiced vinegar. Serve cold.

SCALLOPED TOMATOES WITH ONIONS

2 cupfuls sliced onions	Salt and pepper
2 cupfuls tomatoes	1 cupful bread crumbs

1 tablespoonful fat

Parboil the onions for 15 minutes; drain.[1] Into a greased baking-dish put a layer of tomatoes, then one of onions, and sprinkle with salt and pepper. Repeat until all the vegetables are added.

Mix the bread crumbs and fat as directed for Stuffed Tomatoes (see p. 17). Sprinkle these crumbs on top of the

[1] When the water is drained from the onions, there is a loss of nutriment. In cooking onions, however, we usually consider it advisable to lose some food value for the sake of flavor. See "Nutriment versus Flavor," p. 251.

vegetables. Bake in a moderate oven (400° F.) for 30 minutes or until the onions are tender. Serve hot.

BROILED TOMATOES

Wash and cut tomatoes in halves, crosswise; do not peel them. Place them (with cut surface up) in a "frying" pan (without fat). Cook on top of the range or in a moderately hot oven at 400° F. for 30 minutes, or until the tomatoes are soft, but not broken. Add a bit of butter to each half of tomato and season with salt and pepper. Serve at once.

QUESTIONS

Since sugar is manufactured from beets, the latter must contain considerable sugar. From this fact and the results of Experiment 11 (p. 70), explain why beets must not be pared or cut in pieces before cooking.

State another reason why beets should not be pared or cut into pieces before cooking. Also give the reason for leaving a portion of the stem on beets during cooking.

Explain why only one beet should be tested for sufficient cooking, and why it should be tested with a knitting needle or wire skewer rather than with a fork.

What is the price of beets per pound? How many beets in a pound?

Carefully explain how the nutriment is retained by cooking beets and tomatoes according to the recipes of this lesson.

What is the advantage and disadvantage in draining water from onions after parboiling them?

LESSON XII

Fresh Vegetables (B)

Food Prejudices. — Most persons have decided likes and dislikes for certain foods. These opinions very often have no reasonable foundation. One taste of a food poorly prepared or a disparaging remark heard in childhood may be the cause for a lifetime's aversion for a food.

There is no better way to overcome food prejudices than by learning to prepare foods well — to make them tasty and nutritious — and to appreciate their nutritive value. Food prejudices like most others may be overcome by a thorough knowledge of the subject.

Come to the school kitchen with an open mind. When you understand why certain foods are valuable in diet and are able to prepare them skilfully, you may learn to enjoy them. To discover that foods which you previously considered commonplace and uninteresting are tasty, is really a pleasing experience.

Time for Cooking Fresh Vegetables in Water. — It is not possible to state just how long a vegetable will be required to cook in water. The time varies with the kind of vegetable, its size, and age. Usually the older a vegetable, the longer the time required for cooking. Young vegetables, especially green corn and tender cabbage, may be spoiled by too long cooking.

For novices, a time table may be helpful not only in determining when a food is sufficiently cooked but in deciding how long to allow for cooking a food before it is to be served. But do not depend entirely upon a time table. Judging by appearance and using the fork or knitting needle is the most reliable test.

TABLE

Asparagus	15–20 minutes	Onions	30–45 minutes
Beets (young)	45–60 minutes	Parsnips	30–45 minutes
Beets (old)	3–4 hours	Peas (fresh)	20–30 minutes
Cabbage	15–30 minutes	Potatoes	25–30 minutes
Carrots	30–60 minutes	Spinach	15–30 minutes
Cauliflower	20–30 minutes	Squash (summer)	20–30 minutes
Celery	20–45 minutes	String Beans	1–3 hours
Green Corn	12–20 minutes	Sweet Potatoes	15–25 minutes
Lima beans (fresh)	45–60 minutes	Turnips	30–45 minutes

Paring Vegetables. — If the outside skin of a vegetable is removed, it should be pared as thin as possible. The covering of the carrot and new potato is so thin that it can be removed by scraping, thereby saving the valuable nutritive substances just beneath the skin.

Turnips are an exception to the rule, a thick layer of cellular material covers them. For this reason, a thick paring is cut from turnips. (Cut a turnip in two and note the thickness of its skin.)

MASHED TURNIPS

6 medium turnips — Salt and pepper
2 tablespoonfuls butter or substitute

Scrub and pare the turnips. Cut each into cubes. Place in the top part of a steamer (see Figure 31) and cook until tender when tested with a fork or knitting needle.

Mash the turnips with a potato masher. Add butter or substitute and enough salt and pepper to season. Serve hot.

BUTTERED CARROTS

4 cupfuls carrots, cut into strips	2 teaspoonfuls salt
2 tablespoonfuls butter or substitute	Dash pepper

Scrub and scrape carrots, cut them into strips. Put them in a saucepan and add water to a depth of 1 inch. When the carrots are tender and only a small amount of water remains, add the butter or substitute and seasonings. Continue to cook slowly until almost all of the remaining water has evaporated. Serve the vegetables and surrounding liquid hot.

Young string beans cut in halves lengthwise and parsnips cut in strips may be cooked in the same way.

(Adapted from a *United States Department of Agriculture* recipe.)

QUESTIONS

Why should the outside skin of a vegetable be pared as thin as possible? What is the exception to this rule?

How should vegetable stock be utilized? Why?

Housekeepers usually add milk to potatoes when mashing them. Why is moisture not added to mashed turnips?

What advantage is there in steaming turnips rather than cooking them in water?

Why are carrots cooked in a small quantity of water rather than a large amount?

What are the prices of turnips and carrots per pound? How many of each of these vegetables in a pound?

LESSON XIII

Fresh Fruits

Fruit, a Necessity. — An authority[1] on diet says that at least as much money should be spent for fruits as for meat, eggs, and fish. Fruit should no longer be considered a luxury but a necessity in diet.

Fruits as well as vegetables are effective in preventing constipation, — the common disorder which may lead to serious disturbances. Most fruits, especially those containing considerable acid, such as lemons, oranges, and apples, are laxative. Prunes and figs are also valuable in constipation. Blackberries are unlike other fruits in this respect, — they are constipating.

A disease called scurvy is often due to a lack of fresh vegetables and fruits in diet. Orange juice is especially valuable in preventing scurvy. Fruits are valuable not only because they aid in preventing constipation and scurvy, but because they contain ash. Fruits are rich in mineral matter.

[1] See "Feeding the Family" (p. 240), by Mary Swartz Rose, Ph.D.

Kinds of Fruits. — In a broad sense fruits are seed vessels. This classification includes many foods that are ordinarily considered vegetables. So in this text seed vessels that are used as desserts are termed fruits. Rhubarb is not properly a fruit; it is a vegetable, but because it is used in the diet the same way as fruit, it is classed as such.

Fruits are sometimes classified as food fruits and flavor fruits. This distinction depends upon the quantity of sugar and water that fruits contain, — those containing much sugar, such as ripe bananas and dried fruits, being called food fruits and those containing much water and less sugar, such as oranges and strawberries, being termed flavor fruits. This classification may be somewhat misleading, however, for all fruits may be considered food fruits. Fruits containing much water are generally rich in ash and other valuable substances and hence have decided food value.

When to add the sugar to cooked fruits — before or after cooking — is a practical problem for every housewife. Fruits contain acids, and most cooked fruits require the addition of sugar to make them palatable.

The flavor of fresh fruit is generally popular. In cooking fruit it is desirable to retain the fresh fruit flavor. Housekeepers have found that a less desirable flavor results — the fruit "loses" more of its "fresh flavor" — if the sugar is cooked with the fruit. Moreover, when sugar is cooked with fruit, a sirup is formed, which is more apt to scorch than a mixture of fruit and water. For these reasons, it is well to add sugar to fruit *after cooking*, unless it is desired to preserve the shape of the fruit or unless fruit is made into jelly. Fruit is cooked in a sirup if it is desired to preserve its shape.

Suggestions for Cooking Fruits. — Fruits should be washed, cut into pieces, and then pared or peeled, unless they are to be strained after cooking. For some fruits it is not necessary to remove the skins before straining.

We have all seen the dark stain on a steel knife that has been used for paring fruit or certain vegetables. *This black substance is formed by the action of the acid of the fruit or vegetable on the metal.* It is disagreeable in taste and may produce harmful results. For this reason all fruits should be cooked in granite, earthenware, or glass utensils.

The characteristic odors from cooking fruits indicate loss of flavor. This can be prevented somewhat by cooking fruits at a *low* (simmering) *temperature* in a *covered* utensil. The *casserole* used on top of a range or in the oven is most desirable for cooking fruits. Slow cooking prevents some fruits from breaking into pieces.

FRUIT SAUCES

Cook fruit in enough water to keep from scorching. When the fruit is tender, remove it from the fire, stir or beat until smooth, or press through a colander or strainer. Add the sugar at once and stir until the sugar is dissolved. Use $\frac{1}{8}$ to $\frac{1}{4}$ cupful of sugar for each cupful of cooked fruit.

If fruit is somewhat lacking in flavor, it is often improved by adding spices or other flavoring. Some apples are made more palatable by adding cinnamon, nutmeg, or lemon juice.

STEWED FRUITS

Make a sirup of sugar and water, using one cupful of water and $\frac{1}{2}$ to 1 cupful of sugar. When the sirup is boiling, add the fruit and cook *gently* until tender. If the sirup is not thick enough when the fruit is tender, remove the fruit from the sirup, cook the sirup until of proper consistency, and then pour over the fruit.

Very firm fruit, such as quinces and sweet apples, as well as some unripe fruits, should be cooked in clear water until tender and then sweetened.

Comparison of Fruit Sauce and Stewed Fruit. — Use the same kind of fruit and the same quantity of sugar, and make a Fruit Sauce and a dish of Stewed Fruit. Compare the fruit cooked by the two methods as to flavor and appearance. Which is more like fresh fruit in flavor?

At what time during its preparation should sugar be added to cooked fruit? Explain your answer clearly. Give two exceptions to this rule. Should sugar be added to cooked fruit while the fruit is hot or after it is cool? Why? (See Experiments 10 and 11, p. 70.)

What is gained by not paring or peeling fruit that is to be strained after cooking? When fruit is cooking, what indicates a loss of flavor? What two precautions can be taken to preserve the flavor of fruits? What means, other than cooking in sirup, can be employed to retain the shape of cooked fruit?

RHUBARB SAUCE

Cut rhubarb (without peeling) into one-inch pieces. Place these in the top of a *double boiler*. Cook in a double boiler until soft, stirring occasionally. When cooked, add $\frac{1}{3}$ to $\frac{1}{2}$ cupful of sugar for each cupful of cooked rhubarb.

The *casserole* may be used for cooking rhubarb. Place the rhubarb in a casserole. Add one tablespoonful of water for each cupful of rhubarb. Cover and simmer on top of a range, or bake in a slow oven until soft. Add sugar as directed above.

QUESTIONS

How many pounds in one peck of apples? How many medium sized apples in a pound?

What is the price per pound of fresh peaches?

For what substances is fruit especially valuable in diet? Give suggestions for retaining these nutritious materials when cooking fruit. Make a list of fresh fruits, stating when each is in season.

NOTE TO THE TEACHER. — If desired, the lessons of Division Seventeen, *The Preservation of Food*, may follow this lesson. Also see the note on p. 39.

RELATED WORK

LESSON XIV

Review: Meal Cooking

MENU [1]

Scalloped Corn
Baked Apple
Tea

Outside Preparation of Lesson.

(*a*) Examine the recipes for these foods given in the text.

(*b*) Determine the number of servings each recipe will make.

(*c*) Study the methods of preparation so that no written directions regarding the process of cooking will be needed in class.

(*d*) Note the kind of utensils to be used for each food.

(*e*) Plan the order of preparing these foods so as to cook them in the least time.

(*f*) Plan the preparation so that all foods may be ready to serve in the proper condition — hot or cold — *at one time.*

Preparation of Lesson in Class.

(*a*) Having your plans well in mind, begin to work at once. Work independently.

[1] Note to the Teacher. — The "menu" of a "meal" lesson is to be assigned during the lesson previous to the "meal" lesson, so that its preparation can be planned before class time. Since only review foods are assigned, no instruction other than criticism of the finished product is to be given during the lesson. By cooking the group of foods in individual quantity, it is possible for pupils to complete the "meal" lesson in a 90-minute class period. It is more desirable, however, to cook enough of each food to serve five or six persons, provided the laboratory period is sufficiently long and the foods can be utilized in the lunch room.

(*b*) Cook a sufficient quantity of each food to serve one or more persons as the time permits.

(*c*) Soil the least number of dishes possible.

(*d*) Keep the table and utensils neat while working.

(*e*) Have the serving dishes ready, — warmed, if necessary.

(*f*) Taste the food before serving to see if properly seasoned.

(*g*) Just before serving food, clear the table so that it may be ready for serving.

(*h*) Serve all the foods *at once*, as a hostess cooking and serving without a maid.

(*i*) If your work is a failure in any way, determine the cause of the failure and its remedy.

LESSON XV

Home Projects [1]

Suggestions for Home Work. — Prepare vegetables for at least one meal daily.

Cook fruit at least once a week.

Suggested Aims:

(1) To cook vegetables in such a way that no nutriment is lost.

(2) To retain as much of the nutriment and fresh flavor of the fruits as possible.

[1] See Lesson IX, p. 51.

DIVISION FOUR

ENERGY-GIVING OR FUEL FOODS, — RICH IN CARBOHYDRATES

LESSON XVI

SUGAR: DIGESTION OF SUGAR

Energy; Fuel. — An automobile is a machine. The use of gasoline in this machine gives it energy or the power to move.

The human body is also a machine. Certain foods are taken into the human machine. The utilization of these foods gives the body energy or the power to move (*i.e.* to do work). The body is capable of both voluntary and involuntary work. Walking and running are examples of the former kind of work, while the beating of the heart and the circulating of the blood are examples of the latter kind.

At the same time that the body works, heat is generated. Hence foods not only give the body the power to do work, but incidentally they heat the body. Foods which enable the body to work are termed energy-giving or fuel foods.

There are a number of energy-giving or fuel foods: *sugar* is the first one to be considered.

Experiment 10: The Solubility of Granulated Sugar in Cold Water. — Place half a teaspoonful of granulated sugar in a test tube, add a little cold water, shake. Is the mixture clear? Set it aside for a few minutes. Does the sugar separate from the water?

Experiment 11: The Solubility of Granulated Sugar in Hot Water. — Dissolve half a teaspoonful of granulated sugar in hot water. Compare with Experiment 10. Which dissolves sugar more readily, — cold or hot water? If you desired to dissolve some sugar quickly, at what temperature would you have the water?

Experiment 12: The Solubility of Powdered Sugar. — Dissolve half a teaspoonful of powdered sugar in the same quantity of hot water used in Experiment 11. Does it dissolve more readily than granulated sugar? Explain this difference. If you desired to dissolve some lumpy sugar quickly, how would you prepare it?

The Digestion of Sugar. — Since sugar is so readily dissolved, and since dissolving is an important step in the process of digestion (see *Solution and Digestion*, p. 40), it would seem that the digestion of sugar would be easy. Some sugars, such as glucose, need no digestion in a chemical sense, and are wholesome provided their solution is not too concentrated. The digestion of other sugar, such as granulated sugar, is slightly more complex.

Because the digesting of some sugar is simple, one should not conclude that this food should be used in large quantities or in preference to other fuel foods. If sugar is eaten in large quantities there is so much dissolved sugar for the organs of digestion to take care of that the stomach and small intestines become irritated. This is especially true when candy is eaten between meals, — at a time when the stomach is empty. Then, too, it may ferment in the stomach or intestines and produce digestive disturbances. All sweets should be eaten only in moderation and either during a meal or at its close. When sugar is mixed with other foods, it is diluted, and is not so apt to cause distress.

Sugars and Sirups. — In various plants and in milk, the chemist finds a number of different kinds of sugar. These may be classified into two groups: — (1) single sugars and (2) double sugars. *Dextrose* or *glucose* is one of the single sugars, while *sucrose* or *cane sugar* is an example of a double sugar.

The solid sugars and sirups found at market and having different trade names consist of one or more of the different kinds of sugars. A discussion of these follows:

(*a*) *Granulated sugar* is made either from the sugar cane or sugar beet. The juice is pressed or soaked out of these plants, then purified, refined, and crystallized. *Powdered sugar* is prepared by crushing granulated sugar. *Confectioners' sugar* is a very finely ground form of cane or beet sugar. Granulated sugar is 100 per cent sugar. Crushed sugars sometimes contain flour or other materials.

Brown sugar is made from the cane or beet, but is not refined as much as is granulated sugar. It contains some ash and moisture.

(*b*) *Corn sirup* is made by boiling corn-starch with an acid and then refining the product. This sirup contains no cane sugar. Its sweet flavor and sirupy consistency are due to the presence of 38.5 per cent glucose and 42 per cent dextrin (see p. 102). Glucose is not as sweet as granulated sugar. Hence, in depending upon corn sirup alone, the tendency is to use more sugar than is advisable so as to satisfy our taste for sweets. At least $1\frac{1}{2}$ times as much corn sirup as granulated sugar is needed to produce the sweetness of the solid sugar. A mixture of corn sirup and granulated sugar is often used for sweetening foods.

(*c*) *Molasses and Sorghum.*— Molasses is a by-product of cane sugar. In addition to sugar, it contains certain mineral materials such as lime. Since it is especially necessary that foods given children contain lime, the use of molasses in place of sugar may be recommended for children.

One should remember, however, that much sugar of any kind is not good for children. Molasses contains some acid. Because of modern methods of sugar refining, however, molasses is less acid than the sirup of former days. It also differs in flavor.

Sorghum is a sirup prepared from the sorghum plant. It contains ash and has a characteristic flavor. If the flavor of molasses or sorghum is too strong to be pleasant, a mixture of equal parts of corn sirup and molasses or sorghum may be found desirable. Mixtures of different sirups sold under various trade names may be purchased.

(*d*) *Honey* is sugar extracted from flowers. Its limited supply and cost prevent its general use. It is not so rich in mineral matter as is molasses.

(*e*) *Maple Sirup and Sugar.* — Maple sirup and sugar are prepared from sap extracted from the maple tree. They both have a distinctive flavor in addition to their sweet taste. Maple sugar contains approximately 83 per cent of sugar, while maple sirup contains about 71 per cent.

PEANUT CANDY

2 cupfuls granulated sugar *or*	$\frac{3}{4}$ cupful chopped peanuts
1 cupful granulated sugar *and*	$\frac{1}{4}$ teaspoonful salt
1 cupful corn sirup (dark)	

Mix the peanuts and salt and place in the warming oven to heat. If sugar is used alone, put it in an iron pan. Place the pan over a low flame and stir constantly until the sugar is changed to a *light brown* sirup.

If a combination of sugar and sirup is used, put them in a pan, stir, and cook until the mixture is very brittle when tried in cold water.

Add the chopped peanuts and salt to either kind of sirup, stirring them in as quickly as possible. Pour immediately into a hot, *unbuttered* pan. When slightly cool divide into squares with a chopping knife.

Puffed cereals or *shredded coconut* may be used instead of peanuts. Commercial salted peanuts may be used also. When the latter are used, the salt in the recipe above should be omitted.

Caramelized Sugar. — It should be noted that when heat is applied to granulated sugar, the latter liquefies and becomes brown in color. This brown liquid is called *caramel.* The process of making it is called *caramelization.*

When sugar is caramelizing, it reaches a high temperature. The melting point of tin is near the temperature of caramelized sugar. The enamel of granite ware is apt to chip off if subjected to great changes of temperature. Iron is not affected by the highest cooking temperature, hence it is desirable to use an iron utensil for caramelizing sugar.

NOTE. — When cane or granulated sugar is caramelized, a small quantity of an injurious substance called *furfural* is formed. (See Journal of Home Economics, Vol. IX (April, 1917), p. 167.) The more sugar is heated, the more of the injurious substance is produced. Also, cane sugar yields more furfural than glucose, — the kind of sugar that is present in corn sirup. When caramelized sugar is boiled with water, however, the furfural is expelled.

In making Peanut Candy, the caramelized sugar cannot be boiled with water, hence it is desirable to use a combination of granulated sugar and corn sirup and heat the mixture until it is only light brown in color.

Experiment 13: The Solubility of Caramel. — Immediately after removing the candy from the iron pan, pour hot water into the pan. Allow it to stand for several minutes, then examine. Is caramel soluble in water? Does it dissolve more or less readily than granulated sugar? What practical application can be drawn from this experiment with regard to washing a pan in which sugar has been caramelized?

QUESTIONS

Weigh one pound of granulated sugar. How many cupfuls does it measure?

Weigh one pound of powdered sugar. How many cupfuls does it measure?

What is the price per pound of granulated and of powdered sugar?

What is the price of corn sirup per can? How much does a can measure?

Calculate the cost of peanut candy made entirely with granulated sugar and that made with granulated sugar and sirup.

Note the proportion of unshelled to shelled peanuts. How many unshelled peanuts are required for one cupful of shelled peanuts?

Why is an iron rather than a granite pan used for making peanut candy?

What is the advantage of heating the pan?

Why is it necessary to pour the mixture into the pan immediately after adding the peanuts?

Why is a mixture of granulated sugar and corn sirup used in the making of peanut candy rather than corn sirup? (See *Corn Sirup*, p. 72.)

From your work in physiology, explain the relation of the digestion, absorption, and assimilation of foods.

LESSON XVII

Sugar-rich Fruits: Dried Fruits (A)

Dried Fruits. — The wrinkled skins of dried fruits indicate that there has been a loss of some material. The water of fresh fruits evaporates as they are dried. Hence dried fruits contain very much less water than fresh fruits. But weight for weight they contain a greater quantity of sugar and ash.

Like all fruits, dried fruits are especially valuable for their ash. They are also valuable for their sugar. Three fourths of the weight of most dried fruit is sugar.

Dried fruits such as raisins, dates, figs, and prunes are valuable sweets for boys and girls. It is much better to eat one of these fruits than candy. This is because the sugar is mixed with other materials and as explained previously does not irritate the digestive organs as does the concentrated sugar existing in most candies. (See the *Digestion of Sugar*, p. 71.) The fact that mineral materials exist along with sugar is another point in favor of the sweet fruits. All the above-mentioned fruits contain iron. Very young children are fed prune juice because of its laxative effect.

The unpopularity of prunes is unfortunate. This may be because prunes were formerly one of the cheapest fruits or because they are cooked and served in the same way too often. A pleasing variation may be made by combining them with other food materials. Many kinds of very tasty desserts containing prunes may be made. Many varieties of prunes may be cooked without the addition of any sugar. Desirable results can often be secured by combining prunes and other dried fruits with tart fruits such as apricots, apples, and rhubarb.

Raisins are a favorite food of mountain climbers and those tramping long distances. They serve as a satisfying diet on such trips because of their high sugar content (sugar has been mentioned previously as energy-giver, see p. 70). Since they are a dried fruit, a small quantity furnishes much food. This is an advantageous factor in carrying them.

General Rules for Cooking Dried Fruits. — Wash the fruit carefully. Place it in the saucepan in which it is to be cooked and pour enough cold water over the fruit to cover it. Cover the saucepan and allow the fruit to soak for several hours or overnight. Then cook the fruit at simmering temperature in the water in which it was soaked. When the fruit is tender, remove the saucepan from the fire, add sugar if desired, and stir carefully until the sugar is dissolved. Serve cold.

PRUNES

Prepare according to the general rule. For each 2 cupfuls of prunes add about $\frac{1}{4}$ cupful of sugar and one tablespoonful of lemon juice. The sugar may be omitted and only the lemon juice added.

APRICOTS

Prepare according to the general rule. For $\frac{1}{2}$ pound of apricots add $\frac{1}{2}$ cupful of sugar.

To Prepare Raisins for Cooking. — Raisins that are sold in packages need only slight washing. Before using, they should be separated and examined for any bits of stem that have not been removed before packing. It is desirable to cut each raisin in halves when used for cakes and breads.

Raisins that are sold by "bulk" need careful washing. Place seeded raisins in a strainer and pour cold water over them; drain well. If the raisins are to be used at once or in a cake, dry them on a towel.

If raisins are to be seeded, cover them with boiling water. When they are soft, drain and press out the seeds.

To Prepare Currants for Cooking. — "Package" currants need but little washing, but they should be examined carefully for bits of stem before using. To clean "bulk" currants place them in a colander or strainer, shake flour over them, and rub the floured currants between the hands. Pour water through the strainer until the water comes through clear. If the currants are to be used in a cake, dry them in the sun, on a towel, or in a "cool" oven.

MIXED FRUIT SAUCE

½ pound dried apricots	1 lemon, — juice
1 pint water	1 orange, — juice and grated rind
1 cupful raisins	⅝ cupful sugar
¼ teaspoonful salt	

Soak the apricots for several hours or overnight in the water. Add the other fruits and cook the mixture at simmering temperature until the apricots and raisins are tender. Add the sugar and salt. Stir until dissolved. Serve the sauce cold as a dessert.

QUESTIONS

Weigh 1 cupful of dried fruit and record weight.

Weigh and measure soaked fruit (1 cupful before soaking) and record weight and measure. To what is the increase in measure of the soaked fruit due? What use should be made of the water in which dried fruit is soaked? What does this water contain? (See Experiment 10, p. 70.)

What is the purpose of soaking dried fruit before cooking?

What is the purpose of covering the fruit while soaking?

Using the data regarding fresh fruit obtained in Lesson I, p. 14, and that obtained by weighing dried fruit before and after soaking, estimate the difference in the cost of one pound of fresh and of soaked dried fruit.

State two reasons for combining raisins with apples and apricots in Baked Apples, p. 5, and Mixed Fruit Sauce, p. 77.

LESSON XVIII

Sugar-rich Fruits: Dried Fruits (B)

Desserts and Food Value. — Very often dried fruits and nuts are used as accessories after a meal. Under these conditions they are digested often with difficulty, because the meal itself has taxed the digestive organs. These foods should be considered as a part of the meal and should not be added after enough other foods have been eaten. Not only dried fruits and nuts but other desserts often prove distressing, not because they are unwholesome, but because too much food has been eaten.

PRUNE PUDDING

1 cupful cooked prunes, seeded and chopped	1 tablespoonful butter *or* substitute, melted
½ cupful sugar	3 crackers (rolled fine) *or*
1 cupful chopped nuts	½ cupful dried bread crumbs
½ cupful milk or prune water	1 teaspoonful baking powder
1 teaspoonful vanilla	Salt

Mix all the ingredients. Pour into a buttered baking-dish. Bake in a moderate oven (*i.e.* 350° F.) for 30 to 40 minutes, or until the mixture is firm. Serve hot or cold with plain or whipped cream.

DATE PUDDING

½ cupful sugar	1 teaspoonful baking powder
1 egg	Salt
2 tablespoonfuls milk	1 cupful dates, seeded, and cut in pieces
⅓ cupful flour	1 cupful California walnuts, chopped

Mix the sugar, milk, and egg. Mix the remaining ingredients; then add to the first mixture. Mix, and turn into an oiled baking-dish or pan measuring 8 by 8 inches. Bake in a moderate oven (350° F.) from 30 to 40 minutes or until it is firm. Serve hot or cold with plain or whipped cream.

QUESTIONS

How many dry, uncooked prunes are required to make 1 cupful of cooked prunes? (See *Questions*, p. 77.)

What are the prices per pound of figs and dates?

How many will the above recipes serve?

What ingredients in these puddings scorch readily? Why is Prune Pudding surrounded with hot water during baking?

LESSON XIX

Cereals: Starch and Cellulose

Starch is a very important fuel food; like sugar, it gives energy to the body. Starch is closely related to sugar; it has much the same composition and the same use in the body. In certain respects, however, starch differs from sugar.

Experiment 14: The Starch Test. — Put a drop of tincture of iodine on, — corn-starch, flour, rice, cream of wheat, wheatena, oatmeal, tapioca, potato, meat, and egg. What is the result?

If a substance contains starch, it changes to a blue color when tincture of iodine is added to it.

From these experiments determine in which class — animal or vegetable — the starchy foods belong.

Experiment 15: The Effect of Cold Water on Starch. — Mix ½ teaspoonful of corn-starch or flour with cold water in a test tube or glass cup. What happens to a solid substance when it is dissolved? (See Experiment 6, p. 40.) Set the mixture aside for a few minutes, then note its appearance. Is starch soluble in cold water? What important difference between starch and sugar does this experiment show?

Experiment 16: The Effect of Heat on Starch. — Hold to the light the starch and water mixture from Experiment 15. Is it opaque or transparent? Turn the mixture into a saucepan, heat, and stir it; return the mixture to the test tube or cup and again hold it to the light. What change was caused by heating it? Set the mixture aside for a few minutes. Have the starch and water separated as in the uncooked starch? Can you say it is insoluble, like uncooked starch? Can you say it is soluble, like sugar? What term indicating a half-dissolved condition can you apply to the cooked starch?

Experiment 17: Stiffening of Cooked Starch. — Place the test tube containing cooked starch from Experiment 16 in cold water. After ten minutes examine it. Can you pour it out of the tube? How does cooked starch change when cooled?

Experiment 18: The Structure of Starch. — Examine starch under the microscope. While you are still looking through the microscope, make a drawing of several grains of starch. Insert this drawing in your notebook.

Cellulose. — Cellulose is a tough substance found in the fiber of wood. As previously mentioned (see p. 58) the outside covering of vegetables and fruits and their interior framework contain much cellulose. The fibrous material found in rolled oats consists almost entirely of cellulose.

Experiment 19: Separation of Cellulose and Starch. — Place a heaping teaspoonful of rolled oats in a cup and add just enough water to cover it. Allow it to stand for at least 15 minutes. Pour the mixture into a cheese-cloth and press out the moisture and much of the starch, catching it in a saucepan. Rinse the starch out of the cloth as thoroughly as possible by holding it under running water. Examine the substance remaining in the cloth. Tear it into pieces. Is it tough? Does it suggest any common material? What is it? Heat the contents of the saucepan. What is this substance?

The tiny grains of starch shown under the microscope (see Figure 23) contain both starch and cellulose. The latter forms the outer covering of the microscopic grains. Starchy vegetables contain much cellulose: (*a*) in the outside covering; (*b*) in the interior framework; (*c*) in the covering of the starch grains.

Some plants rich in cellulose can be eaten in the raw state. But certain fibrous foods, especially cereals or grains, are irritating if eaten in the uncooked condition. It is necessary to soften them if used as food. Now cellulose itself is not soluble in cold or hot water nor is it softened by boiling in water. But other materials existing with cellulose are softened or changed by cooking. Hence changes in these substances in contact with the cellulose brought about by boiling water soften the food and separate cellulose fibers.

From *Household Chemistry*, by J. M. Blanchard.

FIGURE 23. — GRAINS OF STARCH. *a*, potato starch; *b*, corn-starch. (Much magnified.)

Heat and moisture applied to starchy foods serve three important purposes:

(*a*) They soften the food; (*b*) they change the starch to a paste or make it semisoluble; (*c*) they improve the flavor.

Cellulose is not a fuel material; it does not serve in the body as an energy-giver. Its value in diet is due to the fact that it is bulky and furnishes ballast for the alimentary canal. It stimulates the flow of the digestive juices as it brushes against the walls of the digestive tract, and thus aids in the digestion of foods and in the elimination of waste material.

Carbohydrate, a Foodstuff. — Because sugar, starch, and cellulose have somewhat the same composition and some properties in common, they are grouped into one class, viz. *carbohydrate*. Sugar, starch, and cellulose are all included in the term carbohydrate. *Carbohydrate is one of the foodstuffs.* Sugar is a food containing only the carbohydrate foodstuff. Cereals contain not only carbohydrates but other foodstuffs. They contain, however, a larger quantity of carbohydrate than any of the other foodstuffs, for which reason they are classed as carbohydrate-rich foods.

Cereals. — Cereals are cultivated grasses, the seeds of which are used for food. The most important are wheat, Indian corn or maize, rice, oats, rye, and barley. From these many different kinds of flours, meals, and breakfast foods are prepared.

Cereals rank high in nutritive value. Many of them contain about 75 per cent of starch. They also contain ash and a substance which builds the body. Because they are widely distributed in various climates, they have an important place in man's diet.

At market one finds two classes of cereals sold as breakfast foods — (1) the ready to eat and (2) the uncooked or partially cooked grains. The ready-to-eat cereals cost much more per pound than the cereals that require cooking. The difference in the price per pound, however, is not an accurate difference in the cost of the two, for the cost of the fuel in cooking grains at home must be taken into consideration.

Of the cereals that require cooking, those that are partially cooked are doubtless the more popular. Many of these such as rolled oats or wheat are steamed and rolled. Hence they take much less time to prepare in the home kitchen than the uncooked grains.

All breakfast cereals require long cooking to make them most palatable, the time of cooking depending upon the character of the cellulose and the method of preparing the cereal for market.

Most partially cooked grains are improved by a longer cooking than is usually given them. It is interesting to measure equal quantities of a rolled cereal and cook one quantity for 20 minutes and the other for $1\frac{1}{2}$ hours and taste each. The superior flavor and texture of the well-cooked cereal is well worth the additional length of time of cocking. Grains are also found on sale in bulk and in package. The latter cost more but insure greater cleanliness. Since, however, cereals sold in bulk are those that require cooking, they will be thoroughly sterilized before serving and need occasion no concern regarding their cleanliness.

General Rules for Cooking Cereals. — Pour the cereal slowly into boiling salted water. Cook directly over the flame for about 10 minutes. Then place over boiling water and cook from $\frac{1}{2}$ to 8 hours. Usually *one teaspoonful of salt* is used for *each cupful of cereal.* The quantity of water depends upon the kind of cereal. The double boiler is particularly good for cooking cereals. The *fireless cooker* (see p. 90) also is a most satisfactory device for cooking these foods easily and economically.

Starchy foods are most easily digested when well masticated. Dry foods require more mastication than moist foods. It is well then to have the water used in cooking the cereal entirely absorbed. If, when nearly done, the cereal is too moist, uncover the vessel and cook until the excess of water is evaporated.

Care should be taken, however, not to allow a tough skin to form on the top of the cereal. This digests with difficulty. Its formation can be prevented by keeping the cereal covered or by stirring occasionally.

Heat ready-to-eat cereals in the oven until they are crisp.

ROLLED OATS OR WHEAT

3 cupfuls boiling water 1 teaspoonful salt
1 cupful cereal

Prepare according to the general directions, cooking in the double boiler at least $1\frac{1}{2}$ hours.

CREAM OF WHEAT OR WHEATENA

3 cupfuls boiling water 1 teaspoonful salt
$\frac{1}{2}$ cupful cereal

Prepare according to the general rule, cooking in the double boiler at least $\frac{1}{2}$ hour.

A few minutes before taking from the fire, $\frac{1}{2}$ pound of dates, cleaned, stoned, and cut into pieces, may be added. Raisins or figs may also be used with Cream of Wheat and other cereals.

QUESTIONS

How would the temperature of boiling water be affected if a cupful of cereal were poured into it all at once? From this explain why cereals should be added *slowly* to the boiling water.

Compare the cooked and uncooked cereal. How does it change in appearance and quantity?

Why are cereals not cooked entirely over the naked flame?

What is the price, weight, and measure of a package of Rolled Oats or Wheat? Of a package of Cream of Wheat or Wheatena?

What is the cost of the quantity of cereal indicated in the recipes above?

Calculate the difference in the cost per pound of ready-to-eat and uncooked cereals.

LESSON XX

CEREALS: RICE (A)

Polished and Unpolished Rice. — At market one finds two kinds of rice, — one white and pearly in appearance called *polished* rice, and the other, gray or brown and lusterless called *unpolished* rice. In preparing rice for market, the outer husks of the grain are removed and the rice is cleaned. It may then be sold as unpolished rice or it may be further treated by rubbing or polishing to make it ready for market. Rice is subjected to this latter process merely to satisfy the demand of purchasers. The food value of polished rice is inferior to that of the unpolished grain. Much valuable ash and other material are lost. Indeed, a certain disease,[1] due to improper nourishment, has been cured by giving the sufferer rice polishings. The flavor of rice is also impaired by polishing it. Unpolished rice is much the more valuable food. It requires, however, longer cooking than polished rice. Soaking in water before cooking shortens the length of time required for cooking.

To Clean Rice. — To wash rice, put it in a strainer and allow the water from a faucet to run through the strainer. Rub the rice between the hands.

RICE (cooked over boiling water)

3 cupfuls boiling water 1 teaspoonful salt
1 cupful rice

Follow the General Rules for Cooking Cereals (p. 83); when the rice is added to the boiling water, stir it to prevent adhering to the pan. Cook over hot water, *i.e.* in a double boiler, until the grains are soft (usually about 45 minutes).

The above ingredients may be placed in a steamer (see Figure 31, p. 108) and cooked in steam until the rice grains are tender. It is then called *Steamed Rice*.

Rice is most palatable combined with various fruits.

[1] Beri-beri, a disease common among those inhabitants of Oriental countries whose diet consists almost entirely of polished rice and fish.

FIGURE 24. — A CUPFUL OF RICE BEFORE AND AFTER BOILING.
The large utensil was required to boil it; the water drained from it is in the jar.

BOILED RICE[1]

3 quarts boiling water 2 teaspoonfuls salt
1 cupful rice

Add the salt to the boiling water. When the water boils rapidly, add the rice slowly, so that the water does not stop boiling. Boil *rapidly* for 20 minutes or until the grains are soft. Turn into a colander or strainer to drain. Rinse with hot water, drain well, then sprinkle with salt.

Save the water from the Boiled Rice for the experiment below and for preparing Cheese Sauce for class work.

When the rice is boiling, decide whether or not it should be covered tightly.

Experiment 20: The Difference in Nutritive Value of Boiled Rice and Rice Cooked over Boiling Water. — Pour a little of the water from the boiled rice into a test tube. Cool the rice water and test

[1] Reserve some of the cooked rice of this lesson for the following lesson.

it with iodine for starch. Is any of the starch from rice cooked over boiling water wasted? Which method of cooking rice leaves more nutriment in the cooked product?

CHEESE SAUCE (made with rice water)

1 pint rice water
1 tablespoonful corn-starch
1 teaspoonful salt
$\frac{1}{4}$ teaspoonful mustard
$\frac{1}{8}$ teaspoonful paprika
$\frac{1}{2}$ cupful cheese grated or cut into pieces

Mix the corn-starch with about 2 tablespoonfuls of cold rice water. Heat the remainder of the liquid. Add the corn-starch mixture to the hot rice water. Stir and cook for about 10 minutes. Then add the seasonings and cheese. Continue stirring and cooking until the cheese is blended with the other ingredients. Serve hot over cooked rice.

One cupful of tomatoes or a small quantity of pimentos (cut into pieces) may be added along with the cheese to the sauce. If pimentos are used, the paprika should be omitted.

QUESTIONS

How is rice tested for sufficient cooking?

Why does rice take a shorter time to cook than most of the wheat and oat foods? (See *Cereals*, p. 82.)

Note the difference in the quantity of water used for boiled rice and for rice cooked over boiling water. Note that the saucepan is used for cooking one and the double boiler for cooking the other. From this explain the reason for the difference in the quantity of water used.

Which method of cooking rice takes longer? Explain the difference in the length of time of cooking.

Measure the rice after cooking. How much has it increased in bulk?

If one desired 2 cupfuls of cooked rice, how much uncooked rice should be used?

Compare the individual grains of rice cooked in boiling water and rice cooked over boiling water, — are the grains separated or pasted together? Explain the difference in appearance.

What ingredients do cereals contain that make it possible to mold them (see Experiment 17, p. 80)? Which is the better for molding, — boiled rice or rice cooked over boiling water? Why?

What is the advantage in using rice water rather than plain water to prepare Cheese Sauce?

What other use could be made of rice water?

LESSON XXI

CEREALS: RICE (B)

RICE PUDDING

Steamed rice may be prepared for a simple dessert by using both milk and water. Follow the recipe for Rice Cooked over Boiling Water, p. 85, using $1\frac{1}{2}$ cupfuls of water and $1\frac{1}{2}$ cupfuls of milk. Cook the water and rice until the water is absorbed, add the milk, and continue cooking over water. Serve with cream and sugar, or with a suitable sauce.

RICE PUDDING (made with cooked rice) [1]

2 cupfuls cooked rice	$\frac{1}{2}$ cupful raisins
$\frac{3}{4}$–1 cupful milk	$\frac{1}{3}$ cupful sugar

Grated rind $\frac{1}{2}$ lemon

These ingredients may be cooked in several different ways. By changing the flavoring, method of serving, and sauce, rice desserts of pleasing variety may be made from the materials above.

The pudding may be *baked* in the following manner:

Mix the ingredients, place in a buttered baking-dish, and bake in a moderate oven (350° F.) for 35 minutes or until the rice has absorbed the milk and is brown. Vanilla or nutmeg, or both, may be substituted for the lemon rind.

[1] A portion of the rice cooked in the previous lesson may be utilized in making this pudding.

This dessert may be *cooked over water* by mixing the ingredients in the top of a double boiler and cooking until the milk is absorbed. Then butter hot custard cups or tea cups and press some rice into each. Turn out at once and serve with Caramel, Chocolate (see p. 186), or other sauce.

Lemon Sauce (see p. 114), in which dates, cut into pieces, have been cooked, makes a tasty sauce for this pudding. When Lemon Sauce and dates are used, the raisins should be omitted and the pudding flavored with nutmeg.

CARAMEL SAUCE

$\frac{1}{3}$ cupful sugar	1 cupful milk
2 tablespoonfuls flour	$\frac{1}{2}$ teaspoonful vanilla
1 tablespoonful butter or substitute	Salt

Mix the sugar, flour, and butter in a frying pan; then heat the mixture to caramelize the sugar, stirring constantly. Scald the milk in a double boiler. When the sugar is caramelized, add it to the hot milk and heat the mixture until the caramelized sugar is dissolved. Add the salt and vanilla.[1] Serve hot or cold over puddings.

QUESTIONS

Why is it advisable to use a double boiler for cooking rice? (See Lesson XX, p. 84.)

If rice is cooked in a double boiler and milk is to be added, why should not the milk be added until the rice mixture is placed over hot water? (See statement regarding the scorching of milk in *Questions*, p. 101.)

Which method of cooking the Rice Pudding — baking or cooking over water — requires more milk? Explain your answer. Also explain why a definite quantity of milk cannot be stated in the recipe.

See "Note," p. 74. Is any of the injurious substance formed in caramelizing sugar present in Caramel Sauce?

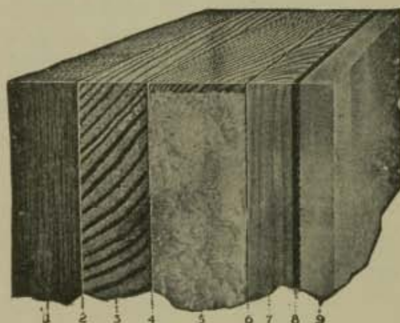
[1] If the sauce is to be served cold, it is well to allow the cooked mixture to cool before adding the vanilla (see *Flavoring Extracts*, p. 265).

LESSON XXII

Cereals and the Fireless Cooker

The Fireless Cooker. — The fact that fuels are expensive and that the supply of some fuels is diminishing, makes it advisable to conserve heat. This can be done in no more satisfactory way than by means of a fireless cooker.

It has been said that future historians in summing up the great achievements of the first quarter of the twentieth century will probably name as the most important, wireless telegraphy, aviation, and fireless cookery. The fireless cooker cannot be used with all methods of cooking, but its possibilities are many.



Courtesy of *McCray Refrigerator Co.*

Figure 25. — Insulated Wall of a Refrigerator.

The Principle of Fireless Cookery. — In Experiment 2 (p. 16) it was found that wood did not transmit heat rapidly, while tin did. Another familiar illustration will show the difference between wood and metal in transmitting heat. A metal door knob feels very cold on a winter day, because the metal conducts the heat away from the hand rapidly, while a wooden knob is comfortable to touch. Wood is termed a poor conductor of heat. Metals are good conductors of heat.

Paper, hay, excelsior, sawdust, cork, wool, feathers, and many other materials are poor conductors of heat. If any hot substance is surrounded by any of these poor conducting materials, the heat of that substance is retained for some time. Also, if any cold substance is surrounded by a poor conductor, the substance remains cold. In throwing a piece of carpet or newspaper over an ice cream freezer, to prevent the ice from melting, one makes use of the latter principle.

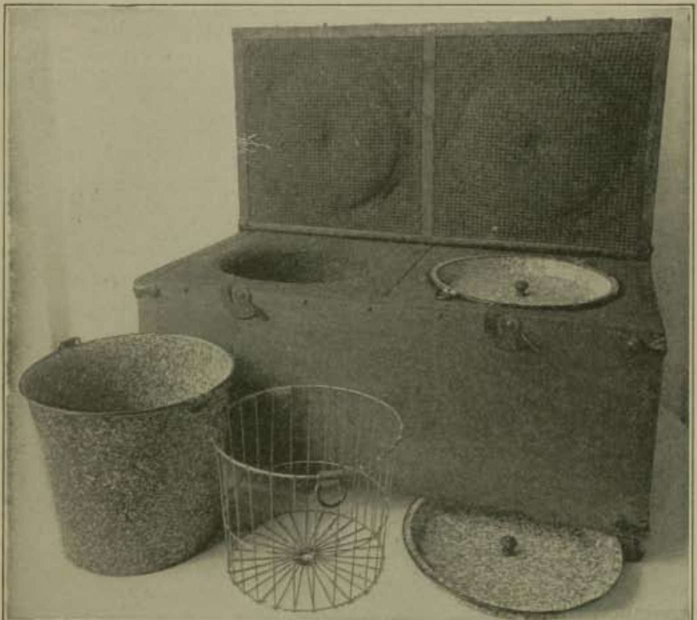


FIGURE 26. — FIRELESS COOKER HAVING EXCELSIOR PACKING.

The walls of a well-built refrigerator consist of a number of layers of non-conducting materials (see Figure 25).

To understand the principle involved in "cooking without fire," try the following:

Experiment 21: Retention of Heat. — Fill 2 tin measuring cups half full of boiling water. Immediately inclose one cup of water in a paper bag or wrap paper about it so there will be considerable air space between the cup and paper. After 15 minutes, insert a thermometer into the water in each of the cups. Which is hotter? What has "kept in" the heat of the hotter water?

The fireless cooker is a device containing cooking kettles which are surrounded by some poor conductor. When food is heated thoroughly, the heat can be retained for a number of hours by placing the hot food in the fireless cooker.

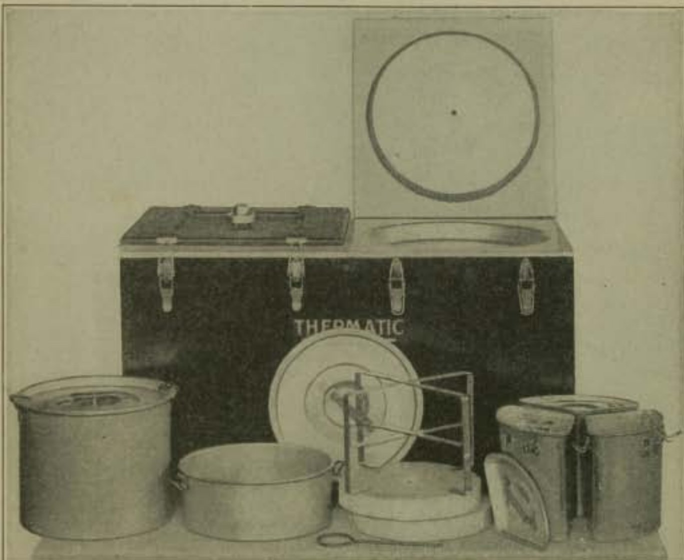
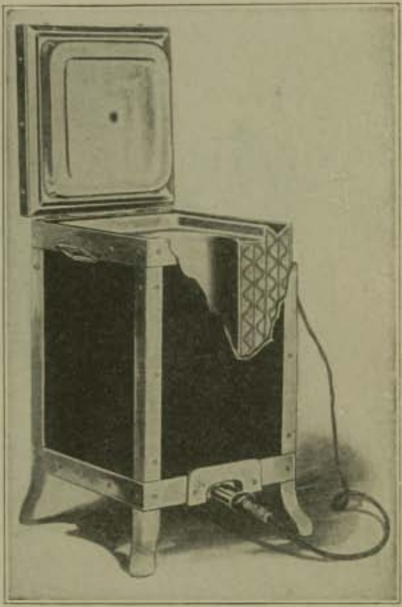


FIGURE 27. — FIRELESS COOKER WITH STONE DISKS.
Note the kettles of various shapes.

In the ordinary fireless cooker it is possible to cook all foods that can be cooked in water at a temperature below the boiling point of water, *i.e.* simmering temperature. Another type of fireless cooker has a metallic or an enamel lining and is provided with movable stone disks. Both the stones and food are heated on a range and then introduced into the cooker in such a way that the stones are under and over the kettle of food. By this arrangement, foods can be cooked at a higher temperature than in the ordinary fireless cooker (see Figures 26 and 27).

There are also electric fireless cookers (see Figure 28). Such cookers are equipped with a heating element which is placed in the bottom of the insulated box. With these it is not necessary to heat the food before placing it in the cooker. The uncooked food is put into the cooker and the current turned on. By means of a clock arrangement the current may be cut off when the desired length of time of heating has passed.

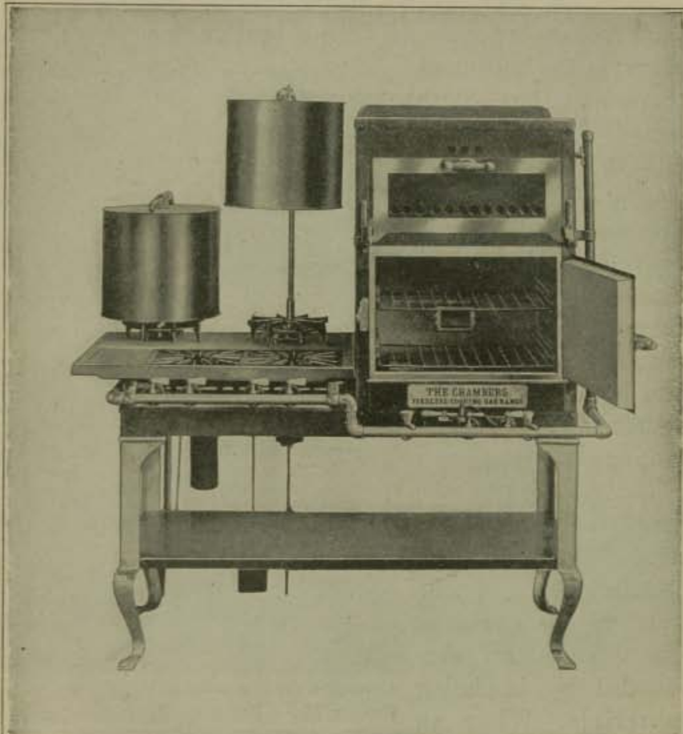


Courtesy of the *Standard Electric Stove Co.*

FIGURE 28. — ELECTRIC FIRELESS COOKER. Has a heating element in the bottom of the cooker.

The principle of the fireless cooker is used on some of the modern gas and electric ranges. The walls of the ovens of these ranges are surrounded by insulating materials. When an oven is heated and has reached the desired temperature, the gas or electricity is cut off, but the baking temperature is retained for some time. The top burners of some gas ranges have a fireless cooker attachment in the form of an insulated hood. The food is first heated over the burner, then the hood is lowered over the food, and the gas is cut off. The food continues to cook, however, by the retained heat (see Figure 29).

Suggestions for Using a Fireless Cooker. — One should keep the following in mind in using the ordinary fireless cooker:



Courtesy of the *Chambers Manufacturing Co.*

FIGURE 29. — GAS RANGE HAVING FIRELESS COOKER ATTACHMENT, INSULATED OVEN AND HOODS.

1. Have the food heated thoroughly before placing in the fireless cooker. (This direction does not apply to an electrical fireless cooker such as shown in Figure 28.) If the foods are small, as cereals, 5 minutes' boiling is usually sufficient cook-

ing on the range ; if large in size, as a piece of beef, 30 minutes is required to heat it through.

2. After heating, place the *covered* kettle containing the food into the cooker immediately. It is well to have the cooker near the range so as to waste but little heat while getting the food into the cooker.

3. The kettle should be well filled. A small quantity of food should not be placed in a large kettle. It is possible, however, to fill the large kettle almost full of boiling water, then rest a wire rack on the rim of the kettle and place a small pan containing the food in the wire rack (see Figure 26). Or place the food in a pan with sloping sides and broad rim, such as a "pudding pan," which may be set in the large kettle so as to rest on the rim.

4. Do not open the cooker to "see how the food is getting along." If the box is opened, the food must be removed at once. The food may, however, be reheated and returned to the cooker. It is sometimes necessary to follow this plan, where food requires very long cooking.

5. The length of time a food must be left in the fireless cooker varies with the kind of food and style of cooker. In many of the homemade boxes, the water does not remain hot enough for cooking after 12 hours; in some, for not more than 8 hours. If foods require longer cooking than this, they should be removed and reheated as mentioned above. *Food should never be allowed to become cool in a fireless cooker.*

6. After using any type of fireless cooker, let the lid remain wide open for 2 or 3 hours. Except when in use do not close it tightly.

Every thrifty housekeeper should possess and use a fireless cooker. As has been mentioned, it saves fuel, prevents the strong odor of food permeating all parts of the house, lessens work and care in cooking, prevents burning and scorching, and provides workers and picnickers with warm lunches. A fireless cooker can be made satisfactorily at home with little expenditure of effort and money. It has been found that paper crumpled so as to afford considerable air space is a satisfactory non-conducting material for a fireless cooker. Detailed directions for making a fireless cooker are given in United States Department of Agriculture, Farmers' Bulletin 771, "Homemade Fireless Cookers and Their Use" and in several popular books.

CORN-MEAL MUSH

4 cupfuls boiling water   1 cupful corn-meal
1 teaspoonful salt

Mix the ingredients in the small pan of the fireless cooker and cook directly over the flame of a range, boiling for 5 minutes, and stirring occasionally. Cover and place in the large kettle of the fireless cooker which contains boiling water. Place in a fireless cooker for 5 to 10 hours.

NOTE. — If corn-meal mush is to be cooked over a flame in a double boiler, prepare according to the general rule for cereals and cook over boiling water for at least 3 hours.

CORN-MEAL MUSH FOR "FRYING"

2 cupfuls corn-meal   2 teaspoonfuls salt
2 tablespoonfuls flour   2 cupfuls cold water
1 quart boiling water

Mix the dry ingredients, add the cold water, and mix thoroughly. Place the boiling water in the small pan of the fireless cooker. Stir the corn-meal mixture into the boiling water and cook 10 minutes directly over the flame, stirring constantly. Cover and place in the large kettle of boiling water. Place in the fireless cooker 5 to 10 hours. Remove the pan of mush from the water and allow the mush to cool.

NOTE. — Corn-meal Mush for frying may be cooked over a flame in a double boiler according to the recipe given above. Cook it for several hours.

RICE AND TOMATOES

½ cupful rice	1 cupful tomatoes
1 tablespoonful butter or substitute	1 teaspoonful salt
1 slice onion	½ teaspoonful celery salt
1¼ cupfuls boiling water	⅛ teaspoonful pepper

In the small pan of the fireless cooker cook (over a flame) the rice, onion, and fat, stirring constantly until they are slightly brown. Add boiling water and cook until the water is almost absorbed. Add the tomatoes and seasoning and heat the mixture until it boils. Cover and place in the large kettle of boiling water belonging to the fireless cooker. Place in the fireless cooker for ¾ hour. This food may be served as a border around meat.

QUESTIONS

In your own way, explain the principle of "cooking without fire."

What ingredient does Corn-meal Mush for "Frying" contain that plain Corn-meal Mush does not? What is the use of this ingredient in Corn-meal Mush for "Frying"? (See *Wheat Flour and Corn-meal*, p. 369.)

How does the method of preparing Corn-meal Mush for "Frying" differ from the usual method of cooking cereals?

How many cupfuls of corn-meal in one pound? Of rice in one pound? What is the price per pound of corn-meal and rice?

LESSON XXIII

Cereals for Frying or Baking

"FRIED" OR BAKED MUSH

Cut Corn-meal Mush for "Frying" (see p. 96) into slices ⅓ inch thick. Dip each slice in flour and brown in a little hot fat (butter or substitute, or a slice of salt pork fat may be used).

The slices of mush may be spread with softened fat, or dipped in melted fat, and browned in the oven or broiling oven.

Instead of spreading the mush with fat, the slices may be dipped in cracker or fine dried bread crumbs (see p. 176), then dipped into egg mixture — 1 egg beaten and diluted with 1 tablespoonful of water — and again dipped into cracker or bread crumbs. Place the "breaded slices" in a dripping pan, put fat in bits over the top and bake for about ½ hour or until the crumbs are brown.

Hot mush may be served plain or with sirup.

In the same way, left-over wheatena, cream of wheat, farina, and other breakfast cereals may be molded, cooled, and then "fried" or baked.

FRENCH TOAST

1 or 2 eggs	1 cupful milk
¼ teaspoonful salt	6 or 8 slices of stale bread

Beat the eggs slightly, add the salt and milk, and dip the bread in the mixture. Heat a griddle or "frying" pan and place a little butter or substitute, or a combination of butter and some other fat, in the pan. Brown the bread on one side in the hot fat. Place a bit of fat on the top of each slice, turn, and brown the other side. Serve hot. A mixture of powdered sugar and cinnamon, or sirup is sometimes used in serving French Toast.

SIRUP

½ cupful corn sirup (dark)	¼ cupful boiling water
2 tablespoonfuls brown sugar	⅛ teaspoonful salt

1 teaspoonful vanilla

Mix the corn sirup, sugar, water, and salt. Heat until the boiling point is reached. Cool and then add the vanilla.

If it is desired to serve the sirup hot, its flavor is improved by the addition of 1 teaspoonful of butter.

QUESTIONS

In preparing French Toast, what care must be taken in dipping the stale bread in the milk and egg mixture?

Since it is desirable to serve the slices of toast whole, which are the better for French Toast, — large or small pieces of bread?

What is the advantage of placing a bit of fat on each slice of bread just before turning it?

Why is it advisable to add butter to the sirup only when the latter is to be served hot?

What is the purpose of adding sugar to corn sirup? (See *Corn Sirup*, p. 72.)

LESSON XXIV

Powdered Cereals Used for Thickening

Experiment 22: Starch Grains and Boiling Water. — Pour 2 tablespoonfuls of boiling water over 1 teaspoonful of flour. Stir and heat over the flame. Is the mixture smooth? Examine the center of a "lump." How does it compare with uncooked starch? Are all the starch grains swelled and semisoluble?

Experiment 23: Separation of Starch Grains with Cold Water. — Mix 1 teaspoonful of flour with 1 teaspoonful of water. Add 2 tablespoonfuls of boiling water, stir, and heat. Is the mixture smooth? Explain clearly the use of cold water in this mixture.

Experiment 24: Separation of Starch Grains with Sugar. — Mix 1 teaspoonful of flour with 1 teaspoonful of sugar. Add 2 tablespoonfuls of boiling water, stir, and heat. Is the mixture smooth? Carefully explain the use of sugar in the mixture.

Experiment 25: Separation of Starch Grains with Fat. — Mix 1 teaspoonful of flour with 1 teaspoonful of fat. Add 2 tablespoonfuls of boiling water, stir, and heat. Is the mixture smooth? Explain the use of fat in this mixture.

To cook starch successfully, it is necessary to swell every grain of starch contained in the starchy food. To accomplish this each grain must be surrounded by heat and moisture. In vegetables and cereals, the cellular framework separates the starch grains so that they are uniformly cooked. Since there is nothing to separate the grains in a powdered starchy substance, as shown in the foregoing experiments, it becomes necessary to mix it with certain materials so that the heat and moisture can penetrate every grain at the same time.

BLANC MANGE

2 cupfuls milk	2 teaspoonfuls vanilla
$\frac{1}{4}$ cupful corn-starch	Nutmeg
$\frac{1}{4}$ cupful sugar	$\frac{1}{8}$ teaspoonful salt

Scald the milk in a double boiler. Mix the sugar and corn-starch. Add the hot milk slowly to the sugar and corn-starch mixture, stirring rapidly. Return to the double boiler and cook 30 minutes, stir rapidly until the mixture thickens. Add the salt and flavoring and pour into a mold which has been moistened with cold water. Cool, turn from the mold, and serve with sugar and cream.

If a softer and more creamy dessert is desired, the corn-starch may be reduced to 3 tablespoonfuls. If this quantity of thickening is used, the cooked dessert should be poured into sherbet glasses or other suitable dishes for serving; it will not become stiff enough to mold.

NOTE. — While cooking Blanc Mange, note the number of minutes that is required to thicken the mixture and the length of time of cooking given in the recipe. Why is it necessary to cook the mixture for so long a time after it thickens? (See *Cereals*, p. 82.)

CHOCOLATE CORN-STARCH PUDDING

Proceed as for Blanc Mange, using $\frac{3}{8}$ cupful of sugar instead of $\frac{1}{4}$ cupful. Cut into pieces 1 square (*i.e.* 1 ounce) of Baker's chocolate. Add to it $\frac{1}{4}$ cupful of boiling water. Stir and heat until smooth and thoroughly blended. Add this to the corn-starch mixture just before taking from the fire. Add ½ teaspoonful of vanilla. Mold and serve as Blanc Mange.

Note that the quantity of sugar is increased when chocolate is added to the corn-starch mixture. Chocolate mixtures require considerable sugar to make them tasty.

3 tablespoonfuls of cocoa may be substituted for the chocolate. When this is done, mix the cocoa with the corn-starch and sugar and add no water to it. Proceed as in making plain Blanc Mange.

QUESTIONS

Name three substances that can be used to prevent the lumping of powdered cereals used for thickening.

Give the reason for mixing the sugar, corn-starch, and hot milk of Blanc Mange as directed.

For how long a time after placing in the double boiler is it necessary to stir the corn-starch, sugar, and hot milk mixture?

Milk, especially a milk and starchy mixture, scorches readily (see *Scalding Milk*, p. 166). From this explain why Blanc Mange is cooked entirely over boiling water, and not over the flame and then in a double boiler, as cereals.

Why is the flavoring not added while the mixture is cooking (see *Flavoring Extracts*, p. 265)?

What is the price per package of corn-starch?

How much does a package of corn-starch weigh and measure?

Which material — flour or corn-starch — is the cheaper to use for thickening?

How many persons does the quantity of Blanc Mange above serve?

LESSON XXV

Toast: Digestion of Starch

Experiment 26: Change of Starch into Dextrin. — Place a teaspoonful of flour in a frying pan and heat slowly until it becomes *very dark brown* and *uniform* in color. Put a little of the browned flour into a test tube, add water, then shake. Add a few drops of iodine. What indicates the presence of starch? Is starch present?

The starch has been changed to dextrin. Dextrin gives a purple (reddish blue) color when treated with iodine.

Experiment 27: The Solubility of Dextrin. — Pour the remainder of the browned flour from Experiment 26 into a test tube. Add water and shake. Pour through filter paper [1] into another test tube (see Figure 30). Notice the color of the liquid that has been filtered. Add a few drops of iodine to the filtered liquid. Is dextrin present? Is dextrin soluble in water?

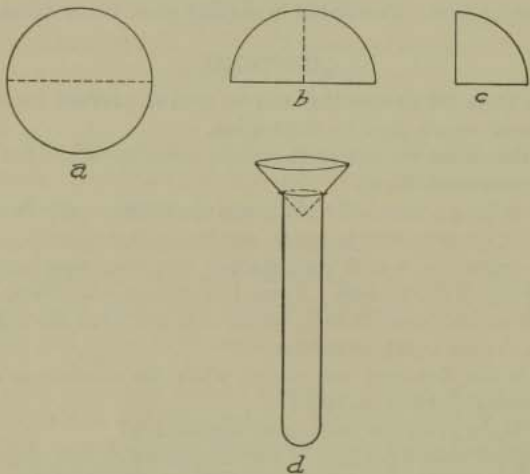


FIGURE 30. — METHOD OF FOLDING FILTER PAPER.

From these experiments, we find that dry heat has changed insoluble starch into a soluble substance called *dextrin*. Dextrin is found in small amounts in the crust of bread and in toast.

Digestion of Starch. — It was found in a previous lesson (Lesson XVI) that sugar is entirely soluble in water, and since digestion and solution are closely related, the diges-

[1] Liquids pass through filter paper, but solids do not. Hence if a mixture of solid and liquid is poured upon filter paper, the liquid passes through, but the solid remains on the paper.

tion of some sugar is simple. Starch was found to be insoluble in cold water and only semi-soluble in hot water. In the process of digestion it would seem that some change must take place in the starch to make it soluble. Such a change *does* take place; starch is changed into a soluble carbohydrate or a sugar before it is digested.

Substances called *enzymes* which are in the saliva of the mouth [1] and in the digestive juices of the intestines [1] cause this change. To show that this change takes place to some extent in the mouth, try the following experiments:

Experiment 28: **Starch in Cracker**. — Test a bit of cracker with iodine for starch. What indicates the presence of starch? Does the cracker contain starch?

Experiment 29: **Action of Saliva upon Starch**. — Thoroughly chew a bit of cracker. As you chew the cracker, note that it becomes sweeter in flavor. Remove from the mouth, and place upon a piece of paper. Test it with iodine. A purple (reddish blue) color indicates a soluble carbohydrate (see Experiment 27, p. 102) What substance does the masticated cracker contain? Explain the change that has taken place in the cracker by mastication.

Toast. — Bread is properly toasted when it is dried out thoroughly and then browned on the outside. Both the crumb and the crust of the toast are thus made crisp. Crisp toast crumbles during mastication.

Fresh bread contains much moisture. When it is toasted quickly, the moisture is inclosed in the interior of the slice and the resulting toast is very soft. This kind of toast is almost as difficult to digest as fresh bread. Instead of toast breaking into bits during digestion, it remains in a solid mass and is digested with difficulty.

Give at least two practical methods of toasting bread to produce the desired kind of toast.

[1] Ptyalin and amylopsin are the ferments found in the mouth and intestines, respectively.

CREAM TOAST

1½ tablespoonfuls butter or substitute	½ teaspoonful salt
2 tablespoonfuls flour	2 cupfuls milk or cream

6 to 8 slices of toast

Heat the fat; when it bubbles, add the flour and salt, mixing thoroughly. Add a small portion of the milk. Heat and stir continually until it thickens. Add another portion of the milk and proceed as before. Continue until all the milk has been added. The sauce is sufficiently cooked when it reaches the boiling point after the last quantity of milk has been added. Pour this sauce over dry or moist toast.

Moist toast is prepared by dipping dry toast quickly into hot, salted water or hot milk. If the crust has not been cut from bread for toasting, only the outer edges of the toast may be moistened.

The flavor of butter in Cream Toast is pleasing. To secure some butter flavor and at the same time economize, a combination of butter and a mild flavored fat or oil may be used.

QUESTIONS

Give the reason for mixing flour and fat as directed in White Sauce (see Experiment 25, p. 99).

What is the proportion of fat and flour? What is the proportion of flour and liquid? Using this proportion, how much flour should be used for one cupful of liquid?

What is the use of flour in White Sauce?

Note the consistency of the sauce, and keep it in mind as a standard of comparison for the thickness of other sauces.

What should be the condition of the crumb of toast to be most quickly digested? Give reasons for your answer.

LESSON XXVI

Root Vegetables (A)

Plant Roots. — Plants used for food have their stored-up food largely in the form of starch and to some extent in the form of sugar. The parts of the plant underneath the ground as well as the seeds serve as a storehouse for the plant. All roots and tubers contain carbohydrates, although not in so large a proportion as cereals. Those most commonly used as foods are potatoes, tapioca, parsnips, carrots, beets, and turnips. Potatoes and tapioca contain the most starch in this group. Parsnips, carrots, and beets contain a little starch and much sugar. Turnips contain much cellulose. Carrots, parsnips, and beets are also rich in cellulose.

All root vegetables as well as leaf and stem vegetables contain ash.

Comparison of Vegetables Cooked with or without the Skins, and in Water or in Steam.[1] — Clean, prepare, and cook in water pared and unpared potatoes, scraped and unscraped carrots, and cook in steam pared potatoes and scraped carrots.

Clean the vegetables by scrubbing with a brush; cook them in *gently boiling* water. Use the same quantity of water in each case (when cooked in water) and add one teaspoonful of salt to each quart of water. When the vegetables are tender (test with a fork or knitting needle), drain each thoroughly, catching the water in a bowl. Dry each vegetable by shaking the saucepan containing it over a flame.

Pour into a test tube a little of the water from each water-cooked vegetable; cool, and then test with iodine for starch.

Also pour some of the water from each water-cooked vegetable in an evaporating dish. Boil the water until the moisture is entirely evaporated. Then continue to heat the contents

[1] Note to the Teacher. — This lesson can be conducted most expeditiously by dividing the class into groups of six and having each group clean, prepare, and cook in water and in steam, potatoes and carrots as directed above.

of the dish until charred material appears and then disappears. Is any solid material left? If so, it is mineral matter.

Which vegetables, — those cooked (in water) with or without the skins, — lose the more starch and ash?

Which vegetables without the skins, — those cooked in water or those cooked in steam, — lose the more starch and ash?

As far as saving nutriment is concerned, which method of preparation is better for vegetables cooked in water? Which method of cooking is better for vegetables without the skins?

Peel the vegetables that were cooked with the skins. Cut all into dice. Prepare about half as much *White Sauce* as you have of the vegetable, using the ingredients for the sauce in the following proportion:

1½ tablespoonfuls flour
½ teaspoonful salt
1 tablespoonful butter or substitute
1 cupful liquid

For the *liquid* of the sauce for those vegetables cooked in water without the skins, use half milk and half vegetable stock. Use only milk for the sauce for the vegetables cooked in water with the skins and for steamed vegetables. (For method of making White Sauce, see *Cream Toast*, p. 104.) Add the vegetables to the sauce, reheat, and serve. Divide the vegetables among the pupils of each group so that each tastes the six vegetables.

Which vegetables, — those cooked with or without the skins, — have the more pleasing color?

Which vegetables, — those cooked with or without the skins, — have the more pleasing flavor?

As far as appearance and flavor are concerned, which method of preparation is better for potatoes? Which method for carrots?

As far as both nutriment and flavor are concerned, which method of cooking is better for both vegetables?

Suggestions for Cooking Root Vegetables. — All vegetables growing beneath the ground should be cleaned by scrubbing with a small brush. Unless a vegetable is dried or wilted, it should not be soaked in water for any length of time before cooking.

The comparison just made shows that the outside skins of vegetables should not be removed before cooking in water if we wish to retain all the nutriment. There are some who contend, however, that a more delicate and pleasing flavor results when old and strong-flavored vegetables have their skins removed before cooking, and that the flavor is more to be desired than a saving of all nutrients. Often vegetables are more pleasing in color when cooked without their skins.

The nutrients lost by paring root vegetables and cooking them in water consist not only of carbohydrates, but of ash and other valuable materials.[1]

Satisfactory results may be obtained by *baking* or *steaming* vegetables. By using the latter method, vegetables can be pared and cut into pieces and then cooked with little loss of nutrients. It has been pointed out,[2] however, that there may be considerable loss of nutrients in steamed vegetables. The extent of the loss depends in part upon the type of steamer and the method of using it. If the bottom of the upper pan of a steamer is perforated and the vegetables are placed in contact with the perforated portion, the condensed steam " washes " the mineral matter from the vegetable. This " vegetable broth " then drops into the lower pan of the steamer.

[1] *Vitamines*, see Division Seven, page 245.

[2] See Journal of Home Economics, Vol. XI (May, 1919), "Changes in the Food Value of Vegetables," by Minna C. Denton.

An evidence of this can be secured by steaming spinach or squash in the manner described above and observing the coloring which appears in the water beneath the steaming vegetable. Loss of nutrients in such a steamer can be avoided by placing the vegetable in a pan or plate and inserting the latter in the upper portion of the steamer. The pan or plate should, of course, be of smaller diameter than the top of the steamer. By using the type of steamer which has perforations at the top of the upper pan (see Figure 31), no loss of nutrients occurs, provided the accumulated vegetable broth is used.

Courtesy of *Geo. H. Bowman Co.*
FIGURE 31.—UTENSIL FOR STEAMING. — A "STEAMER."

Care should also be taken not to steam vegetables for long periods at a very high temperature as is sometimes done in using the pressure cooker. This results in both loss of nutrients and flavor.

If starchy vegetables are cooked in water, when tender immediately drain away the water and dry them. Serve at once or let them remain uncovered in a warm place. The steam is thus allowed to escape. Condensed steam makes starchy vegetables soggy.

BOILED POTATOES

If potatoes are to be cooked without their skins, pare them as thin as possible, or in the case of new potatoes, scrape them. Cut away any green portion [1] which appears on the

[1] Green spots on potatoes are caused by the tubers growing too near the surface of the ground. This colored portion contains an injurious substance called solanin.

potato. If the potatoes are sprouted,[1] also cut away the portion around the sprouts.

In cooking potatoes in water, follow the directions given on page 59, *Cooking Vegetables in Water*. When they are tender, drain off the water immediately; shake gently and dry on the back of the range with the saucepan uncovered or with a cloth folded over the top to absorb the moisture. Sprinkle generously with salt. Boiled potatoes may be put through a ricer before serving.

Creamed and Scalloped Vegetables. — Cooked vegetables may be creamed by cutting them into cubes, adding White Sauce, and then reheating. If the cut vegetables are cold, they can be heated by adding them to the sauce with the last portion of liquid. By the time the sauce reaches the boiling point, the vegetables will be heated. Care should be taken not to break the vegetables while heating them in the sauce. Care should also be taken to prevent the sauce from scorching. An asbestos mat over a gas burner is desirable for this purpose. *Use one part of White Sauce with 2 or 3 parts of diced vegetables.*

Vegetables may be scalloped by placing Creamed Vegetables in an oiled baking-dish, covering with buttered crumbs, and browning in the oven.

WHITE SAUCE FOR VEGETABLES

1½ tablespoonfuls flour
1 tablespoonful butter or substitute

or

2 tablespoonfuls flour
1½ tablespoonfuls butter or substitute

½ teaspoonful salt
White pepper
½ cupful milk
½ cupful vegetable stock

[1] Sprouted potatoes also contain some solanin. Potatoes should not be allowed to sprout since nutritious material is used up by the growing sprouts and, as mentioned above, an injurious material is formed. Potatoes can be prevented from sprouting by storing them in a dry, dark, cool place.

Cook as directed for Cream Sauce (see *Cream Toast*, p. 104). The thickness of White Sauce for vegetables depends upon the kind of vegetable. The thinner sauce is generally more satisfactory with starchy vegetables.

CRUMBS FOR SCALLOPED DISHES

1 cupful soft bread crumbs
$\frac{1}{8}$ teaspoonful salt
White pepper or cayenne
1 tablespoonful butter or substitute

Mix seasonings and crumbs together, then add to the melted fat, or place the fat in bits over the seasoned crumbs.

QUESTIONS

How should the water boil in cooking vegetables? Why?

Why should not potatoes be covered with a tin lid or plate after cooking?

Are potatoes sold by the pound or bushel? What is the price per pound or bushel?

Mention at least three ways of cooking root vegetables so as to retain their nutriment.

LESSON XXVII

Root Vegetables (B)

Experiment 30: The Effect of Soaking Starchy Vegetables in Water. — Over several pieces of potato pour enough water to cover. Allow the vegetable to stand at least 15 minutes. Pour the water from the vegetable into a test tube and heat it. Cool, then test the water with iodine. What does the water contain? What conclusion can you draw concerning the soaking of vegetables in water before cooking?

SWEET POTATOES

Cook sweet potatoes with or without the skins (see *Cooking Vegetables in Water*, p. 59). Peel (if cooked with the skins), mash, add a little hot milk, salt, and butter, beat thoroughly and serve.

Cooked sweet potatoes may also be cut into halves lengthwise, spread with butter or substitute, sprinkled with a very little sugar, and browned in the oven.

SWEET POTATOES (Southern style)

3 tablespoonfuls butter or substitute	6 sweet potatoes
2 tablespoonfuls sugar	Salt and pepper
Boiling water	

Scrub and pare the sweet potatoes, cut them into halves lengthwise. Put the butter and sugar in a frying pan and when hot, add the sweet potatoes. Brown the potatoes, add the salt and pepper and enough boiling water to cover the bottom of the frying pan. Cover and cook slowly until the potatoes are tender. Nearly all the water should be evaporated when the potatoes are cooked. That which remains should be poured over the potatoes as a sauce for serving.

Sweet potatoes may also be cooked in a casserole in the oven. Cover and bake until almost tender (400° F., 40 minutes). Then uncover and bake until brown (500° F., 20 minutes).

MOCK OYSTERS (parsnips with nuts and rice)

4 parsnips	1 cupful cooked rice [1]
2 eggs	4 tablespoonfuls flour
1 cupful nuts, chopped	$1\frac{1}{4}$ teaspoonfuls salt
$\frac{1}{8}$ teaspoonful pepper	

Boil or steam the parsnips until tender. Press them through a coarse sieve or colander. Add the beaten eggs. Then add the remainder of the ingredients. If the mixture is too thick to drop from the spoon, add a little milk. Drop by tablespoonfuls on to an oiled baking-sheet. Bake until brown (500° F., 12 to 15 minutes). Serve hot with Tomato

[1] If the rice is cooked by boiling, use the rice water instead of plain water in making Tomato Sauce.

Sauce (see below). Celery Sauce (see p. 501) may also be used in serving Mock Oysters. (Adapted from *Ninety Tested Recipes,* Teachers College.)

TOMATO SAUCE

½ can tomatoes	2 sprays of parsley
1 cupful water	3 tablespoonfuls fat
2 cloves	2 slices onion
3 allspice berries	¼ cupful flour
3 peppercorns	1 teaspoonful salt

Allow tomatoes, water, spices, and herbs to simmer 15 to 20 minutes. Brown the onion in the fat, add flour and salt, then the tomato mixture. Follow the method of making White Sauce (see *Cream Toast,* p. 104). Strain and serve.

QUESTIONS

From the results of Experiment 30, p. 110, explain why vegetables should be placed in boiling rather than in cold water for cooking.

Why should the water be drained from boiled vegetables immediately after cooking?

From your grocer, find out in what quantities sweet potatoes are usually purchased. What is the price of them? How do they compare in price with white potatoes?

What is the price per pound of parsnips?

In preparing Tomato Sauce, what is the purpose of cooking the tomatoes and spices together for 15 or 20 minutes?

Why are the tomatoes strained after thickening rather than before?

LESSON XXVIII

Root Vegetables (C)

Tapioca is a food material prepared from the roots of the cassava plant grown in South America. Like many other foods prepared from the roots of plants, it consists of a large per cent of starch. In its preparation, tapioca is heated so that the starch is partially cooked. Tapioca is prepared for the market in two forms, — pearl tapioca, and minute or granulated tapioca. The latter requires a much shorter time to cook. If granulated tapioca is substituted for pearl tapioca, but one half the quantity is required.

APPLE TAPIOCA

¾ cupful pearl tapioca *or*	½ teaspoonful salt
⅜ cupful granulated tapioca	6 apples
2½ cupfuls boiling water	½ cupful sugar

If pearl tapioca is used, cover it generously with cold water and allow it to stand one hour or overnight. While soaking keep the tapioca covered. If any water is unabsorbed, do not discard it, — use less than the given quantity of boiling water.

If granulated tapioca is used, no cold water is needed. For either granulated or pearl tapioca, add the boiling water and salt to the tapioca and cook over the naked flame and then over hot water as in the case of breakfast cereal (see *General Rules for Cooking Cereals*, p. 83). Cook in the double boiler until transparent. Wash, core, and pare the apples; place them in a buttered baking-dish; fill the cavities with sugar, pour tapioca over them, and bake in a hot oven (450° F.) for 30 minutes or until the apples are soft. Serve with sugar and cream, or with Lemon Sauce.

Other fruits may be substituted for apples. If canned fruits are used, substitute the fruit sirup for part of the water in which the tapioca is cooked.

RHUBARB TAPIOCA

Use the same ingredients for the rhubarb dessert as for Apple Tapioca, substituting for the apples 3 cupfuls of rhubarb, cut into pieces, and using twice the quantity of sugar. Bake until the rhubarb is soft.

LEMON SAUCE

¾ cupful sugar — 2 cupfuls boiling water
2 tablespoonfuls flour — 1 lemon, — juice and rind
1 tablespoonful butter

Mix sugar and flour thoroughly; then slowly add the boiling water. Cook 10 minutes. Add the lemon juice and rind, then the butter. Stir until the butter is melted, when the sauce will be ready to serve.

For economy, the butter may be omitted. It adds to the flavor, however.

Sweet Sauces. — Sweet Sauces usually contain sugar and butter and are thickened with a powdered cereal. It is interesting to consider which of the two materials — sugar or butter — should be used to separate the grains of the flour or corn-starch.

The quantity of fat used with the flour of White Sauces (see below) is a little less than that of the flour. It is difficult to separate starch grains when the quantity of fat equals only one half the quantity of flour. On the other hand, when starch grains are separated by means of sugar, the quantity of the sugar should equal at least the quantity of the starchy material (see *Blanc Mange*, p. 100). In the recipe for Lemon Sauce above, it will be noted that the quantity of fat is one half that of the flour; the quantity of sugar greatly exceeds that of the flour. Hence the sugar affords a more satisfactory means of separating the starch grains in Lemon Sauce.

PROPORTIONS OF INGREDIENTS FOR SAUCES

	Flour	Fat	Liquid
Thin White Sauce (Toast, sweet sauce, certain cream soups, etc.)	1 tablespoonful,	¾ tablespoonful,	1 cup
Medium White Sauce	2 tablespoonfuls,	1½ tablespoonfuls,	1 cup

	Flour	Fat	Liquid
(Vegetables (see page 109), gravy, tomato sauce, etc.)			
Thick White Sauce	3 tablespoonfuls,	2 tablespoonfuls,	1 cup
(Gravy, tomato sauce, etc.)			
Very Thick White Sauce	4 tablespoonfuls,	3 tablespoonfuls,	1 cup
(Croquettes, etc.)			

(If richer sauces are desired, equal quantities of fat and flour should be used.)

QUESTIONS

What is the purpose of soaking pearl tapioca in water before cooking? Give the reason for covering pearl tapioca while it is soaking. Why is it necessary to cook it in a double boiler?

What is the use of flour in Lemon Sauce? Why is the flour mixed with the sugar before adding the boiling water (see Experiment 24, p. 99)? How long does it take the flour to thicken? How long a time does the recipe give for cooking the flour mixture? What is the purpose of cooking it for so long a time?

What precautions can be taken to prevent the sauce from scorching?

If, after cooking the required length of time, the sauce is not thick enough, what is the simplest method of thickening it?

For a sauce recipe in which very little fat and no sugar are given, devise a method of preparing *smooth* sauce.

LESSON XXIX

Starchy Foods Cooked at High Temperature

Steam under Pressure. — Which is hotter, — the "steam" (*i.e.* water vapor) coming from boiling water in an uncovered saucepan or teakettle or the "steam" which has been held underneath the lid of a covered saucepan or teakettle (see Figure 32)? Steam confined in a small space or held under pressure may reach a temperature higher than that of boiling water.

Effect of High Temperature upon Pop Corn and Potatoes. — Pop corn contains water. When heated, the water changes to steam. The covering of cellulose holds the steam in the kernel. When the steam expands and reaches a temperature far above the boiling point of water, it finally bursts the covering and the starch swells at once.

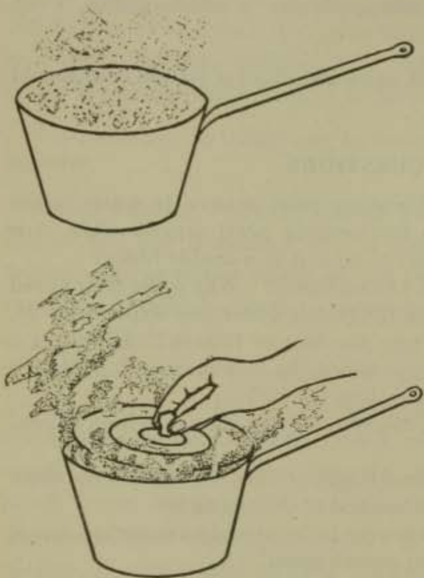


FIGURE 32. — "STEAM" WITHOUT PRESSURE AND "STEAM" WHICH HAS BEEN UNDER PRESSURE.

In baking potatoes, the water contained in them vaporizes. The vaporized water or steam is held under pressure by the skin of the vegetable. The steam thus becomes hotter than boiling water, hence a baked potato is cooked at a higher temperature than a boiled potato, and no nutrients are lost.

POP CORN

Moisten pop corn with cold water. Almost cover the bottom of a popper with the kernels. Hold the popper first at some distance from the heat and then gradually bring it closer, shaking it well all the time to keep the corn from burning. The corn should not begin to pop before three and one half minutes. When popping commences, most of the kernels should open. If there is some time between the popping of the first and last kernels, the corn will become tough.

BUTTERED POP CORN NO. I

4 quarts freshly popped corn   ¼ cupful butter
Salt

Melt the butter and pour it over the corn, stirring with a spoon. Sprinkle at once with salt from a salt shaker, continue stirring.

BUTTERED POP CORN NO. II

1 tablespoonful butter and 1 tablespoonful oil *or*
2 tablespoonfuls oil   ½ cupful shelled pop corn
Salt

Put the fat in a large frying pan; when melted, add the salted corn. Stir until the corn is evenly coated with fat. Cover closely and heat gradually, shaking the pan vigorously all the time.

BAKED POTATOES

Scrub potatoes and place them on the grate of a *hot* oven (500° F.). (Potatoes should be baked in a *hot* oven, to prevent them from becoming waxy or soggy.) Bake until soft when tested with a fork or knitting needle, usually 50 to 60 minutes. Break the skin at once to allow the steam to escape, or make two gashes in the top of each potato, one at right angles to the other. Gently press the potato so that the steam may escape. Serve in an uncovered dish. Place the steaming potatoes on a folded napkin for serving.

STUFFED POTATOES

3 tablespoonfuls butter   2 teaspoonfuls salt
½ cupful milk   Pepper
6 baked potatoes (medium size)

Cut the baked potatoes in halves lengthwise. Remove the inside, taking care not to break the skin; mash the potatoes, add the milk, butter, and seasoning, and beat them as ordinary mashed potatoes. Return the mixture to the potato shells, place the stuffed potatoes in a pan, and bake in a *hot* oven (500° F.) until brown.

Before browning the stuffed potatoes, grated cheese may be sprinkled over them.

QUESTIONS

Explain why pop corn can be cooked thoroughly in about 5 minutes while rolled oats or wheat requires 1½ hours for sufficient cooking.

Analyze the difference in taste of a baked and a boiled potato. To what is the sweet taste of a baked potato due (see Experiment 26, p. 101)? Explain fully why baked potatoes are more easily digested than boiled potatoes (see Experiment 26 and *Solution and Digestion*, p. 40).

Which contains more nutriment, — baked potatoes or boiled potatoes? Explain (see *Comparison of Vegetables Cooked with and without the Skins, and in Water or in Steam*, p. 105).

What is the purpose of breaking the skins of potatoes *at once* after baking? Why are baked potatoes served in an uncovered dish? What could be used to cover them?

RELATED WORK

LESSON XXX

Dining Room Service [1]

Basic Principles. — Practically all rules for laying the table and all methods of serving have been formulated to bring about neatness, convenience, and order. The standard of living,[1] the occasion, the size of the dining room, the number of guests, and the attendants, all have to be taken into

[1] Note. — See Suggestions for Teaching, p. 3, Appendix.

consideration in dining room service. Therefore the method of serving must be governed by conditions. It is possible here to give only general suggestions.

THE TABLE

Table Linen. — Table padding, or a silence cloth, should first be placed on the table, then the table-cloth should be laid straight and smooth.

Napkins should be folded simply and laid at the left of the plate. A dinner napkin is folded four times; a luncheon

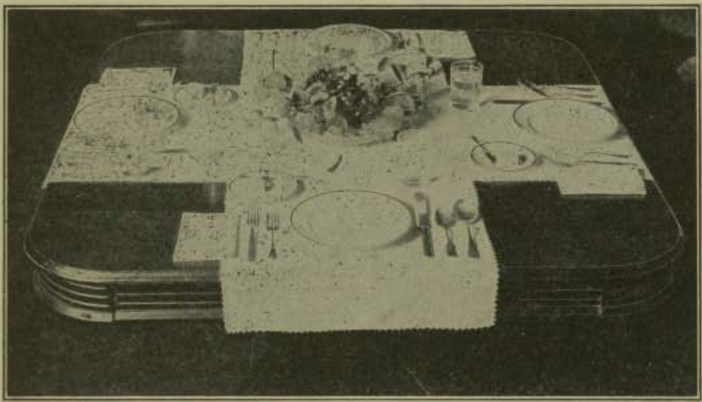


FIGURE 33. — TABLE LAID FOR AN INFORMAL LUNCHEON.

Note the position of the silver, napkins, bread-and-butter plates, and tumblers. Also note that a *low* bowl of flowers is used as a centerpiece.

napkin is folded twice to form a square, or three times to form either a triangle or an oblong.

If desired, the table-cloth may be omitted for breakfast or luncheon. Doilies with pads underneath them, lunch or breakfast cloths, or table runners (see Figure 33) may be used instead of the table-cloth. The two latter coverings are especially practical, since they are more quickly laundered than table-cloths. Their initial cost is also usually less than that of a table-cloth.

Doilies may be placed on the serving tray. They are also often used on plates containing crackers, bread, and cakes. Baked potatoes, corn, and hot breads may be served in a folded napkin.

China and Glassware. — The term "cover" means the space, with its china, silver, and glassware, allowed for each guest. At least twenty-two inches of space should be allowed for a cover (see Figure 33).

The quantity of china on the table depends upon the occasion and the style of serving. In any form of service, the first course, if cold, may be placed on the table before the guests are seated. If the first course is a hot food, it is always placed on the table after the guests are seated. For informal occasions, and sometimes for formal occasions, the bread-and-butter plate is used. It is placed beyond the tines of the fork. Glasses are placed beyond the tip of the knife. A sugar bowl and cream pitcher, salts, peppers, etc., may also be placed on the table. A salt and a pepper shaker should be placed so as to be accessible to each two covers. Dishes containing olives or nuts are sometimes placed on the table before the guests are seated.

For breakfast, the coffeepot, hot-water pitcher, milk and cream pitchers, spoon tray, and cups and saucers may be placed so as to form a semicircle about the hostess's place. The coffeepot should be placed at the right, and the cups and saucers at the left. If tiles or stands for the coffeepot and hot-water pitcher are used, they should also be a part of the table service. A large tray may be used to hold all of the coffee service.

If the serving is to be done without a maid, it is advisable to place all the china, glass, and silver to be used for the meal either on the table or on the serving table.

Silver. — Convenience and order have determined the customary way of placing the silver at each cover. At the right of the plates place the knives, the spoons, and the forks that are to be used without knives (as for oysters, fish, or salad). At the left, place all the forks that are to be used with knives. Many prefer, however, to place all the forks, except the oyster fork, at the left of the plate. Enough silver for all courses, except the dessert course, is usually placed on the table; it is permissible, however, to place the silver for all courses. If the silver for any course is not placed on the table before the meal is announced, it may be brought in on a tray and placed at each cover just before serving the course; or it may be laid on each serving dish of the course.

While a general rule for laying silver is to place each piece at each cover in the order of its use, *the knives are usually all grouped together at the right of the plate and the spoons laid together at the right of the knives.* It is advisable, however, to place the spoons and knives in the order of their use, *i.e.* place the spoon that is to be used first farthest to the right and the knife that is to be used first, farthest to the right of the group of knives. Since only forks are placed at the left of the plate, they should be laid in the order of their use, that first to be used being placed farthest to the left (see Figure 33).

All silver should be placed from one half to one inch from the edge of the table; the sharp edges of the blades of the knives should be turned towards the plates; the spoons and forks should be placed with their bowls and tines turned up. The butter spreaders may be laid across the bread-and-butter plates. Generally when soup and raw oysters are served, the oyster fork is laid across the soup spoon. If the silver that is to be used in serving a dish of food is placed on the table, it should be laid *beside* not *in* the dish of food.

Table Accessories. — A low bowl of flowers or fruit, tastefully arranged, makes a pleasing centerpiece. A centerpiece, however, should be a real source of pleasure; it should not obstruct the view of guests opposite (see Figure 33).

Place cards afford a graceful means of seating guests. When used, they should be placed on the napkin. Menu cards, sometimes used for occasional dinners, are also placed on the napkin.

STYLES OF SERVING

There are several styles of serving:

English (ordinary family service). — The foods are served at the table, the host serving fish, meat, and vegetables; the hostess serving soup, salad, and dessert; and other members of the family serving fruit and the vegetables that are served in individual dishes. The served dishes may be passed to each guest by the maid, or when no maid serves, they may be passed from one person to another. This method is used for family and informal service, and also when serving is done without a maid.

Russian (serving from the side). — This may be observed in one of two ways:

(*a*) Foods are separated into portions on individual plates and placed before the guests.

(*b*) Foods are separated into portions on the serving dishes and passed to the left of each guest so that he may help himself, or the portions may be served by the maid. The necessary serving spoon or fork should be provided with the serving dishes. The Russian style of serving is the most formal and requires the service of at least one maid.

Compromise. — Sometimes it is desirable to use one style of serving for one course and another style for another course, as the Russian style for the soup course, and the English style for the meat course. Or the foods of one course may be in such form that it is convenient to follow both styles of serving, as meat served in English style and "side dishes" served in Russian style. Such style of serving is termed the compromise.

METHODS OF SERVING WITH A MAID

Established Rules for Serving. — While each hostess follows her own inclination in the details of serving, there are certain rules that are always observed:

Cold foods are served on cold dishes; hot foods on hot dishes.

Dishes offered to a guest are *passed* to the left of the guest; other dishes are *placed* to the right of a guest, except when a plate is placed at the same time a soiled or served plate is removed, — it is then placed at the left. Plates are removed from the right when possible.

When the Russian style of serving is observed, the following plan of removing and placing plates at the close of a course is followed:

The maid carries the clean or served plate of the following course in her right hand and goes to the left of the guest. She removes the soiled plate of the course just concluded with her left hand and then places the empty or served plate before the guest with her right hand. She then goes to the kitchen or pantry with the soiled plate, returns with a clean or served plate, and proceeds as before.

In following the English style in serving plates, the maid first places the dish to be served (the platter of meat, for example) in front of the host. Then an empty plate is placed before the host. The maid then gets another clean plate, returns to the left of the host, takes up the served plate in her left hand, and places the empty plate before him. She then places the served plate before one of the guests from the right side. Again she goes to the left of the host, places a plate before him, and proceeds as before.

At the end of a course, remove the dishes of each cover, then such dishes as the platters and tureens, and finally the crumbs. All dishes belonging to a particular course should be removed at the end of that course. Soiled dishes are always unsightly; hence care should be taken to remove them in the neatest way. Plates should not be piled on top of one another. When the dinner plate, the bread-and-butter plate, and the side dishes are to be removed, the smaller dishes (bread-and-butter plates and side dishes) should be removed on the serving tray. The larger plates may be removed one at a time, and an empty or service plate may be put in the place of each. If no empty or service plate is to be placed for the next course, two soiled plates may be removed at the same time, one in each hand.

Use of the Buffet and Serving Table. — Many dining rooms have both a buffet and serving table. When such is the case the serving table is used for holding the dishes and foods that are used in serving the meal, such as dessert plates, creamer and sugar, plate of bread, etc.; the buffet is used for holding dishes that are used occasionally, such as the coffee service, chafing dish, etc.

Accidents at the table may be quickly remedied, if extra silver and a soft (*i.e.* unfolded) napkin are placed on the serving table before the meal is announced.

Use of the Serving Tray. — The serving tray should be used for carrying all silver. It should also be used for small dishes, such as preserves, olives, sauces, and for the creamer and sugar, and the cups and saucers. In passing large dishes, such as plates, platters, and tureens, use a folded napkin underneath the dishes instead of a tray.

Removing the Crumbs from the Table. — For a table with a cloth, the crumb tray and scraper, or better, a plate and folded napkin are used to remove the crumbs. A brush is not desirable for "crumbing" the table. For a table without a cloth, the folded napkin and plate are used. The table may be crumbed before and after the salad course or before the dessert course.

Use of Finger Bowls. — Finger bowls are used after the fruit course of breakfast, and at the end of a luncheon or dinner. They should be placed on plates, with a doily between the plate and finger bowl.

For breakfast, the finger bowls and plates may be brought in first. The finger bowl and doily should be removed to the left so that the same plates may be used for the fruit course.

For formal luncheon or dinner, finger bowls on doilies and plates are brought in, one at a time, when removing the main dish of the dessert. The finger bowls and doilies are then set aside and the plate used for bonbons and nuts, which are passed on a tray. Or, if desired, the finger bowls may be brought after the bonbons. In this case the finger bowl and plate are exchanged for the plate of the dessert course. An informal way is to pass finger bowls on plates and doilies before the dessert course. Then the finger bowl and doily are set aside as at breakfast and the dessert served on the same plate.

Order of Seating and Serving Guests. — The host and hostess usually sit opposite each other, *i.e.* at the head and foot of the table. If there is a waitress to do the serving, the head of the table should be farthest from the entrance of the dining room. If there is no maid, the hostess's chair should be nearest the kitchen door or pantry. A woman guest of honor sits at the right of the host; a gentleman guest, at the right of the hostess.

The order of serving guests varies in different homes and for different occasions. Sometimes the women at the table are served before the men. This is usually done, however for home service or when only a few persons are at the table. At a large dinner table or a banquet, guests are usually served in the order in which they sit. In many homes, the guests are served first, while in others the hostess is always the first to be served. At a family meal, when no guests are present, the hostess should always be served first.

METHOD OF SERVING WITHOUT A MAID

When there is no maid, a woman has a threefold duty to perform when serving a meal. She must act as cook, as waitress, and as hostess. Much skill, ingenuity, and practice are required to do this successfully. The underlying principle of its accomplishment is forethought. A hostess must plan, even to the minutest detail, the performance of each duty.

Preparation before Announcing the Meal. — In planning the menu, a wise selection should be made. Simple foods should be selected and but few courses should be served. A young hostess should remember that a simple meal easily served is more enjoyable and more fitting than an elaborate dinner where the hostess must frequently leave the table. Foods should be selected that can be prepared before the meal is served, and that will not be harmed by standing. A soufflé which must be served immediately when taken from the oven is not a wise choice for such a meal.

For almost all meals some of the dishes and foods must be left in the warming oven or in the refrigerator, but as many dishes and foods as possible should be taken to the dining room before the meal is announced. The suggestion has been made that dishes be kept warm by placing them in a pan of hot water on the serving table. This would mean, however, that a tea towel be at hand to dry the dishes before using. Special hot-water dishes for the purpose can now be obtained in city shops.

A serving table or a wheel tray (see Figure 34) is of great service to a woman acting as hostess and waitress. It should be placed near the hostess so that she can reach it without rising from her chair. In the absence of a wheel tray, a large serving tray is a great convenience in setting and clearing the table; it saves many steps.

FIGURE 34. — WHEEL TRAY.

Serving at the Table. — The English style of serving (see p. 122) should be followed. The hostess may thus have the aid of the host and the other members of the family in serving. Moreover, serving in this manner gives an air of hospitality.

As hostess, a woman must not leave her place at the table many times or for many minutes. If the details of the meal have not been well planned, she will have to make many trips to the kitchen. This is one of the indications that the presence of guests is a burden to the hostess. She should never leave or enter the dining room empty-handed, for a saving of energy is more sensible than faithful adherence to form. The soiled dishes, as they are removed from the table, may be placed upon the serving table. By the use of the latter, the dining table can be kept free from an overcrowded appearance and the hostess saved many steps. The lower shelf of the serving table is the most desirable place for the soiled dishes.

For a family meal, the table may be crumbed as follows: Let the hostess use the crumb tray while seated at her place, and then let her pass it on so that each member of the family may in turn remove the crumbs from his own cover. It is perfectly proper to omit crumbing when guests are present and where there is no maid.

The host and the other members of the family can do much to add to the pleasure of a meal by introducing an interesting topic of conversation that will occupy the attention of the guests during the absence of the hostess. If the hostess is sole entertainer, she would do well to start an absorbing subject of conversation just before leaving the dining room.

QUESTIONS

Why is it desirable to use doilies on plates containing crackers, bread, and cakes?

Why should baked potatoes, corn, and hot breads be served on a folded napkin?

Why should the coffeepot be placed at the right of the hostess's cover and the cups and saucers at the left of her cover?

In laying the table, why should the knives, spoons, and the forks that are to be used without knives be placed at the right of the plates? Why should the forks that are to be used with knives be placed at the left of the plates?

In serving, why should dishes which admit of choice be passed to the left of a guest? Why should dishes which do not admit of choice be placed at the right?

Why should this order of clearing the table at the end of a course be followed: first, the soiled dishes, then the food, then the clean dishes, and finally the crumbs?

Why should all dishes belonging to a particular course be removed at the end of the course?

Why is a brush not desirable for crumbing the table?

Why are finger bowls used after the fruit course of breakfast and at the end of luncheon or dinner?

Make a list of the linen, silver, glass, and china needed for the dining and serving tables, when serving the menu given below. Give method of serving each course, using the English style.

Cream of Tomato Soup Soup Sticks
Veal Cutlets
Rice
Rolls — Butter
Cucumber Salad Wafers
Snow Pudding, Custard Sauce
Cakes — Coffee

LESSON XXXI

Cooking and Serving Breakfast

Cook and serve a breakfast.

If the lesson period is limited to 90 minutes, it is advisable to plan only a simple meal. The following menu is suggested:

Seasonable Fruit, — fresh or cooked
French Toast with Sirup
Milk

Determine the number of persons each recipe for the foods above will serve. It may be necessary to prepare only a portion of a given recipe or more food than the quantity stated in the recipe. The pupil should become accustomed to dividing or multiplying the quantities given in recipes.

Commence your work at such a time that the food will be in proper condition — hot or cold — at the time set for serving the breakfast.

Follow the English or family style of serving.

Serve the breakfast with or without a maid (see previous lesson).

LESSON XXXII

Review: Meal Cooking

MENU

Seasonable Fruit Sauce
Breakfast Cereal
Coffee

See Review, p. 68, for suggestions regarding the preparation of the lesson.

LESSON XXXIII

Home Projects [1]

Suggestions for Home Work. — If cooked cereals are desired for breakfast at your home, prepare breakfast cereals in the evening for the following morning.

Make a dessert for the evening meal at least three times a week.

Suggested Aims:

(1) To cook the cereal a sufficient length of time to produce a sweet flavor and make it tender, to evaporate the moisture sufficiently so that mastication will be necessary, to allow no scum to form on top.

(2) To select a variety of desserts so that a different one may be served each time.

[1] See Lesson IX, p. 51.

DIVISION FIVE

ENERGY-GIVING OR FUEL FOODS,—RICH IN FATS AND OILS

LESSON XXXIV

Fat as a Frying Medium

Comparison of Fats and Carbohydrates. — *Fat is a foodstuff.* Fat and oil [1] form another great class of energy-giving or fuel foods. In the body, these foods, like carbohydrates, give energy; in fact weight for weight they furnish more than twice as much energy as carbohydrates. There is, for example, about as much fat by weight in one pound of butter as there are carbohydrates in one pound of tapioca. By measurement it has been found that one pound of butter gives to the body almost two and one fourth times as much energy as does one pound of tapioca.

Fats and oils are not only used as food (butter for example) and as constituents of foods (fat in pastry), but as a medium for cooking. The use of fat as a cooking medium follows:

Experiment 31: Temperature at which Fats and Oils Decompose or "Burn." — Into each of 6 test tubes put 2 teaspoonfuls of butter, cottonseed oil, corn oil, beef drippings, lard, and Crisco. Gently heat each one of the fats or oils until fumes first arise from them. Then insert a thermometer [2] in each tube and note the temperatures. These are the temperatures at which the various fats decompose. Record these temperatures in your notebook.

[1] Fat and oil are very similar, oil being fat that is liquid at ordinary temperature.

[2] Care should be taken in using a thermometer in hot fat. It should be allowed to cool before washing.

How do the decomposing temperatures of fat compare with that of boiling water? Which would be the hotter medium for cooking — hot fat or boiling water?

Which fat reaches the highest temperature before it begins to decompose? If fat is used as a medium of cooking, which of these fats, as far as temperature is concerned, would be the most desirable? Give a reason for your answer.

What is the price per pound or pint of each of these fats or oils?

Which of these are vegetable and which are animal fats or oils?

Fats for Deep-fat Frying. — As shown by the above experiment, fat reaches a high temperature when heated. For this reason fat may be used as a cooking medium. The process of cooking food in deep fat is called *frying*. From the standpoint of temperature the best fat for frying is that which can be heated to a very high temperature without burning.

Other factors such as flavor and cost, however, have to be taken into consideration. Fat not only heats foods, but it imparts flavor since some of the fat in which a food is cooked, clings to the food. The costs of the various fats differ greatly. This must be regarded in selecting fats for cooking. Taking these factors into consideration, many prefer the cheaper vegetable fats for frying, while others find a mixture of beef drippings and lard satisfactory.

Experiment 32 : Bread Fried in " Cool " Fat (Class Experiment). — Put some suitable fat for frying in an iron pan and heat. Note carefully the change that takes place in fat as it heats. When the fat " foams " or bubbles, or reaches a temperature of about 300° F., drop into it a piece of bread. After one minute remove the bread from the fat; examine the bread by breaking it apart to see if the fat has soaked into the bread. Is it desirable to have the fat soak into fried foods? What conclusion can you draw as to frying foods in " cool " fats?

Experiment 33 : The Temperature of Fat for Frying (Class Experiment). — Continue to heat the fat of Experiment 32. When fumes begin to rise from the fat, or the fat reaches a temperature of 365° F., again drop a bit of bread into it. After one minute remove the bread and examine it as above. Has as much fat soaked into it as in the first bit of bread? What conclusion can you draw from this in regard to the proper temperature for frying foods?

Cooked foods and foods needing but little cooking require a higher temperature than batters or other uncooked foods. If a bit of bread is browned in 40 seconds, the fat is of proper temperature for cooked foods and for oysters. If bread is browned in 60 seconds, the fat is of proper temperature for uncooked foods.

General Rules for Frying. — Since fat, when heated, reaches such a high temperature, the kettle in which it is heated should be of iron.

If there is any moisture on foods, it must be evaporated before the foods brown. Excessive moisture also cools the fat considerably, hence, *foods that are to be fried should be as dry as possible.*

Place the foods to be cooked in a bath of fat deep enough to float them. The kettle should not be too full, however, as fat is apt to bubble over especially when moist foods are placed in it.

Foods may be placed in a frying basket, or they may be lowered into the fat and taken from it with a wire spoon. All fried foods should be drained on paper.

When one quantity of food has been removed, the fat should be reheated and its temperature tested before adding the second quantity of food.

Fat used for frying should be cooled and clarified with potato as directed on the following page.

If a coal range is used for heating the fat, sand or ashes and a shovel should be near at hand in case the fat takes fire.

If hot fat must be carried or lifted, wrap a towel about the hand before grasping the handle of the kettle.

To Try Out Fat. — The fat of meat consists of fat held by a network of connective tissue. To make meat fat suitable for frying it is necessary to separate the fat from the tissue. This is done as follows:

Remove the tough outside skin and lean parts from meat fat and cut it into small pieces. Put the fat into an iron kettle, and cover it with cold water. Place it uncovered on the stove and heat. When the water has nearly all evaporated, set the kettle back, or lessen the heat, or place in a "cool" oven, and let the fat slowly try out.

As the fat separates from the pieces of tissue, it is well to strain or drain it into a bowl. If this is done, the fat is less apt to scorch. The heating of the connective tissue should continue, until it is shriveled in appearance and no fat can be pressed out from it with a fork. The strained fat should be set aside to become firm and then stored in a cool place.

To Clarify Fat. — Add a few slices of raw potato to fat and heat slowly until it ceases to bubble. Cool, strain through a cloth, and let stand until solid.

FRIED OYSTERS[1]

Large oysters	Dried bread crumbs
Salt and pepper	Eggs

1 tablespoonful water or oyster juice for each egg

Remove pieces of shell from the oyster by running each oyster through the fingers. Wash the oysters, drain immediately, and dry them on a soft cloth or towel (see *Cleaning Oysters*, p. 309). Season with salt and pepper. Beat the eggs slightly and dilute by adding one tablespoonful of water or strained oyster juice to each egg. Sprinkle salt and pepper over the dried bread crumbs (see p. 176). Dip the

[1] NOTE TO THE TEACHER. — If the price of oysters is too high, some seasonable small fresh fish such as pike may be used in place of oysters. These may be prepared for frying in the same manner as oysters. If desired, corn-meal may be substituted for dried bread crumbs.

oysters into the prepared crumbs, then into the egg mixture, and finally into the crumbs. Fry one minute, drain, place on paper, and serve.

Lemons cut into eighths are desirable to serve with fried oysters. Parsley makes a pleasing garnish.

To Clean Utensils that have Contained Fat. — An alkaline substance such as washing soda is effective in cleaning utensils that have held fat. To show the action of washing soda on fats try the following:

Experiment 34: Saponification of Fat. — Into a test tube put $\frac{1}{2}$ teaspoonful of washing soda and 1 teaspoonful water, then heat until the washing soda is entirely dissolved. Melt 1 teaspoonful of solid fat and add it to the soda solution. Boil the contents of the tube for a few minutes and then examine it. What substance does the foaming suggest? What has been formed by the union of fat and soda? What application can be drawn from this with regard to the use of soda in cleaning utensils that have contained fat?

Wipe out with soft paper the utensil that has held fat. Fill it full of water, add some washing soda, and heat. Empty the water and wash. Do not use washing soda in aluminum utensils (see *Preparing Dishes for Washing*, p. 8).

QUESTIONS

What is taking place when hot fat emits an odor?

Name two advantages in dipping foods that are to be fried in egg.

Why are dried rather than soft bread crumbs used for covering foods that are to be fried?

LESSON XXXV

Fat as a Frying Medium — Food Fats

Food Fats. — Fats and oils are extracted from various materials and refined so as to make them suitable for food.

Food fats are of both animal and vegetable origin. Fats separated from milk (butter), meat fats (suet, lard) are animal fats while those separated from seeds (cottonseed and peanut), cereal (corn), fruit (olive), nuts (coconuts) are vegetable fats. A discussion of various food fats follows:

(*a*) *Butter* is made by churning ripened cream so as to separate the fat from the other ingredients contained in milk. It is salted and usually colored before putting it on the market.

The popularity of butter is dependent upon its flavor, for its fuel value is not greater than any other fat. Indeed butter does not contain as much fat as do the vegetable oils and fats, and certain other animal fats. Butter contains 85 per cent of fat while many vegetable oils and fats and lard contain 100 per cent of fat. Butter contains, however, certain growth-producing substances called *vitamines* (see Division Seven, p. 245). All fats do not contain vitamines. The latter are found in butter, but are not present in vegetable oils and fats and in pork fat.

Butter is one of the most expensive foods of a household. Its use, therefore, must be carefully considered. Because of its pleasing flavor, for some purposes no fat is as desirable as butter. If, however, fat is to be combined with foods of *pronounced flavor, i.e.* foods whose flavor is strong enough to cover up other food flavors, other fats may be substituted with satisfactory results.

(*b*) *Oleomargarin* is a combination of several different fats. It is usually made by churning soft beef fat (called oleo oil) and neutral (*i.e.* carefully rendered) lard with milk or cream. Sometimes butter and cottonseed and peanut oils are added. Because colored oleomargarin is highly taxed, this fat is usually not colored in its preparation for the market.

The term oleomargarin is used not only as the trade name for fat of the composition stated above, but as the legal name of any food fat prepared as a butter substitute. To comply with the law, solid fats found at market and containing no oleo oil are labeled oleomargarin.

(*c*) *Nut Margarin* is also a mixture of various fats. It usually consists of coconut oil combined with cottonseed or peanut oil.

(*d*) *Meat Fats.* — The fat of pork is commonly "tried out" or "rendered" to free it from connective tissue. That obtained from trying out the fat from around the kidneys is called *leaf lard;* ordinary lard is obtained from the fats of other parts of the animal. The former is considered of superior quality.

Beef suet or the fat from around the kidneys and loin of beef is also tried out and used for cooking. All scraps of fat — cooked or uncooked — as well as any drippings from beef, veal, pork, and chicken, should be saved and used in cooking. The fat from mutton has a peculiar flavor and so cannot be used in food, unless cooked with certain flavoring materials (see *Mutton,* p. 290). It may be saved for soap-making. Fat from soup and drippings need only be clarified before using for cooking; suet and other uncooked fat of meat must be first tried out.

(*e*) *Vegetable Oils.* — The oil from cottonseed, corn, and peanut is prepared for table use and sold under various trade names. Oil is also extracted from the olive. This is an extremely expensive oil. Its food value is no greater than that of other vegetable oils; only "olive flavor" is secured for the greater price. Refined cottonseed and corn oils are bland in flavor. Peanut has a characteristic flavor pleasing to most persons. When these vegetable oils become rancid, however, their flavor is disagreeable.

Fat Combinations. — Every thrifty housekeeper should have several kinds of fats in her larder, and should use all with discretion. Fats may be combined for certain purposes. Many times in making pastry or in sautéing and frying, it is desirable to use a firm and a soft fat together, such as butter and lard, suet and oil, or suet and chicken fat.

FISH BALLS

1 cupful salt codfish	1 egg
4 small potatoes	½ tablespoonful butter or substitute
	⅛ teaspoonful pepper

Wash the fish in water and tear into small pieces; wash and pare the potatoes. Cook the fish and the *whole* potatoes together in gently boiling water, containing no salt, until the potatoes are soft. Drain and shake over the fire until dry; mash, add the beaten egg, fat, pepper, and salt (if needed), and beat until light. Take up the mixture by spoonfuls, mold slightly, and place in hot deep fat. Do not fry more than six balls at one time. Fry until brown, drain, garnish, and serve at once. White or Cheese Sauce may be served over Fish Balls.

The potatoes used in fish balls may be steamed. The codfish, however, must be soaked or cooked in water.

QUESTIONS

Why is it not necessary to soak codfish for Fish Balls in water before cooking?

Why is salt not added to the water in which codfish and potatoes are cooked?

If a food that is to be fried contains much water, what happens to the water when placed in the hot fat? Explain why it is better to leave the potatoes whole rather than cut them into pieces for cooking. Why is it especially necessary to dry the fish and potato mixture before frying?

What ingredient do Fish Balls contain that hardens immediately on being heated? Of what advantage is this ingredient in mixtures that are to be fried?

What is the price per package of codfish? What is the weight and measure of a package?

LESSON XXXVI

Fat as a Frying Medium — Digestion of Fat

Experiment 35: Action of Oil and Water. — Pour a little corn or cottonseed oil into a test tube, add the same quantity of water, and shake the tube. Set the tube aside for a minute and examine. Which material rises to the top? Is oil soluble in water? What application can be made from this concerning the effectiveness of cleaning the fat of meats with water?

Experiment 36: Emulsion of Fat. — In a test tube put a bit of soap and 2 tablespoonfuls of water. Heat until the soap is melted. Add $\frac{1}{2}$ teaspoonful of vegetable oil. Shake the mixture and then examine. What familiar food does the mixture look like? Set the tube aside for a minute. Does the oil rise to the top as in Experiment 35? The fat is in an emulsified condition.

Breaking Up of Fats. — Fats and oils are not soluble in any substance found in the digestive juices, but they are acted upon by an enzyme[1] and by an alkaline substance found in the pancreatic juice. The enzyme breaks up some of the fat into a fatty acid[2] and glycerin.

During digestion, fat is emulsified, *i.e.* divided into tiny globules which do not coalesce.

When a fat is emulsified, it often looks like milk. (Milk contains fat in an emulsified form; the fat separates, however, by standing and rises to the top to form cream.) Fats can be emulsified by several different substances. A soap solution is one of the substances that will emulsify fats. (The action of soap solution in emulsifying fat was shown in Experiment 36.)

If fats are emulsified by means of soap, one might ask where the soap comes from in the process of digestion. The

[1] Steapsin or lipase is the enzyme found in the pancreatic juice which acts upon fat.

[2] Fatty acids are substances related to fats; they have certain acid properties.

soap is thought to be formed by the action of the alkali of the pancreatic juice upon some of the fatty acids formed by the splitting up of the fat. By means of the soap thus formed, fat is emulsified during digestion. During digestion, fat is broken up into fatty acids and glycerin.

Frying and Digestion. — Fat is a slowly digesting foodstuff. Not only fats, but foods coated with fat are digested slowly. Because of the longer time in the digestive tract, foods may cause digestive disturbances.

When fats are heated to a high temperature, they are decomposed and irritating substances (free fatty acids) are formed. These substances are absorbed by foods which are browned in fats.

It is well, then, to have the least possible quantity of fat soak into foods cooked in fats. It has been found that foods soak up much more fat when sautéd (*i.e.* browning in a small quantity of fat) than when fried. The greatest care should be taken in frying, however, to have the fat and the food to be fried in such condition that as little fat as possible will be absorbed. The fat should be sufficiently hot (see Experiments 32 and 33, page 132), the food as dry as possible, and the browned food drained on paper.

Care should be taken not only in frying foods, but in avoiding the use of an excessive amount of fat such as butter, cream, and vegetable oils in sauces, dressings, and pastry.

Croquettes. — Croquettes are cooked vegetable, cereal, meat, or fish mixtures dipped in dried crumbs and eggs and browned in deep fat. These food mixtures are shaped in various ways. Rice and potato croquettes are usually cylindrical in shape, while chicken croquettes are formed into cones.

Croquettes may be dipped in melted butter or substitute or they may be "dotted" with bits of fat and browned in the oven or broiling oven instead of frying in deep fat.

Starch occurs in considerable quantity in the vegetables and cereals commonly used for croquettes. Meat and fish are usually mixed with a thick White Sauce when used for croquettes, hence croquettes invariably contain a starchy substance. If croquette ingredients are heated while mixing, it is necessary to cool them thoroughly before shaping, in order that the starch may be as stiff as possible.

POTATO CROQUETTES

1 pint mashed potatoes	Celery salt
2 tablespoonfuls butter	Onion juice
Cayenne	1 teaspoonful chopped parsley
1 teaspoonful salt	1 egg-yolk or ½ egg

Mix ingredients together, shape into smooth round balls and then into cylinders. Roll in dried bread crumbs, eggs, and crumbs again (see *Fried Oysters*, p. 134). Fry in deep fat until brown.

QUESTIONS

How does the temperature of fat hot enough for frying compare with that of boiling water? Why is an iron kettle preferable to one of tin or granite for heating fat (see *Caramelized Sugar*, p. 73)?

What happens to foods that are cooked in fat too cool for frying (see Experiment 32, p. 132)?

What is the purpose of covering with egg, mixtures that are to be fried? How should the egg be prepared for "dipping"?

How can the remaining white or half an egg be utilized in preparing Potato Croquettes?

If "left over" mashed potatoes are used for making croquettes, what ingredient in the recipe above should be omitted?

LESSON XXXVII

FAT SAVING

Baking *vs.* Frying. — Foods fried under the most ideal conditions and in the most skilful manner absorb much fat. Many foods well fried, especially doughnuts, are about $\frac{1}{3}$ fat.

Fish Balls and croquettes, as mentioned previously, can be baked instead of fried. Baked croquettes seem somewhat more dry, however, than the fried food. If this is objectionable a sauce may be poured over them before serving.

Tomato, cheese, and brown sauces are tasty with most croquettes.

Doubtless many housekeepers who dislike the odor of hot fat and the cleaning of utensils used in frying foods, will consider the process of baking croquettes very much more satisfactory than that of frying.

RICE CUTLETS WITH CHEESE SAUCE

$\frac{3}{4}$ cupful rice   1 teaspoonful salt
3 cupfuls boiling water

Wash the rice, add the water. (If unpolished rice is used, let it soak for several hours.) Then add the salt and heat the mixture until it boils. Proceed as directed on page 85, Rice (cooked over boiling water). (Unpolished rice requires about 2 hours of cooking.) Make a White Sauce of the following ingredients:

4 tablespoonfuls flour   Dash pepper
1 teaspoonful salt   3 tablespoonfuls fat
1 cupful milk

To $\frac{2}{3}$ of the White Sauce add:

Cooked rice
1 *or* 2 hard-cooked eggs, chopped
1 tablespoonful parsley, chopped

(Reserve the remainder of the White Sauce for the preparation of Cheese Sauce.) Shape the mixture into cutlets. Dip in dried bread crumbs (or corn-meal) and egg as directed for Fried Oysters, p. 134.

Place the cutlets on greased dripping pan. Place bits of fat on top of the cutlets, then bake in a hot oven until brown (500° F. for 25 minutes). Serve hot with the following sauce:

Remainder of the White Sauce
$\frac{3}{4}$ cupful milk
$\frac{1}{4}$ to $\frac{1}{2}$ cupful cheese, cut in small pieces
1 pimento chopped

Dilute the White Sauce with the milk. Add the cheese and pimento. Heat and stir until the cheese is melted. If necessary, add seasoning. Serve hot over the cutlets.

Fat Saving and Soap-making. — The housekeeper who endeavors to waste no food may find that she has saved some fat which is not suitable for food. Such fat can be utilized in soap-making. By using "modern lye," soap-making is not the laborious task as was the preparation of soft soap in colonial days.

The fat for soap-making need not necessarily be decolorized. It should, however, be tried out (if it is meat fat) and clarified before using in the preparation of soap. (These processes are given on p. 134.)

Soap made at home differs somewhat from that made at a factory. When fat and lye are combined chemically, soap and glycerin are formed. A commercial soap-maker extracts the glycerin from soap, the housekeeper does not.

Homemade soap, however, usually proves very satisfactory. When the time consumed in making it is not needed for other duties or obligations, it is a saving to make soap at home.

SOAP

1 can Babbit's lye	6 pounds clarified fat
1 quart cold water	2 tablespoonfuls ammonia

Turn the lye into a granite kettle, slowly add the cold water, stirring with a stick or a wooden spoon. Work most carefully to avoid getting the lye or the lye solution on the hands. When the water is added to the lye, the mixture becomes very hot. Let it stand until it is cool.

Put the fat into a large kettle or dish pan. Heat it until it melts. Then remove it from the fire. Let it cool sufficiently to bear the hands in it. Slowly add the lye solution, stirring constantly. Add the ammonia and continue stirring until the mixture becomes about the consistency of thick cream. Then turn the soap into a wooden box lined with paper or into a granite dripping pan. When the soap becomes firm, cut into pieces of suitable size.

The materials above will make about $8\frac{1}{2}$ pounds of soap.

NOTE. — If desired one small cake of soap may be prepared by each pupil in the classroom. The following recipe may be used:

1 teaspoonful lye	2 tablespoonfuls fat
4 teaspoonfuls cold water	$\frac{1}{8}$ teaspoonful ammonia

Proceed as directed for the large quantity. Pour the mixture into one cup of a granite muffin pan or into a small pasteboard box.

QUESTIONS

How does unpolished rice differ from polished rice? Explain why the former takes a longer time to cook than the latter (see *Polished and Unpolished Rice*, p. 84).

Explain why baked croquettes require a sauce to make them most tasty for serving, while fried croquettes do not.

State at least 3 advantages of baking croquettes rather than frying them. Under what conditions do you think it would be desirable to make soap at home?

RELATED WORK

LESSON XXXVIII

Dining Room Courtesy

THE VALUE OF GOOD TABLE MANNERS

No matter how cultivated in mind and spirit one may be, if there is an absence of refinement of manners, the higher qualities are likely to be overlooked. No one can afford to slight the study of good manners. The basis of all good manners is tact, *i.e.* a kindly consideration of others. This consideration may be shown at the dining table quite as well as at a social gathering. Graceful and easy table manners and a knowledge of how to serve and be served add to the comfort as well as to the pleasure of one's associates in the dining room.

Most of the rules of table conduct have been adopted because they lend ease and grace or because they are sensible; others have been established by custom and long usage.

SUGGESTIONS CONCERNING TABLE MANNERS

The Chair. — If the chair is placed so that the front edge of the seat just touches the table-cloth, there is no necessity for moving the chair when taking one's seat or when rising. One should stand back of the chair until the hostess moves to seat herself and then move to the left of the chair to assume the seat assigned. One should also rise at the left of the chair.

The Knife and Fork. — There is but one "right" way to hold the knife or fork. When the knife and fork are used together, grasp the handle of the knife or fork with the first finger and the thumb so that the end of the handle touches the center of the palm of the hand. The hands should almost cover the handle, but the first finger should not extend down on the blade of the knife or on the prongs of the fork (see Figure 35). The knife is held in the right hand only, and is used for cutting foods and spreading butter on bread. For the latter, a small knife, called a butter spreader, is sometimes provided. After the knife has been used for cutting, it should be so laid on the plate, that it rests wholly on it, never partly on the plate and partly on the table. It is not pleasing to see a guest at the table

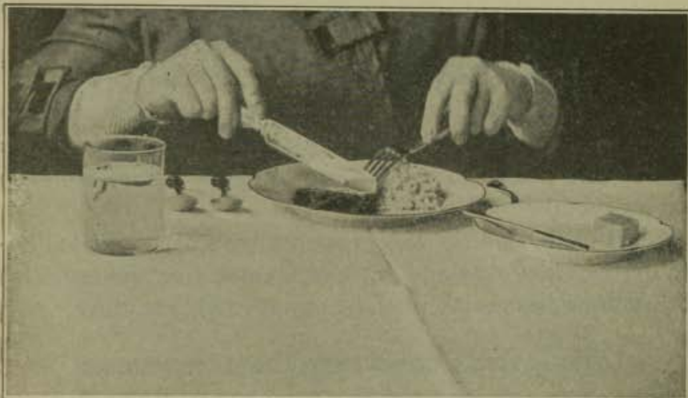


FIGURE 35. — HOW TO HOLD THE KNIFE AND FORK.

holding his knife upright or waving it in the air while he is talking.

The fork is held sometimes in the left hand and sometimes in the right. It should be in the left, when holding foods that are being cut with the knife. It may be held in either hand when conveying food to the mouth. It used to be considered "good form" to use only the right hand in lifting food to the mouth, though this necessitated changing the fork to the right hand after the knife had been laid aside. The common-sense method of keeping the fork in the left hand to carry food to the mouth is now accepted (see Figure 36). When the fork is held in the right hand and used for conveying such food as mashed potato to the mouth, its handle should be grasped by the thumb and first finger in somewhat the manner as a pen is held.

When a second serving is desired, the knife and fork should be placed together on one side of the plate, in order to make room for the food. At the end of a course the knife and fork should be placed side by side in the center of the plate.

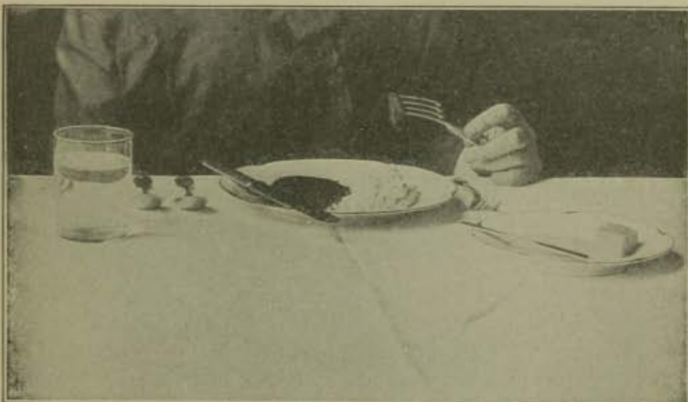


FIGURE 36. — KEEPING THE FORK IN THE LEFT HAND TO CARRY FOOD TO THE MOUTH.

The Fork and Spoon. — Since both the fork and the spoon are used to convey food, there may be some indecision as to the best use of each. The fork should be used whenever it is possible and sensible to do so. Soft foods, such as soft-cooked eggs, custards, certain fruits, and desserts served with cream or sauce, should be eaten with a spoon. The fork should be used for brick ice-cream or stiffly frozen desserts. All vegetables, salads, and pastry are eaten with a fork. In the case of salads and pastry, it is sometimes necessary to cut them with a fork. It is unconventional to cut lettuce with a knife at the table; it may be shredded or torn into pieces before it is served.

For beverages, the spoon is used for stirring and tasting, but not for sipping. After the spoon has been used it should be placed in the saucer (see Figure 37). When tasting with a spoon, the side — not the tip — of the spoon should be used. When using a spoon for serving, or for sipping soup, there is less danger of spilling the food if the spoon is moved away from, rather than toward, oneself (see Figure 38).

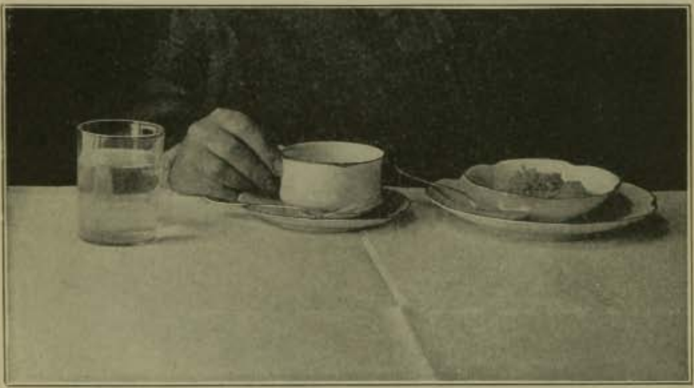


FIGURE 37. — THE TEASPOON SHOULD REST ON THE SAUCER.

The Fingers. — Almost all foods are served with a fork, or a spoon. The serving-dish for all such foods should of course be provided with a fork or a spoon. There are a few foods, however, such as bread, cake, and wafers, which should be taken with the fingers. A slice of bread should not be cut in pieces at the table. It is better to break off a piece of bread and then butter it than to spread the entire slice at one time. If cake is soft, it should be eaten with a fork. Celery, hard cheese (if cut into pieces), radishes, confections, and most uncooked fruits are taken with the fingers, and eaten from them. Olives and salted nuts may be taken from the serving-dish with the fingers, but usually spoons are provided for the purpose. Pieces of chicken or chops should be handled only with the knife and fork. Special utensils are sometimes provided for holding corn served on the cob.

Fruits served whole are sometimes difficult to manage. When possible the hostess should prepare them before they are served. Oranges and grapefruit may be cut into halves or peeled and sliced; bananas may be peeled, scraped, and sliced. If fruits, such as apples, pears, and peaches, are

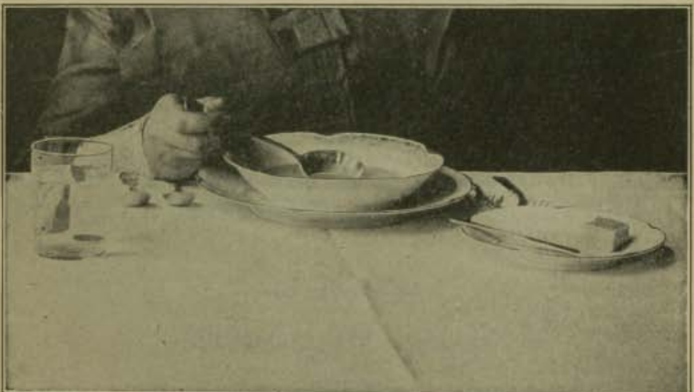


FIGURE 38. — HOW TO HOLD THE SOUPSPOON.

served whole, they should first be cut into quarters, and each quarter should be pared separately and eaten. Peaches may be cut into halves and eaten with a spoon.

The Napkin. — When the napkin is placed on the lap, it need not be spread entirely out, but may be left with one fold in it. A guest who is to be present at consecutive meals should fold his napkin after eating: if, however, he is dining in a hotel or restaurant, or if he is in a home for but one meal, the napkin should be laid on the table without folding.

Quiet Eating. — Quiet mastication without hurry and without noise is an obligation that we owe ourselves and our companions. It is well to refrain from talking during mastication. One cannot eat quietly unless the lips are kept closed while chewing.

LESSON XXXIX

Cooking and Serving Breakfast

Cook and serve a breakfast.

The following is a suggestive menu:

Breakfast Cereal with Dried Fruit
Baked Fish Balls with White Sauce
Toast — Butter
Coffee

Follow the English or family style of serving. Serve the breakfast with or without a maid (see Lesson XXX, p. 118).

LESSON XL

Review: Meal Cooking

MENU

Cooked Fruit, — fresh or dried
Creamed Toast
Coffee

See Review (p. 68) for suggestions regarding the preparation of the lesson.

LESSON XLI

Home Projects[1]

Suggestions for Home Work. — Save all scraps of fat or bits of meat fats which are unfit for food. Try out the

[1] See Lesson IX, p. 51.

latter kind of fat. When you have 3 or more pounds of fat, make soap. When the soap is firm and ready for use, weigh it.

Prepare Fish Balls (either fried or baked), Rice Cutlets with Cheese Sauce, or some other fish or cheese dish which could be used as a substitute for meat.

Suggested Aims:

(1) To calculate the cost of the soap made at home. To calculate the cost of an equal weight of factory-made soap. To determine how much you have saved by making soap at your home.

(2) To determine the difference in cost between meat and meat-substitute sufficient to serve the family.

DIVISION SIX

ENERGY-GIVING AND BODY-BUILDING FOODS,— RICH IN PROTEIN

LESSON XLII

Eggs[1]

Protein, a Body-Builder and Repairer. — An automobile requires not only fuels for its use but occasional repair. The body also needs not only fuel but building and repairing materials. The function of the fuel foods considered thus far is to give energy to the body. But there is another great class of foods, or foodstuffs — those included under the term *protein* — that not only give energy to the body but also build up or promote growth and repair it or support life. The process of building and repairing takes place in the body cells. Hence the body differs from an automobile in that it possesses the property of self-building and repairing.

The child must have protein food so that it can grow and live when growth is completed, the adult must have protein food so that it can live and maintain health. The slightest using of the body causes the wearing away of some of the tissues, hence the importance of food containing the foodstuff, protein.

[1] Note to the Teacher. — If the egg lessons come in the mid-winter months, they may be omitted until the price of eggs is reasonable; or the "theory" concerning eggs and the experiment concerning the temperature of cooking protein-rich foods may be given, and the cooking of eggs take place later in the year.

Protein is a very broad term, including many different materials, having different properties. Some proteins will promote the growth of the body and support life, while others are growth promoting but not life supporting, while still others are only life supporting.

The first type of protein is sometimes called *complete* protein, while the two latter types are called *incomplete* protein. In food study and meal planning, it is not sufficient to know that a food contains protein; one should know whether the protein is complete or incomplete. The incomplete proteins need to be supplemented with other foods containing the lacking type of protein. Milk, eggs, cheese, meat, and fish contain complete proteins, while beans, peas, gelatine, and certain cereals contain incomplete proteins.

A consideration of eggs, a food rich in complete protein, follows:

Experiment 37: The Coagulation of Egg White. — Put the white of an egg in a dish and break the membranes by cutting with a pair of scissors. Then place a small quantity of the white of egg in a test tube. Apply heat. Into what form is the liquid egg white changed by heat?

When eggs are cooked, the protein in the white called *albumin* stiffens or *coagulates*. The yolk also contains a kind of protein which coagulates when heated.

Experiment 38: The Solubility of Albumin. — Put a small portion of the broken egg white in a test tube. Half fill the tube with cold water. Then turn the contents of the tube on to a folded filter paper, and catch the filtrate in another test tube. Are the contents of the tube clear?

Apply heat to the filtrate. What happens? Does this prove that egg albumin was dissolved in the water before applying heat to the contents of the tube? Explain.

Experiment 39: Temperature at which Eggs Coagulate. — Place a teaspoonful of white of egg in a test tube. Insert a thermometer in the test tube and place the test tube in a beaker of water (see Figure 39). Heat the water *gradually*. Note and record:

(*a*) Temperature at which coagulation first appears.

(*b*) Temperature at which the egg white is entirely coagulated. Has the water reached the boiling point when the egg white has entirely coagulated? What application can you draw from this as to the temperature of the water in which eggs may be cooked?

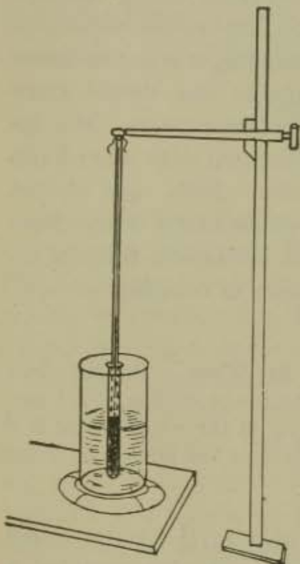


FIGURE 39. — APPARATUS TO DETERMINE THE TEMPERATURE AT WHICH EGGS COAGULATE.

Experiment 40: Comparison of Cooked and Boiled Eggs. — Remove *at once* about half of the coagulated egg from the test tube of Experiment 39. Examine it and press it between the fingers.

Continue to heat the remainder of the egg in the test tube, allowing the water to boil a few minutes. Then remove the egg, examine it, and press it between the fingers. Compare it with the egg cooked below the boiling point of water. Which is more tender? Which breaks more easily? Which do you consider more palatable? What conclusion can you draw concerning the temperature at which eggs should be cooked to make them most tender and palatable?

Digestibility and Palatability of Eggs. — The experiments of this lesson show that eggs cooked at simmering temperature are more tender than those cooked at boiling temperature. The question may arise, is the tender egg more wholesome than the tough egg? It is true that eggs cooked below the boiling temperature will digest in a little less time than those cooked in boiling water. Since, however, the tougher egg is as completely digested as the more tender, the difference in the time of digestion is a matter of little importance.

But even though the difference in digestion is not considered, the difference in *palatability* is worth some attention. If soft-cooked and soft-boiled eggs are compared, the soft-cooked will be found to be much more uniformly cooked. The white of a soft-boiled egg may be firm, while its yolk is very soft or the white may be soft while its yolk is raw.

Structure of Eggs. — A hen's egg consists of shell, membrane, white, yolk, and the little mass in the yolk called the embryo, from which the young chicken grows. The yolk is kept in place by two twisted cords of white membrane. This membrane is the first part to disappear when the egg begins to spoil.

Care and Use of Eggs. — (*a*) Wash eggs just before using.[1] The shells may be used for clearing coffee.

(*b*) Keep eggs in a cool place.

(*c*) The unbroken yolk of an egg may be kept from hardening by covering with cold water.

(*d*) All protein-rich foods contain substances which spoil or decompose readily. The egg loses water by evaporation through the pores in the shell; air enters to take the place of this and since the air contains microörganisms, the egg spoils. Eggs may be kept fresh by keeping air out of them. They may be preserved by packing them, small end down, in bran, sawdust, or sand; by immersing them in water-glass.

(*e*) When using several eggs, if not sure of their freshness, break each separately into a saucer and examine before adding to the rest.

(*f*) When using a number of eggs, it is well to scrape out the bit of white clinging to the inside of the shell.

[1] Washing removes a coating on egg-shells. This coating prevents the entrance of microörganisms. Hence eggs should not be washed until they are to be used.

Tests for Freshness. — (*a*) A fresh egg has a rough shell.

(*b*) Drop an egg into cold water. If it sinks, it is fresh; if it floats, it is stale.

SOFT-COOKED EGGS

Place eggs in enough boiling water to cover. Remove from the fire, cover, and allow to stand from 5 to 8 minutes.

The time of soft-cooking an egg varies with the different conditions. The time depends upon:

(*a*) Temperature of the eggs.

(*b*) Number of eggs cooked.

(*c*) Quantity of water used.

(*d*) Place on the stove.

One must determine by experience the length of time of cooking to produce the desired results.

By following the method above, eggs may be cooked at the dining table.

Hard-cooked Eggs.[1] — Place eggs in cold water and heat the water gradually until it reaches the boiling point. Remove from the fire at once; cover and place on the back of range, or in a warm place, for 20 minutes. Plunge into cold water, so that the shells may be removed easily.

Eggs may be hard-cooked by using the same method as for soft-cooked, allowing the eggs to remain in the hot water for 40 minutes or longer.

Eggs may also be hard-cooked in the *double boiler*. Put boiling water in the top and bottom of the double boiler. Place the eggs in the top part and cook 40 minutes.

If hard-cooked eggs are not well masticated, they are apt to cause distress during digestion. To insure thorough mastication, it is well to chop them fine and mix them with

[1] NOTE TO THE TEACHER. — The Hard-cooked Eggs prepared in this lesson may be used in the preparation of Goldenrod Eggs of the following lesson.

some other food (see *Goldenrod Eggs*, p. 158). Hard-cooked eggs used in this way cause no digestive disturbances to the normal person.

QUESTIONS

Is it possible to cook eggs hard in water that is below the boiling point? Explain your answer.

Why should eggs be called hard- or soft-*cooked* rather than hard- or soft-*boiled?*

LESSON XLIII

EGGS: DIGESTION OF PROTEIN

The Digestion of Protein. — It was mentioned on p. 153 that proteins are made up of many different substances. The materials composing proteins are called *amino acids*. There are 18 common amino acids. All proteins are not made up of the same amino acids. Amino acids in the various proteins differ not only in kind, but in quantity.

When proteins are digested, they undergo certain changes and are finally separated into their amino acids. As amino acids proteins are finally absorbed and carried to all parts of the body.

The digestion of protein begins in the stomach and continues in the intestines. The digestive juices[1] of these organs change protein into soluble forms.

POACHED EGG

Fill a shallow pan about two thirds full of boiling water. Add ½ teaspoonful of salt to each pint of water; place buttered muffin rings in the pan. Break separately each egg into a saucer and carefully slip it into a buttered muffin

[1] The pepsin and hydrochloric acid of the stomach, the trypsin of the pancreatic juice, and the erepsin of the intestinal juice digest proteins.

ring. Cover the pan and place it where the water will keep hot *but not boil.* Pour a spoonful of the hot water on each yolk occasionally.

Let stand (about 5 minutes) until the white is coagulated and a film covers the yolk. Take up with a skimmer, drain, place on slices of toast, and serve at once.

An egg poacher may be used in place of the muffin rings, or the water in the pan may be stirred in a circular motion and the eggs dropped at once into the "whirlpool." This tends to keep the white of egg from separating into pieces.

Eggs are thought by some to be much more tasty when poached in milk rather than in water.

GOLDENROD EGGS

3 or 4 hard-cooked eggs	$1\frac{1}{2}$ tablespoonfuls butter or substitute
2 tablespoonfuls flour	$1\frac{1}{2}$ cupfuls milk
$\frac{1}{8}$ teaspoonful pepper	6 pieces of toast
$\frac{3}{4}$ teaspoonful salt	Parsley

Separate the yolk and white of the cooked eggs, and chop the whites. Make a White Sauce of flour, seasoning, fat, and milk. Add the chopped egg whites to the sauce and pour it over the toast. Press the yolks through a strainer or crush them with a fork and sprinkle them over the top of the toast. Garnish with parsley and serve at once.

If the crusts are not cut from bread in making toast, it is well to dip the edges of each slice of toast for an instant in hot, salted water before adding the sauce (see *Cream Toast,* p. 104).

QUESTIONS

Why is it advisable to pour occasionally a spoonful of hot water over the yolks of eggs that are being poached?

Explain why the chopped hard-cooked eggs in Goldenrod Eggs should be more easily digested than plain hard-cooked eggs (see Experiment 12, p. 71, and *Solution and Digestion,* p. 40).

LESSON XLIV

Eggs: Omelets (A)

To Break an Egg and Separate the White and Yolk. — An egg is sometimes broken by cracking the shell with the blade of a knife or by striking the egg on the edge of a bowl or pan. The following method has also been found satisfactory, especially when it is desired to separate the white and yolk.

Strike the egg one blow upon the surface of the table. Put the thumbs together at the crack in the shell, then hold the egg upright, and gently break the shell into two parts Then slip the yolk several times from one part of the shell to the other until all the white has run over the edge into a bowl or plate. Scrape out the shell of the egg.

Two kinds of egg beaters are used for eggs, — the Dover egg beater and the wire spoon. If the former utensil is used, the egg is generally dropped into a bowl; if the latter, the egg is placed on a plate.

To Beat an Egg. — When the wire spoon is used to beat an egg, draw the spoon straight and swiftly through the egg, tilting the dish and lifting the egg beater so that the material will be turned over at each stroke. Egg whites are beaten *stiff* when the impression made by the beater is retained; and they are beaten *dry*, when the gloss has disappeared and flaky bits fly off as the egg is beaten. Egg yolks are beaten thoroughly when they are thicker and much lighter in color than before beating.

To Cut and Fold Beaten Egg Whites and Other Materials. — Pour the beaten egg whites into the material with which they are to be mixed; then with a tablespoon edgewise, cut the ingredients, lift them, and turn them over the whites. Repeat quickly until the ingredients are mixed thoroughly.

Experiment 41: Effect of Beating a Whole Egg. — Break an egg into a bowl. What is its approximate measure? With a Dover egg beater or wire spoon beat it thoroughly. What is the approximate increase in quantity? What has been beaten into the egg? What other difference is there between a beaten and an unbeaten egg?

(Use this egg for making Scrambled Eggs. See below.)

Experiment 42: Comparison of Eggs Beaten with a Dover Egg Beater and with a Wire Spoon. — Half the pupils of the class beat eggs with Dover egg beaters and the other half with wire spoons. Compare results. What is the difference in the size of the air cells made by using the different utensils? Is there any difference in the quantity of the beaten eggs? Which contains the more air?

Experiment 43: Effect of Beating Egg Yolk and White Separately. — Separate an egg and beat thoroughly the white and then the yolk with a Dover egg beater or wire spoon. What is the approximate increase in quantity? Which becomes lighter when beaten, — a whole or a separated egg? From this explain why every bit of yolk should be removed from the egg white before beating, if it is desired to beat the egg white as stiff as possible.

(Use this egg for making Foamy Omelet. See below.)

SCRAMBLED EGGS

4 eggs	Pepper
1 teaspoonful salt	½ cupful milk

1 teaspoonful butter

Scald the milk in a double boiler and add the butter. Beat the eggs and add the seasoning. Pour the hot milk over the egg mixture; return the whole to the double boiler, and cook, stirring constantly. When the mixture is thick and "lumpy" but still tender, remove from the double boiler and serve at once.

For economy, the butter may be omitted.

FOAMY OMELET

4 eggs	½ teaspoonful salt
4 tablespoonfuls milk or water	Pepper

2 teaspoonfuls butter or substitute

Separate the yolks and whites of the eggs. Beat the yolks of the eggs until creamy; add seasonings and milk or water. Then beat the whites until stiff and cut and fold them into the yolk mixture. Place the fat in an omelet pan, heat, and turn the omelet into it. Cook *slowly*, occasionally turning the pan so that the omelet may brown evenly. When the omelet is set and delicately browned

FIGURE 40. — METHOD OF HOLDING PAN TO TURN AN OMELET ON TO A PLATTER.

underneath, place it in a hot oven for a few minutes to dry the top. Fold and serve immediately.

To Fold an Omelet.— Run a spatula underneath the omelet to loosen it. Make a slight incision with a knife through the middle of the omelet at right angles to the handle of the pan, and fold the omelet over upon itself away from the handle of the pan. Grasp the handle of the pan in the right hand, placing the back of the hand underneath with the thumb pointing away from you. Then turn the omelet upon a platter (see Figure 40).

QUESTIONS

How are Scrambled Eggs usually cooked? From your work concerning the effect of intense heat upon eggs, explain the advantages of the method given above for Scrambled Eggs.

What is the proportion of liquid and salt for each egg of a Foamy Omelet?

Explain why it is especially important to cook a Foamy Omelet slowly.

What causes a Foamy Omelet to "fall"?

What is the test for the sufficient oven-drying of a Foamy Omelet?

How many persons may be served by using these recipes for Scrambled Eggs and Foamy Omelet?

LESSON XLV

EGGS: OMELETS (B)

WHITE SAUCE OMELET

3 tablespoonfuls flour	$2\frac{1}{2}$ tablespoonfuls butter or substitute
1 teaspoonful salt	1 cupful milk
Pepper	4 eggs

2 teaspoonfuls butter or substitute

Make a White Sauce of the milk, fat, flour, and seasoning. Separate the whites and yolks of the eggs, and beat them until light. When the White Sauce is cool, stir in the yolks and fold in the whites. Cook and serve as Foamy Omelet.

BAKED OMELET

Prepare a White Sauce Omelet. Instead of turning it into a frying pan, pour it into an oiled baking-dish. Bake in a hot oven (375° F.) for 30 to 40 minutes, or until it is "puffed" in appearance and golden brown in color. Serve at once from the dish in which it was baked.

Modification of Foamy and White Sauce Omelets. — Mix and cook a Foamy or White Sauce Omelet. As soon as the omelet begins to set, spread it while cooking with finely chopped cooked ham, veal, or chicken. Continue to cook and then dry, fold, and serve as with the usual omelet.

Cooked peas, asparagus, cauliflower, or flaked fish may be added to the sauce of White Sauce Omelet. Cheese may be used in place of meat with either omelet.

Foamy Omelet may be varied by using tomato juice instead of milk. Tomato sauce may be served with either of these omelets.

Sweet Omelet may be made as follows: Add 4 tablespoonfuls of powdered sugar to the Foamy Omelet mixture; after cooking, spread with softened jelly; after folding, sprinkle with powdered sugar. Use $\frac{1}{2}$ cupful of jelly for the Foamy Omelet recipe.

QUESTIONS

Why is the White Sauce cooled before adding the egg yolks in White Sauce Omelet?

Point out the most important differences between a Foamy and a White Sauce Omelet.

What is the purpose of cutting and folding in the whites of eggs in omelets?

What is the purpose of beating eggs?

What are the tests that show when egg white is beaten stiff and when dry?

What are the tests for thoroughly beaten egg yolk?

LESSON XLVI

Milk

Milk, an Invaluable Food. — It has been said that there is no one food *except milk* which cannot be eliminated from the diet. Milk is the only food for which there are no easily found substitutes. The housekeeper or one who plans the food for the family should purchase daily, if possible, a pint of milk for each adult and a quart for each child under ten years. She should see to it that this amount of milk is entirely used either as a beverage or in cooked foods. If one must economize in foods, *less should be spent for meat, and more for milk.*

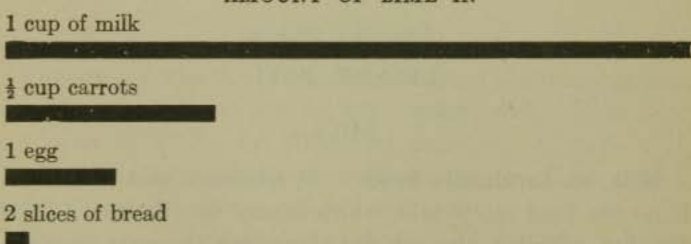
Although more than $\frac{4}{5}$ of milk is water, it contains only a little more water than do potatoes and lean meat. The value of milk is due to the fact that it contains:

(*a*) *Proteins of "excellent quality."* An authority on diet says[1]: "There can be no doubt that the proteins of milk are far superior to those of any foods derived from vegetable sources." The most important protein existing in milk is called *casein.*

Casein is a complete protein and is very important for growth. It has a peculiar property; it precipitates when acid is added to milk. When milk sours, the sugar contained in the milk changes to an acid, and this acid causes the casein to precipitate. Casein is also clotted by an enzyme occurring in the digestive juice of the stomach.

(*b*) *Valuable ash.* Lime which is so essential to body-building is one of the minerals in milk. The following diagram from *United States Food Leaflet No. 11* shows that milk is especially rich in lime. (Lime is calcium oxide.)

AMOUNT OF LIME IN



[1] See "The Newer Knowledge of Nutrition," by McCollum, p. 74.

(*c*) *Vitamines.* These are substances contained only in certain foods. They are essential for maintaining life and health. Milk is rich in these indispensable materials (see Division Seven, p. 245).

Milk also contains fat and carbohydrate. The presence of the foodstuffs in milk is shown by the following:

Experiment 44: Separation of Milk into Foodstuffs.

(*a*) By means of a cream dipper, remove the cream from a bottle of milk. Place a drop of the cream on a piece of paper. Let the paper dry. What foodstuff is indicated by the stain on the paper?

(*b*) Take $\frac{1}{4}$ cupful of the skimmed milk. Heat it to blood temperature (test by dropping the milk on the wrist, see *Junket Custard*, p. 189). Crush $\frac{1}{8}$ junket tablet and add it to the warm milk. Stir until the powder is dissolved. Let the milk stand in a warm place until it is clotted. Heat the clotted milk and boil 1 minute. Pour it into a filter paper. Catch the filtrate in a beaker. What is the foodstuff that remains in the filter paper (see Proteins of "excellent quality," p. 164)?

(*c*) Put 15 cubic centimeters of Fehling's Solution [1] in a flask. Boil for 2 minutes. Add 2 cubic centimeters of the filtrate from (*b*) and boil one minute. To what color does the blue mixture change? A red precipitate indicates sugar. What foodstuff does this test indicate that milk contains?

(*d*) Put the remainder of the filtrate from (*b*) in a custard cup and evaporate over hot water to dryness. Note the residue. What foodstuff other than sugar is contained in the residue?

(*e*) What foodstuff has passed off in the form of vapor during evaporation?

(*f*) As mentioned above, milk also contains vitamines.

[1] Note to the Teacher. — Fehling's Solution is made as follows: Prepare a solution of Rochelle salts, — 175 grams of Rochelle salts, 50 grams of sodium hydroxide, and 250 cubic centimeters of water. Prepare a solution of copper sulphate, — 57.73 grams of copper sulphate, 250 cubic centimeters of water, and 0.4 cubic centimeter of sulphuric acid. Then combine 1 part of the alkaline Rochelle salt solution, 1 part of copper sulphate, and 4 parts of water. Boil the mixture.

This solution deteriorates readily. The best results are obtained by using a "fresh" mixture for testing sugar and by boiling just before using.

LESSON XLVII

Milk with Cocoa and Chocolate

Experiment 45: Scalding Milk. — Fill the lower part of a double boiler one third full of boiling water. Put $\frac{1}{2}$ cupful of milk in the top of the double boiler, cover, and heat over the boiling water. In a few minutes examine. Carefully note the appearance of the surface of the milk. Explain why it is that dishes that have contained milk should be soaked in cold water, and then washed in warm water.

Insert a thermometer in the milk and record temperature. Is it possible to boil milk over hot water? Explain your answer. (Use this scalded milk to make cocoa and chocolate.)

The taste of milk is changed by heating it above 158° F. Less change, however, is produced by scalding than by boiling. Milk is also apt to scorch if cooked at boiling temperature. It is sometimes necessary to boil milk to sterilize it.

Cocoa and Chocolate as found at market are prepared from cacao beans. The latter grow in pods, — the fruit of the tropical cacao trees (see Figure 41). The beans are taken from the pods, allowed to ferment, dried, and roasted. The husks loosened by roasting are then removed from the beans.

Cacao beans are ground, molded, and sold as bitter or baker's chocolate. In the preparation of sweet chocolate sugar is added to the powdered chocolate before molding. Cocoa differs from chocolate in that some of the fat is removed.

Cocoa and chocolate contain protein, fat, and carbohydrates. These materials, in addition to the milk and sugar used in preparing the beverages, make the cocoa and chocolate beverages high in food value. But in addition to the materials mentioned above, there is present in cocoa and chocolate some tannin and stimulating materials. The large percentage of fat existing in chocolate may produce distressing effects when taken in addition to a full meal. If, however, the use of these beverages causes no ill effects, they may be classed among the nutritious foods and are much preferable to tea and coffee especially for girls and boys.

Neither cocoa nor chocolate is soluble in water. Some cocoas are very finely ground and are termed soluble cocoas.

FIGURE 41.—CACAO PODS.

When mixed with water these cocoas do not separate as rapidly as others, but they are not soluble. Because of its insolubility, chocolate should be blended as thoroughly as possible with other materials. A satisfactory and practical method of accomplishing this is to make a *smooth paste* of chocolate and boiling water.

To develop flavor, it is well to cook both chocolate and cocoa at boiling temperature, especially when combining with liquids. The flavor of the cocoa beverage is improved by much cooking. Long cooking of the chocolate beverage causes the fat to separate and float.

COCOA

¼ cupful cocoa	3 cupfuls milk
1 to 3 teaspoonfuls corn-starch	¼ to ⅜ cupful sugar
1 cupful water	¼ teaspoonful salt

Mix cocoa, corn-starch, and water and boil for 10 minutes. Add the milk and sugar to the mixture and cook over hot water for ½ hour. Add salt. Beat well and serve. Vanilla may be added to cocoa if desired.

Varying quantities of corn-starch and sugar are given so that the beverage may be thickened and sweetened to suit one's taste. If desired, the corn-starch may be omitted entirely.

CHOCOLATE

2 squares chocolate	3 cupfuls milk
1 cupful boiling water	¼ teaspoonful salt
⅓ cupful sugar	½ teaspoonful vanilla

Cut the chocolate into bits and put it in a pan; add the boiling water. Stir and cook until it reaches the boiling point and is perfectly smooth. Heat the milk in a double boiler. Then gradually add the hot milk to the chocolate mixture, add the sugar, and heat all in a double boiler. Add salt and vanilla, if desired. If there is a scum over the beverage, beat well. Serve hot.

Whipped cream or marshmallows are often served with chocolate. The use of whipped cream with chocolate, however, makes the beverage excessively rich in fat.

QUESTIONS

What is the difference in method between scalding milk and boiling it? How can one determine when milk is scalded?

If it is necessary to heat milk, give two reasons why it is usually better to scald it than to boil it. Under what conditions should it be boiled?

What is the present cost of milk per quart? When is the price highest and when lowest?

If sweetened chocolate is used, how should the recipe for chocolate beverage be changed? Give two reasons why cocoa and chocolate should not be boiled after adding the hot milk.

Why is vanilla not added until the beverages are ready to be served (see *Flavoring Extracts*, p. 265)?

What is the weight of one square of chocolate? How many squares in an ordinary cake of chocolate? What is the price per cake?

How many cupfuls are there in a half pound box of cocoa? What is the price per box?

See Chocolate Corn-starch Pudding, p. 100. How much cocoa may be used for 1 ounce of chocolate when one is substituted for the other? What is the difference in cost of these quantities of chocolate and cocoa?

LESSON XLVIII

Milk and Cream

Whipping Cream. — A popular way of preparing cream for serving is to whip it. This is done most successfully when the cream is cold and kept cold, *i.e.* surrounded with ice water during the beating process.

To show one of the points involved in chilling materials try the following:

Experiment 46: Comparison of the Conducting Power of Metal and Earthenware. — Select a tin and an earthenware utensil of about the same size and shape. Put an equal quantity of water of the same temperature in each utensil. Surround each with ice water and cover. After 5 minutes, take the temperature of the water in the tin and in the earthenware utensil. Which is colder? Through which material, — tin or earthenware, — is heat transmitted more readily? When cream is to be surrounded by ice water for whipping, in which kind of utensil should it be placed? Explain your answer.

Use a Dover egg beater or a cream whip for whipping cream. Since cream "spatters" when being beaten, a cream whip arranged with a cover is very satisfactory. To prevent spattering, the bowl of cream may be covered with paper while the cream is being whipped. Cut a slit in a piece of paper, insert the Dover egg beater in the slit, put the beater in the cream and push the paper down to cover.

Since cream contains considerable fat, under certain conditions, it is possible to mass the fat together, that is, separate it from the other constituents, and form *butter*. For making butter the cream should be "ripened," *i.e.* it should contain certain bacteria. It should then be churned.

On the other hand, if it is desired to beat or *whip* the cream, but not to form butter, it is necessary to prevent the fat from massing together. To accomplish this, use thick cream (containing 20 per cent or more of fat) from 12 to 24 hours old [1] and have it very cold; it will then whip quickly. Cream may be chilled by placing it on ice for some time before whipping or by surrounding it with ice water while whipping. In warm weather, it is safer not only to chill the cream but also to surround it with ice water while whipping.

A harmless substance called *viscogen* may be added to thinner cream (*i.e.* the so-called coffee or 16 per cent cream) to make the latter whip. Viscogen is prepared by mixing the following ingredients:

[1] Such cream contains a small amount of lactic acid.

½ cupful sugar
1 cupful water
1 tablespoonful milk of lime [1]

Mix the sugar and water and heat the mixture until it boils. Cool and add the milk of lime. Let the mixture stand at least 24 hours before using. Add 1 teaspoonful to each pint of cream, then whip the mixture as directed above.

Comparison of Milk and Cream. — Cream is richer in fat than milk, average cream containing 16 per cent of fat and whole milk about 4 per cent. But cream contains less protein and ash than whole milk.

Since cream is always more expensive than milk, it is interesting to compare the food value of quantities of each which may be purchased for the same price. Although the prices of cream and milk vary in different places, usually ½ pint of cream costs about as much as 1 quart of milk. The following shows the approximate quantity of nutrients shown in the two quantities:

In 1 *quart of milk* [2]	*In* ½ *pint of cream*
As much protein as in 5 eggs	As much protein as in 1 egg
2½ tablespoonfuls of fat	3 tablespoonfuls of fat
3 tablespoonfuls of sugar	½ tablespoonful of sugar

Although ½ pint of cream contains ½ tablespoonful more of fat than does 1 quart of milk, the latter contains 2½ tablespoonfuls more of sugar and as much more protein as is contained in 4 eggs. This comparison makes us question the advisability of buying much cream.

If whole milk is purchased, its top milk may often be used in place of cream. The skim milk that remains is a valuable

[1] Milk of lime may be prepared by mixing 1 part of slaked lime with 3 parts of water.

[2] By permission Journal of Home Economics, Vol. X (August, 1918, p. 379).

food. Although whole milk contains more fat and vitamines than does skim milk, the latter has as much protein, lime, and sugar as whole milk. The use of both whole and skim milk is advised.

Care of Milk. — Milk is one of the foods that require the greatest care, and should be well cared for not only in the home but also on the dairy farm. It is one of the foods that afford ideal conditions for the growth of microscopic vegetable organisms, called *bacteria* (see *Why Foods Spoil*, p. 474). Many varieties of these bacteria or tiny plants produce changes in the milk which cause it to sour. A few varieties of disease-producing bacteria also sometimes exist in milk.

Milk can be kept reasonably free from bacteria by:

(*a*) Perfect cleanliness on the dairy farm.

(*b*) Cooling it immediately after being drawn from the cow, and by keeping it cool.

(*c*) Placing it in sterilized utensils.

(*d*) Covering it, thus keeping it free from dust.

Utensils for holding milk should be of glass, earthenware, or smooth, bright tin. They should be washed, scalded, or even better, boiled, and placed in the sun for two or three hours. In the home, milk should not be used after long standing, even though it is sweet. It is well to buy milk in small quantities and in bottles. The upper rim of a milk bottle should be washed before pouring milk from it. Because milk readily absorbs odors and flavors, it should be kept away from any substance having a strong odor or flavor.

RICE DAINTY

¾ cupful cooked rice	¾ cupful powdered sugar
¾ cupful fruit, cut into pieces	½ to ¾ cupful cream, whipped

Mix the rice, fruit, and sugar, then fold in the whipped cream. Pineapple, shredded or diced; bananas cut into pieces (not slices); dates, seeded and cut into pieces; or cooked apricots are desirable fruits for this dessert.

CREAM OF RICE PUDDING

1 quart milk *or*	½ teaspoonful salt
1 quart milk and water	⅓ cupful sugar
⅓ cupful rice	Grated rind of ½ lemon

Wash rice; put it and all the other ingredients into a buttered pudding dish. Bake in a *slow* oven (250° F.) until firm. This usually takes three hours. While baking, stir the mixture occasionally.

If desired, one half cupful of raisins may be added to the mixture, and 1 teaspoonful vanilla or ¼ teaspoonful nutmeg may be substituted for lemon rind.

QUESTIONS

From your knowledge of the effect of intense heat upon milk, explain why Cream of Rice Pudding should be baked in a slow oven.

What change in quantity takes place in the milk of this pudding during long cooking? What change in quantity takes place in the rice during long cooking? From this explain why so much milk when combined with a little rice forms a solid mixture.

What is the price per pint of thin or coffee cream?

What is the price per pint of heavy or whipping cream?

What is the least quantity of cream that can be purchased?

Explain why it is that scalded milk does not sour as soon as uncooked milk (see *Care of Milk*, p. 172).

Why should utensils that have held milk be scalded or boiled?

LESSON XLIX

Cream Soups (A)

Thick Soups. — Milk combined with various vegetables, grains, and fish is used in making Cream Soups and Purées. The vegetables are cooked and mashed or forced through a strainer and combined with a liquid, — usually milk or milk with vegetable stock. In order to have the vegetable pulp uniformly mixed through the liquid, it is necessary to thicken the liquid with a starchy material. Flour with butter or substitute, mixed and cooked as in White Sauce, is used for this purpose. It is said to " bind " the vegetables and the liquid. Thus, Cream Soups and Purées are simply White Sauces to which vegetable pulp is added.

General Proportions. — *The usual proportion of vegetable pulp or purée to liquid is:* One part of vegetable pulp or purée to 2 parts of liquid, *i.e.* milk, vegetable stock, or meat stock.

The proportion of flour to liquid is: $\frac{1}{2}$ tablespoonful flour to 1 cupful liquid, if a starchy vegetable is used, or, 1 tablespoonful flour to 1 cupful liquid, if a vegetable having little thickening property, as celery, is used.

Sometimes an egg or two is added to soup for thickening or flavor, and to increase the food value.

Different kinds of vegetables are sometimes mixed for a soup, as: Peas and beans, or corn and beans.

POTATO SOUP

3 potatoes	1 tablespoonful flour
1 pint milk *or*	$1\frac{1}{2}$ teaspoonfuls salt
1 pint milk and potato stock	$\frac{1}{8}$ teaspoonful pepper
2 slices of onion	Celery salt
$\frac{3}{4}$ tablespoonful butter or substitute	2 teaspoonfuls chopped parsley

Cook and mash the potatoes, heat the milk and onion in a double boiler, then add them to the mashed potatoes. Press the potato mixture through a strainer and use it as the liquid for a White Sauce, using all other ingredients except the parsley in the sauce. If necessary, add more liquid, or evaporate to the desired consistency. Add the chopped parsley just before serving.

" Left over " mashed potatoes may be utilized in making this soup.

CROUTONS

Cut stale bread into half-inch cubes. Bake until a golden brown (400° F., 8 to 10 minutes). Stir often. Serve with soups.

Save the crusts and prepare Dried Bread Crumbs with them (see p. 176).

QUESTIONS

What is the proportion of flour and liquid in one cup of White Sauce for Vegetables (see p. 109)?

How does the proportion of flour and liquid for one cup of Cream Soup differ from the above proportion?

Why are the potatoes pressed through a strainer *after* rather than *before* adding the hot milk?

Why should the cubes of stale bread be baked slowly (see *Toast*, p. 103)?

LESSON L

Cream Soups (B)

Food Value of Cream Soups. — Since thin or clear soups contain much liquid, their food value is not as high as most solid foods. Cream Soups, however, are as concentrated as a potato; they are the most nourishing of all soups. The use of milk instead of water or stock and of flour and fat, to say nothing of vegetable pulp, increases their food value. Cream Soups are more suitable to serve at a meal of few courses such as luncheon or supper rather than at dinner where there is a greater variety of foods.

Thick soups may serve as a valuable part of a meal; a hot liquid taken into an empty stomach is easily assimilated, acts as an appetizer, and thus prepares for the digestion of the remainder of the meal.

CORN SOUP

1 can of corn	2 tablespoonfuls flour
1 pint water	1 teaspoonful salt
$1\frac{1}{2}$ tablespoonfuls butter or substitute	$\frac{1}{8}$ teaspoonful white pepper
1 slice onion	1 pint milk

Add the water to the canned corn and *simmer* 20 minutes. Melt the fat, add the onion, and cook until light brown. To this add the dry ingredients and proceed as in making White Sauce. Add the cooked corn and strain. Reheat before serving, if necessary.

FIGURE 42. — DRIED BREAD CRUMBS. (Note that the jar is covered with a cloth.)

NOTE. — The method of adding onion flavor to this soup (*i.e.* browning onion in fat) is often used in the preparation of other foods, especially meats and sauces.

SOUP STICKS

Cut stale bread into slices, remove the crusts, and spread with butter. Cut into strips and bake at 400° F., 8 to 10 minutes. Save the crusts and prepare Dried Bread Crumbs with them.

DRIED BREAD CRUMBS

Dried Bread Crumbs may be prepared from crusts and pieces of bread. Dry the bread in the oven (250° F., 2 hours) or in a warming oven. Crumb it by rolling on a pastry board or putting it through a meat grinder. If fine crumbs are desired, sift the crushed bread. Place the fine and coarse crumbs in separate jars. Cover the jars by tying a piece of muslin over each. (The muslin covering can also be conveniently secured by means of a rubber band.) If each jar is tightly covered with a lid, air is excluded from the crumbs and molds often grow on them. Bread crumbs thoroughly dried and stored as directed will keep for several months (see Figure 42).

QUESTIONS

Explain why thick soup may serve as a valuable part of a meal. Why is it served as the first course of a meal?

Is the mashed potato of Potato Soup strained before or after adding it to the other ingredients? When is the Corn Soup strained? How is the flavor extracted from the onion in preparing Potato Soup? How is the flavor extracted for Corn Soup? From this explain the difference in straining the soups.

If fresh corn were used for this soup, how would its cooking differ from that of canned corn?

How should fresh corn be cut from the cob for soup (see *Green Corn*, p. 25)?

What is the price per can of corn?

In preparing Soup Sticks, why are the crusts removed from the bread before buttering it? Why is the bread spread with butter before cutting it into strips? Aside from flavor, what is the purpose of spreading the bread for Soup Sticks with butter?

How should dried bread crumbs be covered for storing? Why?

What is the difference between soft bread crumbs (see note under recipe for Stuffed Tomatoes, p. 17) and dried bread crumbs (see p. 176)? Which should be used for scalloped dishes? Which for covering fried foods? Think of the dishes which contain bread crumbs and then state for which foods either kind of crumbs could be used. Explain.

LESSON LI

Milk Thickened with Egg (A)

Custards. — Since eggs have the property of stiffening when heated, they are often used for thickening liquids, especially milk. Milk thickened with eggs is called *custard.*

There are two kinds of plain custards: (*a*) steamed or baked custard and (*b*) soft custard. The method of mixing these custards is the same, but the methods of cooking and the tests for sufficient cooking differ.

That the milk may not scorch and that the egg may not cook too hard, all milk-and-egg mixtures should be cooked below the boiling temperature of water. They should never be cooked directly over the fire, but over hot water or in a double boiler. That the egg may cook evenly and not too quickly, the water in the double boiler *should not boil rapidly.*

If a custard is properly cooked, the egg is in a soft-cooked condition. It exists in a jelly-like mass throughout the milk. The custard has a creamy appearance. If, however, a custard is cooked too much, the egg becomes hard-cooked and the particles of egg appear in "lumps" in the milk mixture. The custard is then said to be *curdled.*

A curdled custard may be made smooth by placing the upper part of the double boiler in a pan of cold water and then beating the custard *at once* with a Dover egg beater. This applies to all types of plain custards.

STEAMED OR BAKED CUSTARD

1 pint milk	$\frac{1}{8}$ teaspoonful salt
2 or 3 eggs	2 tablespoonfuls caramel sirup *or*
$\frac{1}{4}$ cupful sugar	$\frac{1}{16}$ teaspoonful nutmeg

Scald the milk in a double boiler. Beat the eggs *slightly,* add the sugar and salt, mix. Add the hot milk to this mixture. Strain the mixture, flavor, and pour it into a mold. If *steamed custard* is desired, steam (without stirring) until the custard is firm. Let the water in the steamer boil gently rather than vigorously. Test for sufficient cooking by inserting a knife into the custard. If it comes out clean, the custard is done.

If *baked custard* is desired, place the cups of custard in a pan of hot water, and bake in a moderate oven (325° F.) for 35 minutes or until firm. Test as steamed custard.

If a Baked or Steamed Custard is to be turned out of the mold after steaming, 3 or 4 eggs should be used with each pint of milk. By placing a little Caramel Sirup in the bottom of each mold, a custard may easily be turned out of the mold. The custard mixture should be poured very gently on top of the sirup to prevent the custard and sirup from mixing. The caramel also serves as a sauce for the custard when served. (Caramel Sirup may be prepared by caramelizing sugar (as directed in making *Peanut Candy*, see p. 73) and then dissolving the caramelized sugar in boiling water. Use equal quantities of sugar and water.)

SOFT CUSTARD

1 pint milk	¼ cupful sugar
2 eggs	⅛ teaspoonful salt
½ teaspoonful vanilla	

Mix the materials in the same way as for steamed or baked custard. Instead of pouring the mixture into molds, return it to the double boiler and cook (stirring constantly) until it thickens or forms a coating over the spoon. Strain, cool, and flavor. Note that steamed custard is strained and flavored before cooking, and soft custard, after cooking.

In preparing soft custard, the eggs may be separated and the yolks cooked with the milk and other ingredients. The whites may be beaten stiff and beaten into the hot mixture with a Dover egg beater. Soft Custard may be used as a sauce over cooked rice, cake, bananas, peaches, and other foods.

To Decrease the Eggs in Custard

When eggs are expensive omit 1 or 2 from a custard recipe. Substitute ½ *tablespoonful of corn-starch for each omitted egg*. For methods of thickening milk with both eggs and starchy materials, see Lessons LIV, p. 182.

QUESTIONS

What is the purpose of eggs in custard?

Why are eggs beaten *slightly* for custards?

How do Steamed Custards and Soft Custards differ in method of cooking? What are the tests for sufficient cooking of each?

What is the purpose of straining custards? Why is Steamed Custard strained and flavored before cooking, and Soft Custard, after cooking?

In what condition is the egg when a custard is curdled? How can a curdled custard be made smooth?

LESSON LII

Milk Thickened with Egg (B)

FLOATING ISLAND

Custard

1 pint milk	$\frac{1}{4}$ cupful sugar
3 egg yolks	$\frac{1}{8}$ teaspoonful salt
$\frac{1}{2}$ teaspoonful vanilla	

Meringue

3 egg whites	3 tablespoonfuls powdered sugar

The custard may be made thicker by using 4 (instead of 3) eggs.

Prepare the custard as Soft Custard.

Prepare the Meringue by beating the whites of eggs stiff and then adding 1 tablespoonful of sugar for each white of egg. Drop the Meringue by spoonfuls on the custard. If desired, garnish the Meringue by bits of jelly or colored gelatine.

From the results of Experiment 42, p. 160, which egg beater do you consider most advisable for preparing Meringue?

If desired, the Meringue may be cooked. This may be accomplished in several ways: (*a*) place it on the *hot* custard at once after preparing the custard. (*b*) Steam it by dropping it by spoonfuls on the hot milk before preparing the custard. Cover, and let the egg white cook for about 2 minutes, then remove from the milk and proceed to thicken the milk with the egg yolks. (*c*) Drop the uncooked Meringue on the cooked custard as directed above, then cook and brown it slightly by placing the custard in the broiling oven or in the top of a hot baking oven.

QUESTIONS

In making custards, why should the hot milk be added to the eggs, instead of the eggs to the hot milk?

How does Floating Island differ from Soft Custard?

What is Meringue?

Compare Floating Island made with three eggs to that made with four eggs. How does it differ in thickness, color, and cost?

LESSON LIII

Milk Thickened with Egg (C)

APRICOT DAINTY

1 cupful dried apricots   ½ cupful powdered sugar
3 egg whites

Wash and soak the apricots. Steam until soft. Mash the apricots, or press through a coarse strainer or colander; add the sugar. Beat the whites of eggs until very stiff; fold them into the apricots and sugar mixture. Chill and serve with Custard Sauce.

Dried *prunes* may be substituted for apricots, using less sugar and adding a little lemon juice.

If it is desired to make Apricot Dainty some time before serving, it should be stiffened with gelatine. To do this, mix ½ tablespoonful of granulated or powdered gelatine with 2 tablespoonfuls of cold water. Add the gelatine mixture to the hot mashed or strained apricots, stir until the gelatine is dissolved, then proceed to add the sugar and egg white as directed above.

CUSTARD SAUCE

Use the recipe for Soft Custard (p. 179) for Custard Sauce, substituting 3 yolks for 2 whole eggs.

QUESTIONS

Why is it desirable to steam the fruit rather than cook it in water for this dessert?

Compare the custard made with the entire egg to that made with the egg yolk. What is the difference in thickness and color?

How many egg yolks are equivalent to two whole eggs in thickening?

LESSON LIV

Milk Thickened with Egg and Starchy Materials (A)

Egg and Starch. — How long is it necessary to cook milk-and-starch mixtures so that the starch will be cooked thoroughly (see *Blanc Mange*, p. 100)? How long does it take to cook eggs when used for thickening? Are eggs used for thickening harmed by long cooking? Explain your answer. If both starch and egg are used for thickening a mixture, devise a way whereby the starch can be cooked thoroughly, and the egg can be cooked without curdling.

BUTTERSCOTCH TAPIOCA

1 pint milk	$\frac{1}{2}$ teaspoonful salt
$\frac{1}{8}$ to $\frac{1}{4}$ cupful granulated tapioca	1 egg
$\frac{1}{2}$ cupful dark brown sugar	$\frac{1}{2}$ teaspoonful vanilla

$\frac{1}{2}$ to 1 tablespoonful butter

Scald the milk, add the tapioca, and cook the mixture over hot water until the tapioca is transparent (see *Apple*

Tapioca, p. 113). Mix the sugar, salt, and egg. Add a portion of the hot tapioca mixture to the egg mixture. Mix thoroughly, then return the mixture to the double boiler. Stir and cook until the egg thickens. Add the vanilla and butter and turn into dishes for serving. Cool. Serve with plain or whipped cream.

The quantity of tapioca determines the stiffness of the dessert. If a very soft consistency is desired, use the smaller quantity of tapioca.

Chopped nuts may be added to the dessert just before turning into the serving dishes.

For economy, the egg and butter may be omitted. If the egg is omitted, the greater quantity of tapioca should be used.

CREAM OF POTATO SOUP

3 potatoes	1½ teaspoonfuls salt
2½ cupfuls milk	Pepper
2 egg yolks or 1 egg	⅛ teaspoonful celery salt

Cook the potatoes until soft, drain, and mash. Scald the milk and add it to the potatoes, then strain the mixture. Beat the eggs, add seasoning, combine with the potato mixture, and cook in the top part of the double boiler, stirring constantly, until the egg thickens. *Serve immediately.*

QUESTIONS

In Butterscotch Tapioca what ingredient could be substituted for tapioca? How much of this ingredient should be used (see *Blanc Mange*, p. 100)?

What is the purpose of the eggs in Cream of Potato Soup?

Why should the soup be served immediately after cooking the eggs?

How does this soup differ in thickening materials from Potato Soup (see p. 174)?

What would be the effect of adding 1 egg to plain Blanc Mange?

When and how should the egg be added? Give reasons for your method of adding the egg.

Write a recipe for Soft Custard (see p. 179) in which corn-starch is substituted for one of the eggs. Write out the method of cooking such a custard.

LESSON LV

Milk Thickened with Egg and Starchy Materials (B)

CORN CUSTARD

1 can corn *or*	1 teaspoonful salt
6 ears green corn	1½ tablespoonfuls butter or substitute
2 tablespoonfuls flour	1 cupful milk 2 eggs

Make a White Sauce of the flour, salt, butter, and milk. Add the corn (for method of cutting green corn from the cob, see p. 25) and cook the mixture at boiling temperature for 5 minutes. Beat the eggs, add them to the corn mixture. Turn the mixture into a buttered baking-dish, and place the dish in a pan of hot water. Bake at 400° F. for 25 minutes or until the mixture is firm. Serve hot as a vegetable.

One egg may be omitted and the flour and fat increased to 3 and 2 tablespoonfuls respectively.

CHEESE PUDDING

1 cupful cheese grated or cut into pieces	1 egg
1 cupful milk	½ teaspoonful salt
¼ cupful dried bread crumbs or granulated tapioca	Cayenne

Beat the egg slightly, and add the other ingredients. Turn into a buttered baking-dish, custard cups, or ramekins. Place in a pan of hot water, and bake at 400° F. for 30 minutes or until the mixture is firm. Serve hot (for method of preparing *Dried Bread Crumbs*, see p. 176).

QUESTIONS

What ingredients in Corn Custard thicken the mixture?

What ingredients in Cheese Pudding thicken the mixture?

What is the purpose of placing the baking-dish containing Corn Custard or Cheese Pudding in a pan of hot water? At what temperature should these two foods bake? Give a reason for your answer.

In Cheese Pudding, why are the starchy material and egg cooked for the same length of time?

Compare the cost of a can of corn and six ears of green corn.

How many persons will the recipe for Corn Custard serve?

How many will the Cheese Pudding serve?

LESSON LVI

Milk Thickened with Egg and Starchy Materials (C)

Bread Puddings are made by adding bread to a custard mixture, and then baking in the oven like Baked Custard (see p. 179). For these puddings either stale or dry bread is used. The bread should be softened with the milk.

How many eggs are used to thicken one pint of milk in Steamed or Baked Custard (see p. 178)? How many eggs are used to thicken one pint of milk in Bread Puddings (see recipe below)? Account for this difference.

BREAD PUDDING

2 cupfuls milk	1 egg
1 cupful bread crumbs	$\frac{1}{4}$ teaspoonful salt
1 tablespoonful butter	1 teaspoonful vanilla *or*
3 tablespoonfuls sugar	$\frac{1}{2}$ teaspoonful spices

3 tablespoonfuls cooked currants

Scald the milk; add the bread crumbs. When the crumbs are soft, add the remaining ingredients. Pour the mixture into a buttered baking-dish, and place the baking-dish in a pan of hot water. Bake the pudding slowly until it becomes firm and slightly brown, *i.e.*, at 375° F. for 25 minutes. Serve with cream, Hard Sauce (see p. 31), Chocolate or Vanilla Sauce (see below).

If chocolate were added to the recipe for plain Bread Pudding, what change should be made in the other ingredients (see *Chocolate Corn-starch Pudding*, p. 100)? Since chocolate contains much fat, what ingredient could be omitted, if chocolate were used? Compare the recipes for Bread Pudding and Chocolate Bread Pudding.

CHOCOLATE BREAD PUDDING

1 cupful bread crumbs	⅓ cupful sugar
2 cupfuls scalded milk	1 egg
1 ounce chocolate	¼ teaspoonful salt
¼ cupful boiling water	½ teaspoonful vanilla

Add the bread crumbs to the scalded milk and allow them to soak until soft. Cut the chocolate in pieces, add the boiling water to it, and cook gently until a smooth paste is formed. Add this to the bread mixture. Proceed as in the preparation of plain Bread Pudding. Serve with plain or whipped cream or Lemon Sauce (see p. 114).

VANILLA SAUCE

½ cupful sugar	2 cupfuls boiling water
2 tablespoonfuls flour	1 to 2 tablespoonfuls butter
⅛ teaspoonful salt	1 teaspoonful vanilla

Mix sugar and flour thoroughly, then add boiling water slowly. Cook 10 minutes. Dilute or evaporate if necessary. Add the butter and vanilla[1] just before serving.

CHOCOLATE SAUCE

½ cupful sugar	⅜ cupful cocoa *or*
3 tablespoonfuls flour	2 squares (or ounces) chocolate
1 cupful water	¼ teaspoonful salt
1 cupful milk	½ teaspoonful vanilla

[1] See footnote on p. 89 regarding the adding of vanilla.

Mix the sugar, flour, and cocoa (if the latter is used). Add the water; stir and cook until the mixture thickens. Then add the milk and cook over boiling water for at least 15 minutes.

If chocolate is used, cut it in pieces, add 5 tablespoonfuls of boiling water. Stir and cook until a smooth paste is formed. Add the chocolate to the other ingredients, then the salt and vanilla.[1] Serve hot or cold over desserts.

QUESTIONS

What is the purpose of the egg and bread in the Bread Pudding?

What care must be taken in combining the egg mixture with the hot milk mixture?

Think of the effect of intense heat upon the ingredients of Bread Pudding, and then explain why the pudding should bake slowly. What is the result, if baked in a very hot oven?

What is the reason for covering the pudding during the first 15 minutes of baking?

Name combinations of spices that would be desirable for the pudding.

What care should be taken in cooking chocolate in boiling water?

In preparing Vanilla Sauce, why is the flour mixed with the sugar (see Experiment 24, p. 99)?

How does the quantity of thickening for Vanilla Sauce compare with the quantity of thickening for the Sauce for Cream Toast (see p. 104)?

Give the four different quantities of flour generally used to thicken one pint of sauce (see p. 114).

What care should be taken in cooking Vanilla Sauce?

Compare the recipe for Chocolate Corn-starch Pudding (p. 100) with that for Chocolate Sauce. What material and how much of it is used for thickening each? What difference in consistency is there in the two cooked mixtures? What liquids are used in each mixture? Why is the sauce cooked directly over the flame and then over boiling water, while the pudding is cooked only over boiling water?

[1] See footnote on p. 89 regarding the adding of vanilla.

LESSON LVII

Cheese (A)

The Relation of Cheese to Milk. — To show the relation of cheese to milk, and to understand the manufacture of cheese, try the following:

Experiment 47: Effect of Rennet on Milk. — Put a small quantity of milk in a test tube and heat the milk a very little, taking care not to boil it. Add to it $\frac{1}{4}$ teaspoonful liquid rennet, or $\frac{1}{8}$ junket tablet, and set aside. After a few minutes examine the milk. How has the rennet changed the milk? What substance in the milk has been clotted by the rennet (see Lesson XLVI, p. 163)?

Experiment 48: Separation of Curd and Whey. — Again heat the contents of the test tube of Experiment 47, turn the mixture into a cheese-cloth, and press the cloth until the mixture is dry. Examine the material left in the cloth. How does it differ from ordinary cheese in color and texture? In cheese making what names are given to the solids and liquids of clotted milk?

Cheese is prepared for the market in a way somewhat similar to that shown in Experiments 47 and 48, except that it is colored, salted, pressed into shape, and allowed to ripen. While ripening, changes take place in the ingredients of cheese which develop characteristic flavors and make the cheese firm.

There are two general classes of cheese, — hard cheese and soft cheese. A hard cheese commonly known as "American Cream Cheese" is generally used in this country.

Action of Rennin in Digesting Milk. — The rennet or junket used to clot the casein of the milk is obtained from the digestive juices of the stomach of a calf. An enzyme called *rennin* exists in the gastric juice of the human stomach also. When milk is digested, it is first clotted by the enzyme in the stomach.

Experiment 49: Effect of Acid on Milk. — Add a few drops of vinegar to warm milk in a test tube. What is the result? What substance in the milk has been curdled by the acid?

To what substance in milk is its sweet taste due? Into what has this substance changed when milk sours? What causes the change in this material (see *Care of Milk*, p. 172)? Knowing the effect of acid on milk, explain the clotted condition of sour milk.

JUNKET "CUSTARD"

1 quart milk	1 tablespoonful liquid rennet *or*
¼ cupful sugar	1 junket tablet
1 teaspoonful vanilla	Powdered cinnamon or nutmeg

Heat the milk in a double boiler until it is *lukewarm* only; do not heat it to scalding temperature. Test milk for lukewarm, *i.e.* body temperature, by letting a drop fall on the wrist. If the milk "feels like the wrist" — neither warmer nor colder — it is lukewarm in temperature. If a junket tablet is used, crush it. Add the sugar, vanilla, and rennet or junket, and stir until dissolved. Pour into a glass dish and stand in a warm place until it thickens. Then set the Junket "Custard" in a cool place. When cold, sprinkle with a little cinnamon or nutmeg, and serve with cream.

COTTAGE CHEESE

1 quart thick sour milk ¼ teaspoonful salt
Cream, top milk, or butter

Pour at least 2 quarts of boiling water into the sour milk. Allow the mixture to stand until the curd separates from the whey. Strain the mixture in a cloth, pressing the cloth until the curd is dry, or allow it to drip for several hours or overnight. Put the curd in a bowl, add salt and a little cream, top milk, or melted butter, and mix thoroughly. Serve lightly heaped, or molded into balls.

QUESTIONS

Why should junket tablets be crushed before adding to the milk (see Experiment 12, p. 71)?

In what way is the preparation of milk for Junket "Custard" like the digestion of milk in the stomach?

Tell why Junket "Custard" is quickly digested.

How much Cottage Cheese is obtained from 1 quart of milk?

Explain the use of boiling water in preparing Cottage Cheese from sour milk.

What is the price per pint of Cottage Cheese prepared at home?

What is the price per pint of Cottage Cheese obtained at market?

LESSON LVIII

Cheese (B)

Food Value and Use of Cheese. — Cheese is concentrated food, *i.e.* it contains much nourishment in small bulk. One pound of cheese contains as much protein as two pounds of eggs or one and one half pounds of meat, and as much fat as three pounds of eggs and one pound of beef. In addition to protein and fat, cheese contains ash and vitamines (see Division Seven, p. 245).

Cottage Cheese is a particularly good food. Since it is less expensive than most foods rich in protein, it should be used to a greater extent than it is at the present time. Most tasty salads and meat substitute dishes (see p. 310) may be prepared from cottage cheese.

Cheese was formerly considered somewhat difficult of digestion, but investigations (see Farmers' Bulletin 487, *The Digestion of Cheese*, p. 15) show that cheese differs but little from meat in ease of digestion. Cheese, like protein foods in general, if cooked at all, should be heated at low or moderate temperature.

It is well to cook cheese in combination with other food materials. The use of cheese at the close of a dinner, when sufficient food has already been eaten, is not advisable.

Care of Cheese. — Molds grow rapidly upon cheese, especially if it is placed in a warm place and the air is excluded from it (see *Why Foods Spoil*, p. 474). For this reason, cheese should never be placed in a tightly covered dish or jar. It may be placed in a dish or jar and covered with a cloth. To keep cheese that has been cut from drying, wrap it in paraffin paper, then in a slightly dampened cloth, and then in paper. It should not, however, be kept in the damp cloth too long; molds will grow upon it.

MACARONI AND CHEESE

$\frac{3}{4}$ cupful macaroni $\frac{3}{4}$ cupful grated cheese
$1\frac{1}{2}$ cupfuls medium White Sauce (see p. 114)
2 cupfuls buttered crumbs (see p. 110)

Break macaroni into one-inch pieces. Cook in a large quantity of boiling, salted water, in the same manner as Boiled Rice (see p. 86). When tender, pour into a colander, and run cold water through it. Make the sauce, using half milk and half "macaroni water" for the liquid; then add the cheese and macaroni to it. Pour into a buttered baking-dish. Cover with the buttered crumbs and bake at 450° F. for 20 minutes or until brown.

Rice or noodles, cooked in the same way, may be substituted for macaroni.

QUESTIONS

What must be the condition of cheese in order to grate it? If it is very soft, how should it be prepared to add to the sauce?

What is macaroni? What foodstuff does it contain in large quantity?

What is the effect of cold water on cooked macaroni (see Experiment 17, p. 80)?

Why is it cooked in a large quantity of boiling water?

What does the water in which the macaroni was cooked contain?

What use can be made of the water that is drained from the macaroni (see *Cheese Sauce*, p. 87)?

What is the price per pound of macaroni? What is the price per pound of rice? What is the price per pound of cheese?

How much cheese, by weight, is required for one cupful of grated cheese?

How many will this recipe for Macaroni and Cheese serve?

How does cheese compare in price per pound with beefsteak? How does it compare in nutritive value? How much of the cheese is waste material? How much of beefsteak is waste material? Which is the cheaper food?

LESSON LIX

Structure of Beef — Methods of Cooking Tender Cuts

Meat. — The flesh of animals is called *meat*. In market this term is applied to the muscle, bone, and fat of beef (cattle), veal (calf), mutton (sheep), lamb, and pork (pig).

To show the structure and properties of the substances in lean meat, try the following experiments with beef:

Experiment 50: Division of Muscle. — Scrape a piece of lean beef on both sides until nothing remains but the stringy mass or framework of the meat. What is the color and texture, *i.e.* toughness, of the two parts into which the muscle is divided?

Lean meat, or muscle, of animals may be divided into two parts: (*a*) connective tissue or framework, and (*b*) muscle fiber.

Divide both the connective tissue and muscle fiber into two equal portions. Use them for Experiments 51 and 52.

Experiment 51: Effect of Dry Heat on: (*a*) Connective Tissue. — Examine the connective tissue and note its toughness. Place it in a frying pan and heat it for a few minutes. Examine it again. Is it made more tender or tough by dry heat?

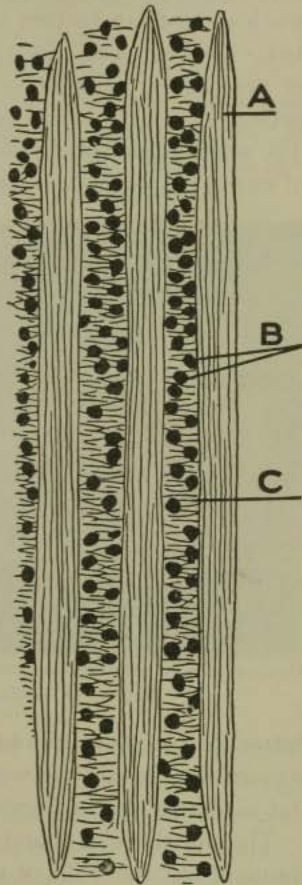
(*b*) **Muscle Fiber.** — Shape one portion of the muscle fiber into a ball. Place it in a frying pan and heat as directed in (*a*). Is the fiber made more tender or tough by dry heat? Sprinkle a bit of salt over it and taste. What can you say regarding the flavor of the fiber?

Experiment 52: Effect of Moisture and Heat on: (*a*) Connective Tissue. — Place the second portion of connective tissue in a pan and cover it with water. Let it simmer for at least 15 minutes. How do moisture and heat affect its toughness?

(*b*) **Muscle Fiber.** — Use the second portion of muscle fiber and cook in water at simmering temperature as directed in (*a*). How do heat and moisture affect its toughness? Sprinkle a bit of salt over it and taste. Compare its flavor with muscle fiber cooked by dry heat. Which has a more pleasing flavor?

From these experiments what conclusion can you draw with regard to the length of time — *long or short* — that *connective tissue* must be cooked in order to make it tender? What conclusion can you draw with regard to the kind of heat — *dry or moist* — that must be applied to connective tissue to make it tender?

What conclusion can you draw regarding the effect of dry and moist heat upon muscle fiber? Which makes it more tender? Which develops the more pleasing flavor?



From *Food and Dietetics*, by R. Hutchison.

FIGURE 43. — STRUCTURE OF MEAT.

A, muscle fibers; B, fat cells; C, connective tissue.

The Structure and Composition of Meat. — The connective tissue of meat is the material which holds the muscle fiber in place. One can get an idea of the structure of muscle fiber from some cuts of meat such as the rump. This meat when cooked can be torn into strands. On closer examination, however, one finds that these strands are made up of tiny tubes, microscopic in size, which are also held together by a network of connective tissue (see Figure 43). The microscopic tubes hold the muscle juice, which consists of water, protein, ash, coloring and flavoring materials. The

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FIGURE 44. — CLUB OR DELMONICO STEAK.

latter give to meat its characteristic taste; they are called *extractives*. In the network of connective tissue, there is fat as shown also in Figure 43.

The muscle juice found in muscle fiber not only contains protein, but the walls of muscle fiber and connective tissue contain protein. These proteins differ greatly in quality, however. They will be discussed in the following lesson.

Care of Meat. — As soon as meat comes from the market remove the paper in which it is wrapped, and put the meat away in a cool place. Before cooking, wipe the meat with a damp cloth. Do not allow it to stand in cold water. If meat is to be roasted, it should be weighed before cooking.

Searing Meat. — Since the juice of meat contains both nutriment and flavor, it is desirable to retain the juice when meat is cooked. This can be accomplished by subjecting meat to intense heat. By so doing, the protein coagulates and "seals" the outside of the meat so that its juices are prevented from escaping. *This process is called searing.*

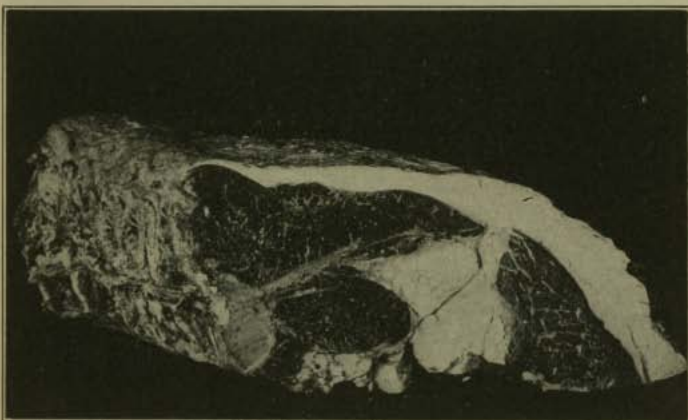

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FIGURE 45. — PORTERHOUSE.

From the results of Experiment 51 (*b*), one can understand why seared meat tastes good. Dry heat tends to develop flavor. Hence it is desirable to sear meat not only to prevent waste of its juices, but to make it tasty. After meat is seared, it is usually necessary to reduce the temperature of cooking in order to cook the interior of meat.

Tender Cuts of Beef. — Certain muscles of an animal used for food contain more connective tissue than others. Such muscles are considered tough cuts of meat. Other

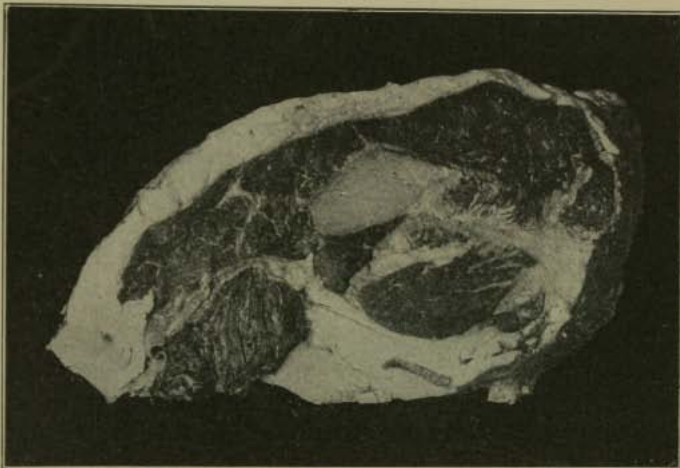

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FIGURE 46. — SIRLOIN, — HIP STEAK (portion next to the porterhouse).

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FIGURE 47. — SIRLOIN, — FLAT BONE (choice cut in the middle of the sirloin section).

muscles contain either less connective tissue or the connective tissue is less tough. These are considered tender cuts.

Muscles which are the least used by the animal are most tender. What parts of the beef would one expect to find most tender?

Certain methods of cooking meat are adapted to cooking the tender cuts. Unless meat is chopped, only tender cuts of meat can be cooked successfully by *dry* heat. The following

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FIGURE 48. — SIRLOIN, — ROUND BONE (next to the rump and round).

methods are used for tender cuts of meat: (*a*) broiling, (*b*) pan-broiling, and (*c*) roasting (baking).

The best steaks of beef for broiling or pan-broiling are club (see Figure 44), porterhouse (see Figure 45), sirloin (see Figures 46, 47, 48), and first cuts of round. The best cuts for roasting are porterhouse, prime ribs (see Figures 49, 50), and sirloin.

Long shoulder or chuck (see Figures 51, 52), top round, and rump (see Figures 54 and 57) are inferior roasts.

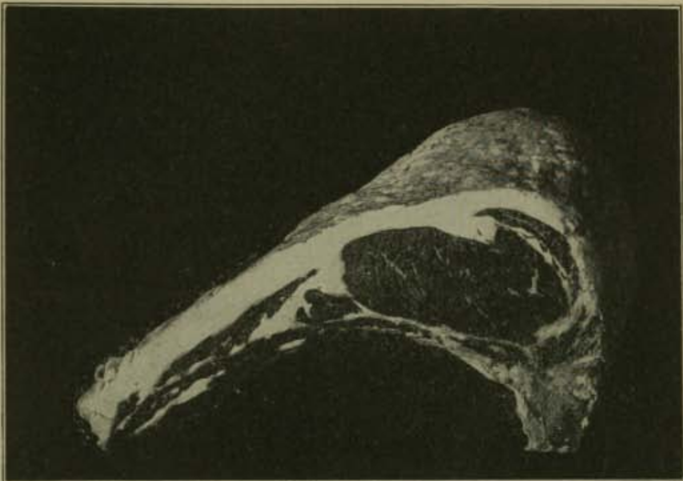

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FIGURE 49. — FIRST CUT PRIME RIB ROAST.

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FIGURE 50. — SECOND CUT PRIME RIB ROAST.

BROILING

Select one of the tender steaks for broiling. Tender steaks should be cut from 1 to 2 inches in thickness. Clean it as directed on p. 195, remove the excess fat, and place the meat on a broiler. Broil over glowing coals or in the broiling oven, holding the broiler very close to the coals, or placing it near the gas flame. The meat should be thoroughly *seared* on both sides. Finish cooking the meat by holding it farther

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FIGURE 51. — BLADE RIB ROAST (7th and 8th ribs).

away from the coals or the gas flame and turning it about every 10 seconds. Steak 1 inch thick should be cooked at least 5 minutes; 2 inches thick, at least 10 minutes. Season, place on a hot platter, and serve *at once*.

PAN-BROILING

Clean the meat, remove excess fat, and place the meat in a very hot frying pan *without any fat*. Sear the meat on both sides, then cook more slowly until done. When thick chops are broiled, stand them on end to brown the edges. Keep the pan free from fat. The time for pan-broiling is the same as for broiling.

Difference between Pan-Broiling and Sautéing. — Pan-broiled steak differs from sautéed steak (commonly termed fried steak) in: (*a*) ease of digestion and (*b*) flavor. As explained on page 140 (*Frying and Digestion*), fat cooked at

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FIGURE 52. — CHUCK RIB ROAST (9th and 10th ribs).

high temperature is not easily digested. For this reason, as far as digestion is concerned, it is better to omit the fat, and to broil a steak.

Meat has a distinct and characteristic flavor. Browned fat also has a pronounced flavor. In broiled steak, the pure meat flavor exists; in "fried" steak there is meat flavor plus browned fat flavor. Since the flavor of meat is most pleasing, it is not advisable to modify it by the addition of any other flavor.

ROASTING (BAKING)

Roasting was accomplished formerly by placing thick pieces of meat before an open fire (see Figure 53). "Roasts" are now placed in the oven and baked. The term roasting, however, is still used. Meat is roasted as follows:

FIGURE 53. — COLONIAL FIREPLACE, SHOWING A "ROASTING KITCHEN" — a device for roasting meat — at lower right-hand corner.

Weigh the meat and clean it. Then skewer it into shape and place it on a rack in a roasting pan. If the meat has but little fat, place extra fat in the bottom of the pan. Place the pan on the upper shelf of a hot oven (500° F.) and sear for 20 minutes. Reduce the temperature to 400° F. Season the exposed surface with salt and pepper, dredge with flour, and remove the pan to the floor or lower shelf of the oven. Baste often. When the meat is about half done, turn it over, season, dredge with flour, and continue baking as before.

Since less evaporation takes place in a large roast than in a small one, the larger roasts are more juicy, hence more desirable. A good roast of beef should weigh at least 4 pounds.

The time for roasting varies with the weight of the meat. Usually, for beef roasts, *15 minutes to each pound* is allowed.

QUESTIONS

Explain the purpose of searing meat.

If meat is to be roasted, pan-broiled, or broiled, how is it seared?

Why is it necessary to remove the fat from meat that is to be broiled or pan-broiled?

Why cannot meat be broiled over *blazing* coals?

What is the price per pound of porterhouse and of sirloin steak?

What is the average weight of sirloin steak? Of porterhouse steak?

How many persons will each serve?

LESSON LX

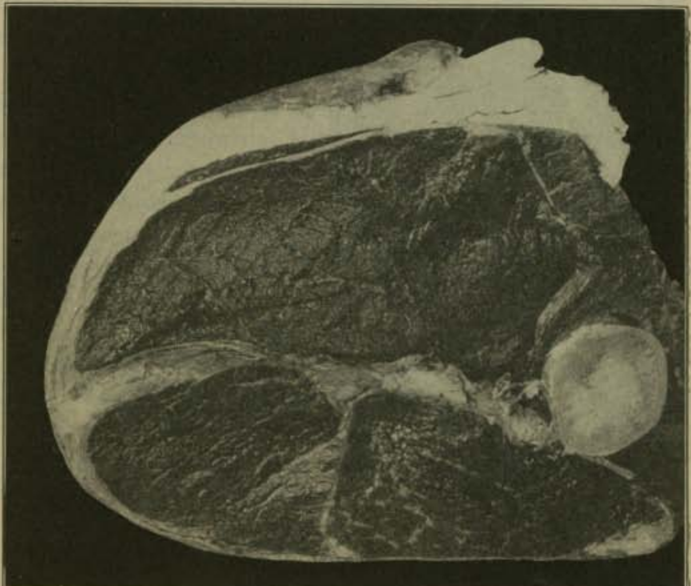
BEEF: METHODS OF COOKING TENDER CUTS (APPLIED TO CHOPPED BEEF) (A)

Protein in Meat. — It was mentioned on p. 194 that there are several different kinds of protein in lean meat. It was also stated that proteins exist in:

(*a*) Connective tissue.
(*b*) Walls of muscle fibers.
(*c*) Muscle juice.

Two proteins exist in connective tissue, viz., *collagen* and *elastin*. Collagen is changed into gelatine by cooking in water. Elastin is found not only in connective tissue, but in the walls of muscle fibers. In muscle juice, there are two proteins, — *myosin or muscle globulin* and *albumin.*

Both myosin and albumin coagulate by heating. It is possible to sear meat because it contains proteins. The scum which invariably forms when meat broth is heated



Courtesy of *Bureau of Publications*, Teachers College.

FIGURE 54. — ROUND.

consists largely of protein, probably in the form of albumin. This protein as shown in experiments on eggs (see p. 153) is soluble in cold water, but is coagulated by heating. If meat broth is skimmed, much of its nutriment is lost.

Of all proteins in meat, myosin is the most important; it exists in greater quantity than the other proteins. Myosin is practically insoluble in both hot and cold water, though

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FIGURE 55. — CHUCK.

somewhat soluble in a salt solution. As not much myosin is extracted from meat in soup making, *the solid part of meat must be eaten in order to obtain the greatest nourishment.* Meat broth does not contain as much food value as meat.

Chopped Beef. — If meat is chopped, what is the effect of the cutting on its structure? How would this affect its toughness?

It is possible to panbroil or roast some of the tough cuts of meat, if the meat is chopped fine. Round (see Figure 54, p. 203) and shoulder or chuck (see Figure 55) are especially desirable cuts for this purpose.

CHOPPED STEAK

1 pound beef steak, chopped	1 to 2 tablespoonfuls chopped parsley
1 onion, grated	1 teaspoonful salt
½ cupful water or ¾ cupful tomatoes	⅛ teaspoonful pepper

Mix all the ingredients and shape into firm cakes. Heat an iron frying pan until hot; oil it with a bit of fat from the meat; *then remove the fat.* Sear the cakes; then reduce the temperature to finish cooking. Turn the cakes often. Season with salt and pepper. Serve at once.

Half a cupful of soft bread crumbs and 1 egg may be added to this meat mixture.

The addition of 1 tablespoonful of lemon juice, or a dash of nutmeg is thought by some to improve the flavor of chopped beef.

Instead of shaping chopped beef into small cakes, it may be formed into one large cake or steak. The chopped steak may be either broiled or pan-broiled. If the latter method is followed, a pan-cake turner is useful in turning over the steak.

BEEF LOAF

Use the ingredients for Chopped Steak, adding the bread crumbs and egg. Shape into a loaf, and place in a greased baking-pan. Bake in a hot oven (450° F.) for about 30 minutes. Serve hot, plain, or with Tomato or Brown Sauce (see pp. 112 and 207).

The use of tomatoes instead of water in *Beef Loaf* makes the meat especially tasty.

QUESTIONS

Why is it necessary to reduce the temperature to finish cooking meat after searing it?

What are the prices per pound of round and long shoulder?

How many cupfuls are there in one pound of chopped meat?

How many servings of Chopped Steak can be obtained from one pound of meat?

LESSON LXI

Beef: Methods of Cooking Tender Cuts (Applied to Chopped Beef) (B)

STUFFED MEAT ROAST

2 pounds chopped meat 2 teaspoonfuls salt
$\frac{1}{8}$ teaspoonful pepper

Mix these ingredients. Take about three fourths of the mixture, put it into a greased baking-dish or pan, shape it into a loaf, and make a large cavity in the center. Into the cavity, put a stuffing prepared as follows:

2 cupfuls bread crumbs	$\frac{1}{4}$ teaspoonful thyme
1 teaspoonful salt	$\frac{1}{4}$ teaspoonful savory
$\frac{1}{4}$ teaspoonful marjoram	$\frac{1}{8}$ teaspoonful pepper

2 tablespoonfuls fat

Mix the crumbs and seasoning. Melt the fat, add the seasoned crumbs. Stir and heat until the crumbs are slightly browned.

Put the remainder of the meat mixture on top of the crumbs, so that the latter are entirely surrounded by the meat mixture. Bake in a hot oven (450° F.) from $\frac{1}{2}$ to $\frac{3}{4}$ hour. Serve hot, — plain or with Brown Sauce (see p. 207).

Instead of bread stuffing, potato stuffing prepared as follows may be used in *Stuffed Meat Roast.*

Tomatoes may be added to the meat mixture (see *Beef Loaf*).

POTATO STUFFING [1]

2 cupfuls dry mashed potatoes	1 stalk celery finely minced *or*
1 egg (beaten)	$\frac{1}{2}$ teaspoonful celery salt
1 small onion, grated	1 teaspoonful salt
1 tablespoonful fat	Pepper

Mix the ingredients and use in place of ordinary bread stuffing.

Experiment 53: Comparison of Starch and Dextrin for Thickening. — When flour is browned what substance is formed from some of the starch (see Experiment 26, p. 101)?

Make a White Sauce, using 1 teaspoonful of fat, $\frac{1}{2}$ tablespoonful of flour, and $\frac{1}{4}$ cupful of water. Make a Brown Sauce with the same ingredients, browning the fat and flour. Compare the Brown and White Sauce as to thickness. Which has the greater thickening property, — starch or dextrin? Estimate the quantity of flour to

[1] From *United States Food Administration* Bulletin.

use for Brown Sauce in order to make it equal in thickness to a White Sauce made by using 1, 2, and 3 tablespoonfuls of flour to 1 cupful of liquid.

NOTE. — If a suitable fat has been used, the Brown Sauce may be seasoned and used with the Stuffed Meat Roast.

BROWN SAUCE

1½ tablespoonfuls fat	Pepper
2 tablespoonfuls flour	1 cupful meat stock or hot water
½ teaspoonful salt	1 teaspoonful scraped onion

If there is any meat stock in the roasting pan, remove it and make the "Brown Sauce" in the pan. Put fat and onion in the pan, and brown them. Add the flour and brown it, then add the other ingredients and cook as *White Sauce.*

QUESTIONS

What cuts of meat are suitable for roasting? Why?

Explain how it is possible to use tough cuts of meat and roast them successfully.

LESSON LXII

BEEF: METHODS OF COOKING TOUGH CUTS (A)

Experiment 54: Effect of Cold Water on Meat. — Place a bit of meat in a test tube or glass measuring cup and add cold water. Allow it to stand for a few minutes and note the appearance. What has been drawn out into the water? What practical application as to washing meat can be made from this?

Heat the water in which the meat has been soaked. What does the water contain? In soup making, should this material be strained out of broth? Explain. If broth must be strained, should a coarse or a fine strainer be used? Why?

Experiment 55: Effect of Boiling Water on Meat. — Pour boiling water over a bit of meat, then heat it. Has the juice been drawn out into the water? Explain how hot water prevents the juices from being drawn out.

Experiment 56: Effect of Salt on Meat. — Sprinkle some salt on a piece of meat. Let stand for 10 minutes or longer and note results. What practical application as to seasoning meats can be drawn from this?

NOTE. — The bits of meat used in these three experiments should be saved and used for soup-making.

Tough Cuts of Beef. — From the Experiments of Lesson LIX, p. 192, what was found to be the toughest portion of the muscle of meat? What method of cooking was used to make this tough part tender (see Experiments 51 and 52)? Toughness of meat depends upon (*a*) amount of connective tissue, and (*b*) character of the walls of muscle-fiber tubes (thick or thin). These conditions depend upon (*a*) the age of the animal, and (*b*) locality of muscle or cut of meat.

Although meat contains some materials which are better slightly cooked, tough cuts of meat contain so much connective tissue that long cooking is necessary to make them palatable. *The long cooking must be accomplished in water or steam* in order that the meat may not burn or become too dry.

Meat from old animals is usually tough. Veal and lamb are more tender than beef and mutton. The muscles that are used most are toughest, because they are developed to a greater extent and contain more connective tissue. Muscles that are constantly used contain more extractives, hence tough cuts of meat have more flavor than tender cuts. This is not always appreciated, however, since all the flavor of tough meat is rarely extracted because it is so hard to chew. Moreover, as mentioned previously, dry heat usually applied to tender cuts tends to develop flavor in meat.

Use of Bone and Fat in Soup-making. — Bone contains a substance which long cooking changes into a jellylike mass called *gelatine*. In the center of the bone there is a fatty substance called *marrow*. This fat in the bone and that in and around the muscles liquefies in making soup stock. In cooling, the fat rises to the top, hardens, excludes the air from the stock, and thus prevents it from spoiling readily. Hence, in soup-making, it is of advantage to use both the fat and the bone with the lean meat. The fat, however, should be removed carefully from the stock before using.

BEEF STOCK

2 pounds meat, bone and fat	2 cloves
¼ teaspoonful celery seed	2 quarts cold water
5 peppercorns	½ bay leaf

2½ teaspoonfuls salt

Cut the meat and fat into small pieces. Try out some of the fat and brown about ⅓ of the meat in it. Put all the meat in a kettle, add the seasoning and water; cover, and allow to soak one hour. Then cook below boiling temperature for 3 hours; strain through a coarse strainer. Pour it through a fat separator or set aside to cool. If the fat has been allowed to solidify, skim it from the surface when the stock is to be used.

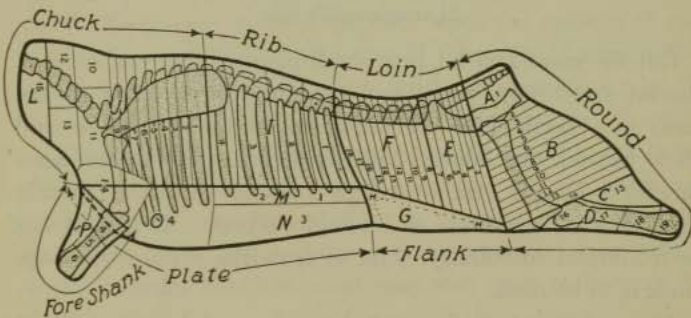
1 can of tomatoes, 1 carrot, 1 turnip, and 1 onion (all cut in small pieces) may be added to the ingredients of beef stock. Trimmings and bones of fresh meats or bones and pieces of roasts or unused meat may be cut into small pieces and used for soup stock. No smoked or charred pieces of meat or bone should be used, however. Stock may be colored with caramel, provided the sugar has been cooked sufficiently to lose its sweetness.

Cuts of Beef (see Figure 56). — The feeding, care, and age of an animal have much to do with the *quality* of its meat. It is considered that good beef is obtained from an animal four or five years old. Beef should be firm, of bright red color, and of fine grain. There should also be a generous supply of suet. The latter should be dry and easily crumbled.

In most markets, meat is made more tender by allowing it to hang for several days at a temperature near freezing.

The *cost* of the different cuts of meat varies greatly. The difference in cost is based upon the tenderness of the cut of meat, and upon the demand, — not upon the nutritive value. Prices vary in different localities, and in different seasons.

The *waste* of a cut of meat is a factor which the housekeeper needs to consider in determining the cost of meat. The cuts of meat containing no waste may be "cheaper" than some cuts whose price per pound is lower.



Adapted from diagram in *University of Illinois* Bulletin, No. 158.

FIGURE 56. — CUTS OF BEEF.

The line dividing the rib and loin cuts and the plate and flank, marks the division of the beef into hind and fore quarters. The position of the various cuts is indicated by letters. The names of the cuts are indicated around the outer boundary of the diagram.

The closely spaced lines such as shown in the round cut indicate that the cut is sliced into steaks, while the more widely spaced lines such as shown in the rib cut, indicate that the cut is separated into pieces for roasting or stewing. The numerals indicate the number of steaks or pieces into which a cut is usually divided.

EXPLANATION OF FIGURE 56. CUTS OF BEEF

HIND QUARTER

	Name and Form of Cut	Method of Cooking
Round	*A.* Rump. 1. Rump piece (see Figure 57, p. 215).	Pot-roasting. Stewing. Corning.
Round	*B.* Round (not including rump and shank). 2–14. Round steaks (see Figure 54, p. 203).	Sautéing. Stewing. Braising. Pot-roasting.
Round	*C.* Horseshoe or Heel. 15. Pot roast.	Pot-roasting. Stewing.
Round	*D.* Hind shank. 16. Knuckle soup bone. 17–19. Soup bones.	Soup-making.
Loin	*E.* Sirloin. 1–4. Round-bone sirloin steaks (see Figure 48, p. 197). 5–6. Flat-bone sirloin steaks (see Figure 47, p. 196). 7. Hip-bone sirloin steak (see Figure 46, p. 196).	Broiling. Roasting (when cut into thick pieces)
Loin	*F.* Porterhouse. 8–15. Porterhouse steaks (see Figure 45, p. 195). 16–18. Club or Delmonico steaks (see Figure 44, p. 194).	Broiling. Roasting (when cut into thick pieces).
Flank	*G.* Flank steak (see Figure 59, p. 219).	Sautéing. Rolling and Braising.
Flank	*H–H.* Flank stew.	Stewing. Corning.

FORE QUARTER

	Name and Form of Cut	Method of Cooking
Rib	*I.* Rib roasts. 1–4. Prime-rib roasts (see Figures 49 and 50, p. 198).	Roasting.
Chuck	*J.* Chuck roasts and steaks. 1. Chuck-rib roast (see Figures 51 and 52, pp. 199 and 200). 2–9. Chuck or shoulder steaks (see Figure 55, p. 204). 10–13. Pot roasts. Note.—In some localities, a pot roast is cut from the lower portion of the chuck. It is called Cross Rib, Boston Cut, or English Cut (see Figure 58, p. 218). 14. Clod, no bone (over knuckle soup bone).	Roasting. Braising. Pot-roasting. Broiling. Sautéing.
Chuck	*L.* Neck. 15. Stew.	Stewing. Soup-making. Corning.
Plate	*M.* Rib ends. 1, 2. Stews.	Stewing. Soup-making. Corning.
Plate	*N.* Navel. 3. Stew.	Stewing. Soup-making. Corning.
Plate	*O.* Brisket. 4. Stew.	Stewing. Soup-making. Corning.
Fore Shank	*P.* Shin. 1. Stew. 2. Knuckle soup bone (underneath clod, *J*, 14). 3–6. Soup bones ("3" underneath clod, *J*, 14).	Stewing. Soup-making.
	Skirt steak,—diaphragm inside of ribs (see Figure 59, p. 219).	Rolling and Braising. Stewing.
	Tail.	Soup-making.

QUESTIONS

Other than the differences in cost, what advantages are there in using tough cuts of meat for soup?

Name at least three cuts of meat that would be suitable for soup-making. Give the price per pound of these cuts.

In soup-making, what is the purpose of cutting the meat into pieces and of cracking the bone?

Why should salt be added to the water in which meat is soaked (see Experiment 56, p. 208)?

LESSON LXIII

Beef: Methods of Cooking Tough Cuts (B)

Examination of Cold Beef Stock. — Examine the beef stock of the previous lesson. Why has the fat risen to the top (see Experiment 35, p. 139)? Why is fat cooked with meat and bone in making soup stock? What use can be made of the fat after removing it from the stock? Remove the fat from the stock. Stir the stock with a spoon. How do you account for its jellylike consistency? From what material has the gelatine been formed? What solid material is found in the stock? Should this be strained out when the stock is used for soup? Explain your answer (see Experiment 54, p. 207).

VEGETABLE SOUP

2 quarts beef stock	1 carrot
2 tablespoonfuls fat	1 turnip
1 onion, sliced	½ stalk celery or dried celery leaves

Heat the fat and sliced onion. Cook until the onion is browned; add a small quantity of water. Cut the vegetables into dice, add them to the water containing browned onion and cook until the vegetables are tender. Add the beef stock to the vegetables and vegetable stock; heat; evaporate, if necessary, and then serve.

The vegetables may be strained from the soup, and cooked rice, macaroni, or barley added; or the rice, macaroni, or barley may be cooked with the vegetables. Pearl barley should be soaked in water before being cooked in the stock.

Other vegetables may be used for soup-making, as tomatoes, green peas, asparagus, and cauliflower. Indeed, ingenuity in combining flavors and utilizing "left overs" should form no small part of soup-making.

Examination of Meat Left from Soup-making. — Which contains the more nutriment, — beef stock or the meat from which the stock was prepared? What valuable protein material does the solid meat contain (see *Protein in Meat*, p. 202)? Taste a bit of the meat. What does it lack? In what does the flavoring of this meat exist? What can be added to this "left over" meat as a substitute for its flavor? In the recipe for Baked Hash (below), what supplies flavor to the meat?

BAKED HASH

1½ cupfuls chopped meat and fat
1½ cupfuls mashed potatoes
Salt and pepper
1 teaspoonful scraped onion
Chopped parsley
½ cupful (or more) boiling water or stock
1 cupful cracker crumbs, *or*
2 cupfuls soft bread crumbs
2 tablespoonfuls butter or substitute

Mix all the ingredients, except the fat and crumbs. Add enough water or stock to moisten all ingredients. Place the mixture in a buttered baking-dish. Mix the fat with the bread or cracker crumbs. Cover the hash mixture with the crumbs, and bake at 400° F. for 20 minutes or until the meat is thoroughly heated and the crumbs browned. Serve at once.

LESSON LXIV

BEEF: METHODS OF COOKING TOUGH CUTS (C)

ROLLED BEEFSTEAK

1 pound round steak
1 cupful soft bread crumbs
$\frac{1}{8}$ teaspoonful ground cloves
Pepper
$\frac{1}{2}$ teaspoonful salt
1 small onion, choppea
Hot water or milk, salt, pepper, flour, and fat

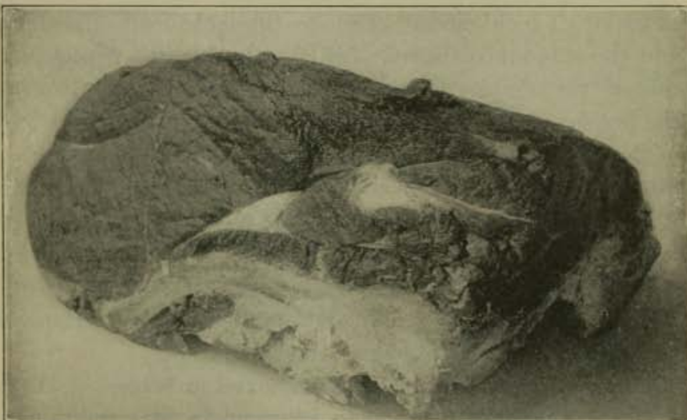


FIGURE 57.—RUMP.

Cut round steak of $\frac{1}{2}$ inch thickness into pieces 3 by 4 inches. Make a stuffing of the bread crumbs, chopped onions, cloves, salt, pepper, with enough hot water or milk to moisten. Spread the stuffing over the pieces of steak, roll up each piece and tie it with a piece of string, or skewer it with toothpicks. Dredge generously with flour and add salt and pepper. Brown in beef drippings or other fat, cover with boiling water, and simmer for $1\frac{1}{2}$ hours or until tender. Remove the strings or toothpicks, and serve the meat with the sauce in which it was cooked.

If the meat has not been cut thin enough, it may be pounded with a wooden potato masher or mallet to make it sufficiently thin.

BEEF STEW

2 pounds beef	1 quart hot water
$\frac{1}{4}$ cupful flour	2 carrots, cut in dice
2 teaspoonfuls salt	1 turnip, cut in dice
$\frac{1}{8}$ teaspoonful pepper	4 potatoes, cut in dice
1 onion cut into slices	1 tablespoonful kitchen bouquet

Remove the fat from the meat to be stewed; cut the meat into 1-inch pieces. Dredge the meat with the flour; add the salt and pepper. Try out the fat in a frying pan; remove the scraps. Brown the onion and then the meat in the hot fat. Add the hot water and pieces of bone and cook in the frying pan for 2 hours at a low temperature; or turn into a double boiler and cook for the same length of time. Add vegetables, except potatoes, and cook for 1 hour longer; add the potatoes $\frac{1}{2}$ hour before the stew is done. If desired, more flour, — mixed with enough cold water to pour easily, — may be added when the potatoes are added. Remove the bone, add kitchen bouquet, and serve.

Thickening the Sauce of Meat Cooked in Water. — When meat is dipped in flour, then browned in fat, and finally cooked in water, the flour thickens the water and forms a sauce around the meat. Usually, however, more flour needs to be added to the sauce to make it sufficiently thick. Sometimes directions for adding a flour-and-water paste to the hot meat stock are given, but unless the flour-and-water paste is cooked for some time (boiled for 5 minutes at least) the sauce does not have a pleasing flavor. This is because the starch is insufficiently cooked or the flour is not browned. It has been found much more satisfactory to sprinkle a little extra flour into the hot fat while browning the floured meat. Thus the sauce is made smooth, and the starch cooked thoroughly by the time the sauce is ready to serve.

QUESTIONS

If round steak has been cut too thick for rolling, what is a practical way of making it of one half inch thickness?

For what purpose is rolled steak browned in fat before cooking in water?

Explain why the rolled steak is cooked in water at simmering rather than at boiling temperature.

What is the purpose of dredging these meats in flour?

Why are not the vegetables added to the Beef Stew when the boiling water is added? Why are not the potatoes added with the other vegetables?

Why is the bone added to the Beef Stew?

Name at least two cuts of beef that would be suitable for Beef Stew. What are the prices per pound of these cuts?

LESSON LXV

BEEF: METHODS OF COOKING TOUGH CUTS (D)

SWISS STEAK

1½ pounds round steak, cut 1 to 1½ inches thick
½ to 1 cupful flour — ½ onion, sliced
Suet or bacon fat — 1½ teaspoonfuls salt
Dash pepper

With the edge of a saucer, pound the flour into both sides of the steak. In a frying pan, put the suet or bacon fat and brown the onion in it. Then brown both sides of the floured meat in the fat. Cover with boiling water and let the meat cook at simmering temperature either on top of the range or in the oven (300° F.) for 2 hours or until it is tender. Add enough salt and pepper to season the meat. If necessary, evaporate the sauce around the meat until it is of sufficient thickness to serve as Brown Sauce. Serve the meat and sauce hot.

If desired, the meat may be stewed in tomato juice instead of water. (If tomato is added, what kind of frying pan (*i.e.* of what material) should be used in cooking the meat? See p. 65, *Suggestions for Cooking Fruits.*)

This variation may also be made: One half green pepper may be chopped and sprinkled over the surface of the steak while the latter is simmering. The onion may be omitted, if desired.

POT ROAST

3 pounds beef
Flour
Salt pork or suet
½ bay leaf
6 peppercorns
Salt and pepper
¼ cupful each, — diced carrot, turnip, onion, and celery

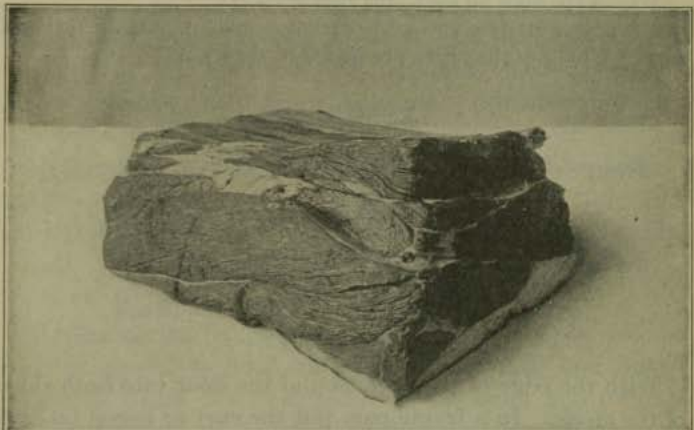


FIGURE 58. — CROSS RIB, BOSTON CUT, OR ENGLISH CUT.

Try out the fat and remove the scraps. Dredge the meat generously with flour and brown the entire surface in the fat. Place the meat on a rack in the kettle; surround it with the vegetables and spices, and season it with salt and pepper. Add 3 cupfuls of boiling water; cover closely and simmer for 4 hours. Turn after the second hour.

Serve hot both the meat and the sauce containing vegetables.

NOTE. — This meat may be saved and used in the following lesson regarding the uses of cooked beef.

Summary of the Methods of Cooking Tough Cuts of Meat. — There are many recipes for cooking meats. All, however, are modifications of a few methods. Moist heat

Courtesy of *Bureau of Publications*, Teachers College.

FIGURE 59. — SKIRT STEAK; FLANK STEAK.

must be applied to tough cuts of meat (see *Tough Cuts of Beef*, p. 208). The methods of cooking such cuts can be summed up as follows:

1. *Soup-making.* — Soak meat, bone, and fat in cold salted water, and then cook below boiling temperature in the water.

2. *"Boiling" or Stewing.* — Plunge meat into boiling water: boil until well seared; then cook in water below the boiling temperature.

3. *Pot-roasting and Braising.* — Sear meat by boiling or browning in fat, then cook in steam. If the cooking is done on the top of the range, it is called pot-roasting. If it is done in the oven, it is called braising.

QUESTIONS

What is the chief difference between pot-roasting and braising?

Why is it not necessary to baste meats cooked by these methods?

What is the difference between braising and roasting meats (see *Roasting*, p. 201)? Why is braising suitable for tough cuts, and roasting for tender cuts (see Experiments 51 and 52, p. 192)?

Name at least three cuts of meat suitable for pot roasts. Give the price per pound of each.

LESSON LXVI

Beef: Uses of Cooked Beef

"Left Overs." — Small pieces of cooked meat should not be thrown away; they can be used in many ways. Even though the meat has been cooked so as to extract its juices, there still remains practically all of the myosin, and this is a valuable constituent. If the juices have been drawn from the meat, a little fresh meat should be added to it, or it should be seasoned well with condiments, spices, or herbs. Water in which the meat has been cooked, and "left over" gravy, should be utilized in making sauces for cooked meats. Cooked meat of tender cut should merely be reheated, not recooked. Hence it is usually well to cut it into pieces or chop it fine in order to heat it quickly.

As in soup-making, ingenuity in combining and using "left over" materials is required in making meat dishes.

Stewed tomatoes can be substituted for stock or gravy, and one starchy food substituted for another. The recipes here given simply serve as suggestions. The ingredients and proportions should be changed to utilize available materials.

SCALLOPED MEAT

2 cupfuls chopped meat	1 teaspoonful scraped onion or chopped parsley
2 tablespoonfuls fat	$1\frac{1}{2}$ cupfuls milk, stock, or water
3 tablespoonfuls flour	2 cupfuls buttered crumbs
$1\frac{1}{2}$ teaspoonfuls salt	(See *Crumbs for Scalloped Dishes*, p. 110.)
$\frac{1}{8}$ teaspoonful pepper	

Make a Brown Sauce of the fat, salt, pepper, flour, onion or parsley, and milk or stock (see p. 207). Mix with the meat. Butter the crumbs, and place about one half cupful in the bottom of the buttered baking-dish. Add the meat mixture, and cover the top with the remainder of the crumbs. Bake at 400° F. for 25 to 30 minutes or until the mixture is thoroughly heated and the crumbs are brown.

Cold fish may be shredded and used in the same way.

Cottage Pie. — Use the same ingredients as for Scalloped Meat, substituting mashed potatoes for buttered bread crumbs. Place the potato only on the top of the mixture. A little nutmeg may be substituted for the onion.

QUESTIONS

How does meat left from beef stock differ from fresh meat in nutritive value? How does it differ in taste?

Name a starchy food that could be substituted for potatoes in Baked Hash (see p. 214).

Why are spices and herbs added to left over meat dishes?

Name at least three vegetable-and-meat combinations that would be desirable for hash.

How many cupfuls of chopped cooked meat can be obtained from one pound of fresh meat?

Why should cooked meat of tender cut be reheated rather than recooked?

LESSON LXVII

Gelatine (A)

Experiment 57: Effect of Cold Water on Gelatine. — Pour 1 teaspoonful of cold water on $\frac{1}{4}$ teaspoonful gelatine. Cover and let stand a few minutes. Examine. Has the water combined with the gelatine? Press a bit of the gelatine with a spoon. How does it compare with the dry gelatine as to hardness?

Experiment 58: Effect of Hot Water on Gelatine. — Pour 1 teaspoonful boiling water on $\frac{1}{4}$ teaspoonful gelatine. Place the mixture over hot water. Stir. What is the effect of boiling water on gelatine?

Note. — Use the gelatine from these two experiments for the preparation of the gelatine dessert of the lesson.

Gelatine. — When the beef stock of Lesson LXII, p. 207, was strained and cooled, what material, other than fat and protein, was present in it? From what substance in the meat and bone was this material formed (see *Protein in Meat*, p. 202; *Use of Bone and Fat in Soup-making*, p. 208; *Examination of Cold Beef Stock*, p. 213)?

The gelatine which is found at market is prepared from the bones, gristle, skin, and other portions of animals. Although gelatine may be purchased in several different forms, housekeepers find the granulated or pulverized gelatine the most convenient to use.

One ounce of granulated gelatine will stiffen $1\frac{1}{2}$ to 2 quarts of jelly. In hot weather more is required. If fruit, vegetables, or nuts are to be molded in the jelly, use $1\frac{1}{2}$ ounces of gelatine.

Gelatine should be first hydrated (*i.e.* combined with water) by means of cold water, and then dissolved in boiling water.

The Value of Gelatine. — Gelatine is an incomplete protein, *i.e.* it is lacking in certain amino acids and hence while a good fuel, it does not, without the help of other proteins, both build and repair the body.

The usual gelatine dish contains such a small quantity of gelatine that the question of its food value may be disregarded. The sugar and fruit, however, that are invariably used in gelatine dishes give them food value. Since gelatine liquefies readily by heating, it is valuable in liquid diet.

LEMON JELLY

1 tablespoonful granulated gelatine *or*
¼ ounce shredded gelatine
¼ cupful cold water
¾ cupful sugar
Salt
1½ cupfuls boiling water
¼ cupful lemon juice

Mix the gelatine and cold water. Let them stand until the water is absorbed. Add the boiling water, sugar, and salt. Stir until the gelatine is dissolved completely, then add the fruit juice, strain, and pour into a mold. Set in a cool place to harden. *Gelatine mixtures should be covered while soaking and cooling.*

To remove jelly from the mold, apply a cloth wrung out of hot water to the outside of the mold.

FRUIT JELLY

Prepare lemon jelly mixture. Cover and allow to cool until it begins to stiffen. Peel oranges and bananas; cut them into small pieces or slices. Cut nuts into pieces. Stir in the prepared fruit and nuts. Turn into a mold, cover, and put in a cool place until firm. Serve cold, with or without cream.

Other fruits may be used instead of those mentioned in the recipe. If pineapple is used it must be cooked before adding to jelly. Pineapple contains an enzyme which liquefies gelatine. Hence jelly containing fresh pineapple fails to stiffen.

WHIPPED JELLY

When a gelatine mixture is cool and begins to stiffen, it may be whipped with a Dover egg beater. Air beaten into a gelatine dessert changes it in appearance and quantity.

Lemon Jelly may be varied as follows:

Prepare lemon jelly mixture. Cover and set aside to cool. Then divide into two portions. Add fruit to one portion and turn it into a mold and set aside in a cool place.

Whip the second portion of jelly. When the jelly in the mold is stiff, pour the whipped jelly over it and set aside to cool.

When ready to serve, unmold, garnish with fruit or nuts, if desired. Serve with top milk, plain or whipped cream (see p. 169) or Custard Sauce (see p. 182).

QUESTIONS

What is the purpose of covering the gelatine while soaking and cooling?

Why is it necessary to dissolve the gelatine completely?

What would be the effect of adding cold fruit juice to the hot gelatine mixture? What must be the temperature of water to dissolve gelatine? From this explain why the gelatine should be dissolved before the fruit juice is added.

What is the purpose of straining gelatine mixtures?

Through what should gelatine mixtures be strained?

Of what material should jelly molds be made? Why?

How are jellies removed from the molds without breaking or marring the jellies? Explain.

When fruit is to be added to jelly, what is the purpose of allowing the jelly to cool and almost stiffen before adding the fruit?

LESSON LXVIII

Gelatine (B)

SNOW PUDDING

1 tablespoonful granulated gelatine
¼ cupful cold water
1 cupful sugar
Salt
1 cupful boiling water
¼ cupful lemon juice
2 or 3 egg whites

Mix these ingredients (except egg whites) as for Lemon Jelly (see p. 223). Set aside to cool. Beat the egg whites until stiff. When the gelatine mixture begins to stiffen, beat it (surrounded by ice water) until it becomes frothy, then add the beaten egg whites and continue beating until the mixture begins to stiffen. Turn into a mold and set aside in a cool place. Serve with chilled Custard Sauce.

For the sauce, follow the recipe for Soft Custard given on p. 179, using egg yolks (instead of whole eggs) and ⅜ cupful of sugar (instead of ¼ cupful). In case only 2 egg yolks are used in making the custard, 1 teaspoonful of corn-starch may be used for additional thickening, as suggested on page 179.

The addition of ½ cupful of chopped nuts to Snow Pudding makes a pleasing variation. The nuts should be added just before turning the mixture into the mold.

Snow Pudding may be prepared by whipping plain Lemon Jelly as directed in the previous lesson and serving it with Custard Sauce. The use of egg whites, however, adds to the food value of the dessert and makes it more tasty.

PINEAPPLE BAVARIAN CREAM

1 tablespoonful gelatine
¼ cupful cold water
1 small can (8 ounces) shredded pineapple
Boiling water
½ cupful sugar
Salt
2 tablespoonfuls lemon juice
½ cupful (or more) whipped cream

Mix the gelatine and cold water and let stand until the water is absorbed.

Drain the sirup from the shredded pineapple and add enough water to it to make $1\frac{1}{2}$ cupfuls. Heat the pineapple sirup and water to boiling point. Then pour it over the gelatine mixture. Stir until the gelatine is dissolved. Add the sugar and salt and continue stirring until they are dissolved. Add the lemon juice. Cover and set aside in a cold place until the mixture begins to stiffen.

Whip the cream (see p. 170). Add the shredded pineapple and whipped cream to the gelatine mixture. Surround this with ice water and beat until the mixture again begins to stiffen. Turn into a mold and set aside in a cool place. Serve cold.

QUESTIONS

What is the price per package of gelatine?

How many ounces are there in one package? How many tablespoonfuls in one package?

Determine the cost of Lemon Jelly. Of Snow Pudding. What is the difference in the cost?

Which is lighter in weight, — beaten egg white or plain Lemon Jelly? From this, explain why it is necessary to set the gelatine mixture aside until it begins to stiffen before adding the beaten egg white in the preparation of Snow Pudding.

Explain why the gelatine mixture should be in a slightly stiffened condition before the whipped cream is added to it in the preparation of Bavarian Cream.

LESSON LXIX

Fish (A)

Experiment 59: Effect of Soaking Fish in Water. — Soak a piece of fresh fish in water for at least 10 minutes. Strain the water and heat it to the boiling point. What foodstuff is found in the water? What practical application can be drawn from the result of this experiment as to washing fish?

Experiment 60: Effect of Boiling Fish Rapidly. — Boil a small piece of fresh fish rapidly for a few minutes. What happens to the fish? Judging from this experiment, what care must be taken in cooking and serving fish?

From the results of Experiments 59 and 60, which method, — boiling or baking, — would be more desirable for cooking fish? Why?

Comparison of Beef with Fish. — Fish is an animal food containing protein. It differs from beef in structure and composition. Most fish contains more water than does beef, hence it has not as high a nutritive value. In the quantity of protein, however, fish is about equal to beef; its protein is also complete. Hence many consider it quite as nutritious as beef. It is lacking in extractives, and needs careful seasoning.

Fat of Fish. — The fat content of fish varies greatly in different kinds of fish. A few fish, such as salmon for example, contain considerable fat. The edible portion of most fish, however, contains less fat than beef. The ease with which we digest fish depends upon the fat it contains. Fish containing the least quantity of fat is the most easily digested.

Classes of Fish. — According to the quantity of fat it contains, fish may be divided into two classes: (*a*) *dry, or* lean *fish*, and (*b*) *oily fish*. Cod, haddock, smelt, flounder, perch, bass, brook trout, and pike are dry, or lean fish. Salmon, shad, mackerel, herring, eel, halibut, lake trout, and white fish are oily fish. (This latter group contains from 5 to 10 per cent of fat.)

Fish may also be divided into two classes, according to the water in which they live, fish from the sea being termed *salt-water fish*, and those from rivers and lakes *fresh-water fish*.

Since fish contains about as much protein as does beef, it should be generally used as a meat alternative. Inspection of the fish found at market will doubtless acquaint you with many kinds of fish.

SALMON TIMBALE OR LOAF

1 can salmon
1 cupful soft bread crumbs
1½ teaspoonfuls chopped parsley
½ teaspoonful salt
Pepper
1 or 2 eggs
1 tablespoonful lemon juice
¼ to ½ cupful milk.

Mix all the ingredients thoroughly, adding enough milk to moisten. Pour into buttered timbale molds or into one bowl. Bake at 350° F. for 30 minutes or place the molds on a rack in a pan, surround with hot water, cover, and cook on top of the range until the fish mixture is firm and is heated thoroughly. Turn out, and serve with White Sauce to which chopped parsley has been added (for White Sauce, see *White Sauce for Vegetables*, p. 109. For the fat of the White Sauce, use the oil drained from the salmon).

Peas in White Sauce make a pleasing addition to Salmon Timbale. *Tuna fish* or other cooked fish may be used instead of salmon.

CASSEROLE OF FISH

Cook 1 cupful of rice or barley (see page 85). Measure the ingredients given in Salmon Timbale or Loaf, using salmon or any kind of canned or cooked fish, and prepare a fish loaf.

Let the cereal cool slightly after cooking. Then line a baking dish or a mold with about three fourths of the cooked rice or barley, pressing it in the dish firmly with a spoon. Put the fish mixture in the cavity and cover it with the remainder of the cereal. Steam the food 30 to 45 minutes. Turn from the mold and serve hot with White Sauce as directed for Salmon Timbale.

Any kind of *cooked* and *chopped meat* may be used instead of fish and combined with rice or barley as described above.

QUESTIONS

What purpose do the eggs serve in Salmon Loaf?

Think of the effect of intense heat upon the different ingredients in this fish mixture, and then explain why it should not cook for a long time or at a high temperature.

What is the price per can of salmon? Of tuna fish?

Name two fresh fish that are in market now. What is the price per pound of each?

LESSON LXX

Fish (B)

Freshness of Fish. — Fish is a food which spoils very quickly, and which is dangerous to eat if not fresh. For this reason the housekeeper should be able to judge of the freshness of fish. In fresh fish:

(*a*) The flesh is firm and elastic, especially along the backbone.

(*b*) The gills are bright.

(*c*) The eyes are bright and bulging.

The sinking of fish when placed in water has also been given as an indication of its fitness for use as food. Decayed fish floats on water.

Since fish spoils readily, it must be frozen if kept for any length of time. Frozen fish is not undesirable provided it is kept in a frozen state until used; it should be thawed out by placing it in cold water *just before cooking*. Fish that has been thawed out and kept for some time before cooking may contain at times poisonous substances called *ptomaines*. Ptomaines in food may produce distressing effects or may even prove fatal.

Fresh fish should be kept in a cool place until used, but should not be placed uncovered in the refrigerator. It may, however, be tightly covered, — put in a tin pail or glass jar, — and placed in the refrigerator. Before cooking, fish should be washed thoroughly with a wet cloth. On account of the odor, all utensils used in the cooking of fish should be washed in salted water.

BAKED FISH

Clean and wash a large fish. The head or tail may or may not be removed before baking. If the head is retained,

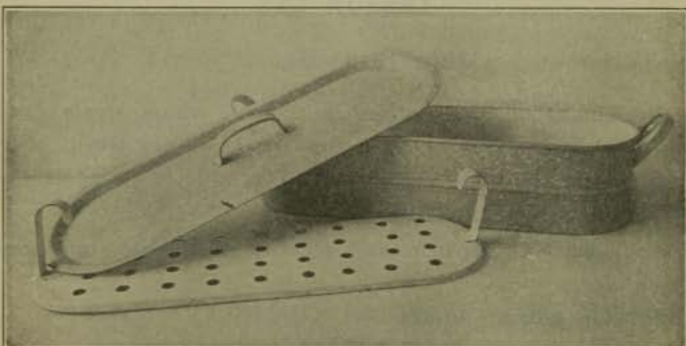


FIGURE 60. — FISH KETTLE, SHOWING RACK.

the eyes should be removed before serving; this is done more easily after cooking. If the tail is retained, it should be wrapped in oiled paper to prevent it from burning.

Sprinkle salt on the inside of the fish and also on the outside, and then fill with stuffing. Skewer the cut edges of the fish together or close the incision as follows:

Hold the edges of the skin together and thrust toothpicks across the opening, through both cut edges of the fish. Then fasten the opening by "*lacing*" string around the toothpicks. Cut gashes on each side across the fish and put strips of salt pork into them or insert strips of pork with a larding needle. Oil a baking sheet or the rack of a fish kettle (see Figure 60) and place the fish on it, forming the fish into an "S" by means of skewers. Place the sheet in a baking-pan and add pieces of salt pork. Bake at 300° F. 15 minutes for each pound, or until the flesh can be separated easily from the bones by means of a skewer or a fork. If the baking-pan is uncovered, baste every 10 minutes. When done, carefully remove the fish from the pan and place on a platter, garnish with parsley and lemon, and serve with *Tomato Sauce* (see p. 112) or *Sauce for Fish* (see below).

In the absence of a baking sheet, two well oiled strips of muslin may be placed across the baking-pan, underneath the fish. When baked, the fish may be removed easily from the pan by means of the strips of muslin.

STUFFING FOR FISH

2 cupfuls soft bread crumbs	1 teaspoonful scraped onion
½ teaspoonful salt	1 teaspoonful chopped parsley
⅛ teaspoonful pepper	1 teaspoonful capers or chopped pickles
Cayenne	

2 tablespoonfuls butter or substitute

Mix the ingredients in the order given (see *Crumbs for Scalloped Dishes*, p. 110).

SAUCE FOR FISH

3 tablespoons butter or substitute	1¾ cupfuls hot water
¼ cupful flour	¼ cupful vinegar *or*
½ teaspoonful salt	1 large lemon, — juice
Cayenne	1 tablespoonful chopped parsley

Prepare the first five ingredients as in White Sauce (see *White Sauce for Vegetables*, p. 109). Then add vinegar or lemon juice and chopped parsley. Serve hot over fish.

Hard-cooked eggs make a pleasing addition to this sauce. Chop the whole eggs or slice the whites and mash the yolks with a fork; then add to the sauce.

QUESTIONS

Why should fish not be left uncovered in the refrigerator?

Why should fish be cleaned by wiping with a cloth, rather than by placing in a pan of water (see Experiment 59, p. 226)?

What is the purpose of placing fish on a baking sheet or placing strips of muslin underneath for baking (see Experiment 60, p. 227)?

How is fish tested for sufficient cooking?

How can the odor be removed from utensils in which fish has been cooked?

LESSON LXXI

Fish (C)

PLANKED (BROILED) FISH

An oak plank, — one inch in thickness and as long and wide as a large platter, — is a satisfactory device for broiling fish. For planking or broiling, fish steaks or thin, flat fish, such as mackerel or bluefish, should be selected.

Clean the fish, then place it, skin side down, on the plank. Sprinkle with salt and pepper, and spread with softened or melted butter. Place in the broiling oven and broil until done, usually 15 or 20 minutes.

A border of potato puff mixture makes a pleasing addition to the fish (see *Potato Puff*, p. 289). A few minutes before the fish is done, remove it from the oven and arrange the potato mixture around it. (A pastry bag and tube may be used for this purpose.) Brush the potato with egg diluted with water (1 tablespoonful of water to 1 egg). Return the plank to the oven to finish broiling the fish and to brown the potatoes. Serve the fish and potatoes on the plank.

FRIED OR SAUTÉED FISH

Clean fish and season with salt and pepper. Mix equal parts of corn-meal and flour. Dip the fish in this mixture. Fry in deep fat or sauté. Drain and serve with a sauce. Dried bread or cracker crumbs, and egg may be used for dipping instead of the corn-meal and flour mixture (see *Fried Oysters*, p. 134).

FISH CHOWDER

½ pound salt fish *or*
2 pounds fresh fish
1 quart potatoes cut in pieces
2 tablespoonfuls bacon drippings *or* other fat
1 onion, chopped
2 tablespoonfuls corn-meal
1 pint milk
Crackers

If salt fish is used, hold it under running water for a few minutes (why?), then shred it.

If fresh fish is used, wash it, remove bones if possible, and cut it into six or eight pieces.

Brown the onion in the fat. Into a kettle put layers of fish and potatoes and add a little browned onion and corn-meal to each layer. Cover with hot water and boil gently until the potatoes are tender. Add the milk and continue heating until the mixture is hot. Just before serving, add a few crackers broken into pieces.

QUESTIONS

State the advantages of using a plank for broiling fish.

Why select fish steaks or thin, flat fish for broiling?

What is the purpose of brushing the potato mixture with egg?

Give two reasons for using well seasoned sauces and stuffing with fish (see *Comparison of Beef with Fish*, p. 227).

LESSON LXXII

Legumes (A)

The Legumes include peas, beans, lentils, and peanuts. These plants bear pods containing seeds; the seeds — green or ripened — and the pods of some of the plants are commonly used as foods.

Protein in Seeds. — Many foods rich in protein belong to the animal kingdom. The seeds of plants, however, contain protein. The common cereals, wheat and corn, contain almost 10 per cent of protein, while oats contain about 16 per cent. But the dried seeds of legumes exceed all seeds in protein content. Peas, beans, lentils, and peanuts contain more protein than most cuts of meat. About 25 per cent of their composition is protein. Soy-beans are much richer in protein than any of the other legumes. They contain about 37 per cent.

It has been mentioned that proteins differ in quality. Although the dried legumes are especially rich in protein, they do not all contain complete protein. With the exception of peanuts and soy-beans, these foods need to be supplemented with other protein-rich foods such as milk, eggs, and cheese.

Since the dried legumes are a much cheaper source of protein than meat, they should be used oftener than they are. Legumes supplemented with milk or combined with a small quantity of meat furnish economical sources of protein food. The protein in legumes is called *legumin*.

Cooking Dried Legumes. — The dried legumes should be soaked overnight in water, to which a little baking soda has been added. These vegetables require long cooking to soften them, and also to develop flavor. A little soda added to the water in which they are cooked also aids in softening them and neutralizes the vegetable acid found in some of the legumes. During the long heating, dried legumes break up, if not carefully cooked.

Dried soy-beans have a strong flavor which is objectionable. This can be removed as follows: Soak the beans overnight in a large quantity of hot water, drain, add fresh water and baking soda (about 1 teaspoonful for each cupful of beans), and cook the beans for about 40 minutes, then drain, add more water, and cook until they are tender. Dried soy-beans require long cooking, — usually 4 or 5 hours. After the 40-minute cooking, they may be drained, heated in more water, and then placed in a *fireless cooker*. The *pressure cooker* may be used effectively in cooking these dried beans.

Soy-beans may also be baked after the 40-minute cooking in the same manner as navy beans (see *Boston Baked Beans*). Serve cooked soy-beans with Tomato Sauce (see p. 112).

Although dried legumes are comparatively cheap, the fuel required to cook them for so long a time may increase their cost to a considerable extent. In cooking these foods, care should be taken to utilize fuel that is already required for some other purpose. The *fireless cooker* is most satisfactory in cooking these dried foods.

BOSTON BAKED BEANS

2 cupfuls navy beans
2 tablespoonfuls molasses or brown sugar
2 teaspoonfuls salt
2 ounces salt pork or bacon
½ teaspoonful mustard

Soak the beans overnight as directed in *Cooking Dried Legumes*. Add a little baking soda and gradually heat to the boiling point. Then add the seasoning to the beans; place half of them in a bean crock; and add the pork which has been scraped and scored. (To score salt pork cut gashes in it nearly to the rind.) Add the remainder of the beans and enough water to cover them slightly. Bake in a slow oven (250° F.) 6 to 12 hours. Keep the beans below the boiling point and see that they are covered with liquid.

Lentils may be baked in the same way as beans.

SALTED PEANUTS

½ cupful salt	1 cupful shelled unroasted peanuts
3 cupfuls water	2 teaspoonfuls butter or substitute

Remove the skins from the peanuts by placing them in boiling water for 3 minutes; drain, cover with cold water; and then slip off the skins. Heat the salt and water, and when boiling, add the peanuts. *Cook 15 minutes.* Drain, rinse off the salt, place in a baking-pan, add the fat, and bake at 350° F., 40 to 50 minutes or until slightly browned. Turn from the pan on paper.

QUESTIONS

Why should dried vegetables be soaked in water before cooking?

Measure the beans after soaking. How much have they increased in bulk?

What is the reason for keeping the beans below the boiling point while baking?

Devise a method for preparing Baked Beans, when they can remain in the oven but an hour or two.

How are fatty meats cleaned? Why can they not be cleaned by washing in water (see Experiment 35, p. 139)?

What is the purpose of scoring the salt pork or bacon?

What is the advantage of seasoning peanuts by cooking in strong salted water rather than sprinkling salt over them after browning?

What are the prices of beans and raw peanuts per pound?

How many cupfuls in a pound of each?

LESSON LXXIII

Legumes (B)

BEAN SOUP

2 cupfuls beans	2 slices onion
3 quarts water	Cayenne
Baking soda	⅛ teaspoonful pepper
1 piece of celery root *or*	2 teaspoonfuls salt
½ teaspoonful celery salt *or*	¼ teaspoonful mustard
Dried celery leaves	2 tablespoonfuls flour

1½ tablespoonfuls butter or substitute

Soak the beans overnight; add soda, onion, and celery. Cook slowly until the beans are soft. Add more water, if more than one quart evaporates. Press through a strainer. Use the remainder of the ingredients in making a sauce. The strained beans should be used as the liquid for the sauce (see *Thick Soups*, p. 173).

Slices of lemon and of hard-cooked eggs may be used as a garnish for this soup.

SPLIT PEA SOUP

1 cupful split peas	⅛ teaspoonful pepper
2½ quarts water	1¼ teaspoonfuls salt
Baking soda	3 tablespoonfuls flour
2 slices onion	2 tablespoonfuls butter or substitute

1 pint milk

Soak the peas overnight; add soda and onion; and cook slowly until the peas are soft. Press through a strainer. Make a White Sauce of the remainder of the ingredients. Add the strained peas, heat, and serve.

Cooking a ham bone with the split peas changes the flavor.

GREEN PEA SOUP

1 pint or can of peas
½ teaspoonful sugar
1 pint liquid round peas and water
Pepper
1 teaspoonful salt
1½ tablespoonfuls butter or substitute
1 pint milk
2 tablespoonfuls flour

Turn the peas into a saucepan; add the liquid, water, and sugar; and cook until very soft. Press the peas through a strainer. Make a White Sauce of the remaining ingredients. Add the strained peas, heat, and serve.

Peas too old to serve as a vegetable may be used for soup. Some of the pods of fresh peas may be cooked with the peas.

CRISP CRACKERS

Spread thin crackers very lightly with butter. Brown in the oven and serve with soup.

QUESTIONS

How should the water boil to prevent dried legumes from breaking (see *Cooking Vegetables in Water*, p. 59)?

What is the simplest way of thickening soup, if it is too thin? Too thick?

If a ham bone is cooked with split peas, what ingredient should be omitted in making the soup? Why?

How many persons will these recipes for soup serve?

How many cupfuls in a pound of split peas? What is the cost per pound of split peas? How much does one cupful of split peas increase in bulk by soaking? What quantity of split peas would be equal to a can of peas? What is the cost of a can of peas? How much is saved in making soup by using split peas rather than green peas?

LESSON LXXIV

Legumes (C)

BEAN ROAST

1 cupful white beans, cooked	1 teaspoonful salt
1 cupful roasted peanuts	Speck pepper
½ cupful bread crumbs	½ cupful milk

Put the beans and peanuts through a food chopper, add the remaining ingredients. Mix and shape into a loaf. Place in an oiled dish and bake 30 minutes in a hot oven (400° F.). Serve hot with Tomato Sauce (see p. 112).

PEANUT BUTTER SOUP

1 cupful peanut butter	3 cupfuls milk
½ cupful chopped celery	2 teaspoonfuls salt
1½ cupfuls water	⅛ teaspoonful pepper
1 grated potato	

Mix the peanut butter with 1 cupful of milk. Heat 2 cupfuls of milk in a double boiler. Cook the celery in the water until the vegetable is tender. Add the grated potato, cook, and stir until the mixture is thickened. Then add it to the hot milk. Also add the peanut butter mixture and seasoning. Heat until it is hot. Beat with a Dover egg beater. Serve hot.

Dried celery leaves may be used instead of fresh celery (see p. 249).

QUESTIONS

Mention the nutrients contained in the food materials of Bean Roast and Peanut Butter Soup. Discuss the value of each nutrient.

Calculate the cost of Bean Roast. How many persons will it serve?

How many persons will one pound of chopped beef serve? Estimate the difference in cost of one serving of Bean Roast and of Chopped Steak.

What is the purpose of grated potato in Peanut Butter Soup? What substance could be substituted for the grated potato? State the method of mixing and cooking if the substitution were made.

RELATED WORK

LESSON LXXV

Cost of Food

Foods Differ Greatly in Cost. — One pound of rice costs much less than one pound of beefsteak. One cut of meat may cost less per pound than another. Twenty-five cents buys much less in weight of sweetbreads than of beefsteak.

Many factors other than difference in cost must, however, be taken into consideration when determining the value of foods.

Cost of Food in Relation to Nutritive Value. — Foods differ in nutritive value per pound. One pound of dried split peas contains more than three times as much nutriment as one pound of fresh peas. The nutritive value of a pound of sweetbreads is much less than that of a pound of beefsteak.

Cost of Food in Relation to Refuse. — Although one cut of meat may sell for more than another, the higher priced one may be cheaper because there is less waste. In most localities flank steak costs more per pound than shoulder steak; yet flank steak is the cheaper meat because it is all edible, while there is about one fifth waste in most shoulder steak. One pays for some refuse even when purchasing eggs.

Cost of Food in Relation to Season. — Most foods are higher in price when out of season. Strawberries may cost seventy-five cents per quart in February and twenty-five cents in the spring or summer months. An unseasonable food is invariably expensive.

Cost of Food in Relation to Weight. — Food labels often contain valuable information. The weight of the contents of a package, can, or bottle, and sometimes the composition of food appears on them.

Packages, bottles, and cans of equal size do not always contain the same quantity of foods. The shape or thickness of a container also affects the quantity of its contents. By examining labels and noting weight and composition, the price and quality of one brand of foods may be compared with another.

Household scales are useful in checking up the weight of foods, such as meats, fats, and vegetables. By weighing foods after they have been purchased, a housekeeper can determine if a dealer is giving her that for which she pays.

Lessening the Cost of Foods. — There are many things, then, that the thrifty buyer should take into consideration when purchasing foods. It is one of the obligations of a woman who purchases and plans the foods for a family to be careful of expense. The following statement concerning thrift is both forceful and true:

"It is not beneath the dignity of any family to avoid useless expenditure no matter how generous its income, and the intelligent housekeeper should take as much pride in setting a good table, at a low price, as the manufacturer does in lessening the cost of production in his factory." [1]

Calculation of the Cost of Food. — In counting the cost of foods, it is necessary to know not only the price per

[1] *United States Department of Agriculture*, Farmers' Bulletin 391, "Economical Use of Meat in the Home," p. 43.

pound, quart, dozen, or package, but the measurement in cupfuls of the given weight. Most of the data for the list given below can be obtained from labels on the containers and from the notes on the weights and measures of various foods prepared from the "Questions" of this text. The dashes indicate that data are not required. The cost should be calculated to four decimal places.

Food	Cost per Pound, Quart, etc.	Measure in Cupfuls of Pound, Quart, etc.	Cost per Cupful	Cost per Tablespoonful	Cost per Teaspoonful
Apricots (dried) (see p. 77)				—	—
Baking Powder			—	—	
Beans, dried (see p. 236) . .				—	—
Butter					
Butter Substitute				—	—
Cheese (see p. 192)				—	—
Cocoa (see p. 169)				—	
Coffee (see p. 51)				Heaping table-spoonful	—
Corn-meal (see p. 97) . . .				—	—
Corn-starch (see p. 101) . .			—		
Cream of Wheat (see p. 84) .				—	—
Cream (see p. 173)					—
Currants (dried)				—	—
Eggs (see Experiment 41, p. 160)			—	One	—
Flour, white					—
Flour, whole wheat				—	—
Flour, graham				—	—
Gelatine (see p. 220) . . .			—		—
Lard					—
Macaroni (see p. 192) . . .				—	—
Meat, chopped (see p. 205) .				—	—
Milk (see p. 169)				—	—
Potatoes (see p. 110) . . .		—	One potato	—	—
Prunes (dried)				—	—
Raisins (dried)				—	—

Food	Cost per Pound, Quart, etc.	Measure in Cupfuls of Pound, Quart, etc.	Cost per Cupful	Cost per Tablespoonful	Cost per Teaspoonful
Rice (see p. 97)				—	—
Rolled Oats (see p. 84)				—	—
Salt			—		
Split Peas (see p. 238)				—	—
Sugar, brown				—	—
Sugar, granulated (see p. 74)				—	—
Sugar, loaf			One lump	—	—
Sugar, powdered (see p. 74)				—	—
Tapioca				—	—
Tea (see p. 46)				—	
Vanilla		—	—	—	
Vegetable Oil					
Wheatena (see p. 84)				—	—

LESSON LXXVI

Cooking and Serving a Breakfast

Cook and serve a breakfast. The following menu is suggested:

Oranges or Baked Apples
Goldenrod Eggs
Baked Mush with Honey or Marmalade
Cocoa

Follow the English or family style of serving (see p. 122). Serve the breakfast with or without a maid.

Calculate the cost of the meal. In determining the cost, use the data from the previous lesson for the staple materials. The cost of fresh foods such as oranges or apples may be secured from the one who did the marketing or from the grocer's statement.

LESSON LXXVII

Review: Meal Cooking

MENU

Cereal with Fruit
Poached Egg on Toast

See Lesson XIV; p. 68, for suggestions regarding the preparation of the Lesson.

LESSON LXXVIII

Home Projects [1]

Suggestions for Home Work. — Set the table for the evening meal each day.

Cook at least one tough cut of meat each week.

Suggested Aims:

(1) To lay the cloth smooth and straight.

(2) To place the dishes in a neat and orderly way on the table.

(3) To make as few trips as possible from the cupboard to the dining table.

(4) To plan the entire number of dishes, knives, forks, spoons, and other things needed during the meal, and then place these on the dining table or other suitable place where they may be conveniently obtained when the meal is being served.

(5) To prepare the tough meat so that it is tender, moist, and tasty.

(6) To determine the cost of meat.

[1] See Lesson IX, p. 51.

DIVISION SEVEN

HEALTH AND GROWTH-PROMOTING FOODS, — RICH IN VITAMINES

LESSON LXXIX

VITAMINES — VEGETABLES OF DELICATE FLAVOR

Vitamines. — In determining the proper diet for perfect nourishment, scientists long since came to the conclusion that the body needed a certain quantity of carbohydrates, fats, protein, ash, and water. They were all agreed that all these foodstuffs needed to be represented in the foods making up a day's diet. Scientists also found that these foodstuffs must exist in a certain proportion in a day's food, — that there should be enough of each of the foodstuffs to meet the needs of the body. A diet made up of foods in which all the foodstuffs were represented in the proper proportion was termed a *balanced ration.*

Investigations of recent years, however, show that these foodstuffs alone do not afford perfect nourishment. Much valuable scientific work is being done on the question of adequate diet. It is found that *certain substances* contained in foods in small amounts are absolutely essential in diet. When animals are fed foods containing only the foodstuffs mentioned above and none of these other substances, they cease growing, become diseased, and eventually die.

These materials so necessary to the growth and maintenance of animal life are termed *Vitamines* by some authorities. There are three classes of Vitamines, called *Fat-soluble A*, *Water-soluble B*, and *Water-soluble C*. It is now believed that there are several more vitamines.

Although vitamines exist in foods only in minute quantities it is necessary to use foods containing all the kinds of vitamines to promote growth and to keep in health.

Fat-soluble A is thought to prevent a disease of the eye called xerophthalmia and probably other diseases, such as night blindness. During the war, because of inadequate diet, many cases of these diseases developed in Europe.

Water-soluble B is called the *anti-neuritic vitamine* because it is necessary to prevent a disease called polyneuritis or beri-beri (see *Polished and Unpolished Rice*, p. 84).

Water-soluble C is called the *anti-scorbutic vitamine* because it is necessary to prevent a disease called scurvy.

Foods Containing Fat-soluble A are *milk*, *eggs*, and *leafy vegetables*. Leafy vegetables rich in fat-soluble A are: spinach, lettuce, Swiss chard, cabbage, and dandelion greens. Milk products, such as butter, cream and cheese, and cod-liver oil also contain fat-soluble A. It is also thought to be present in certain vegetables such as sweet potatoes and carrots, which are not leafy vegetables. Not all fat foods contain fat-soluble A. It does not exist in most vegetable oils.

It has been demonstrated that foods rich in fat-soluble A, especially milk, eggs, and leafy vegetables, are most essential in diet. According to McCollum, dry leaves contain 3 to 5 times as much total ash as do seeds; the former are also especially rich in the important elements calcium, sodium, and chlorine, in which the seed is poorest. Hence leafy vegetables not only abound in the growth-promoting vitamine but in certain essential minerals. Cereals, root vegetables, and meat need to be supplemented with milk and leafy vegetables. Because milk, eggs, and leafy vegetables are so valuable and essential in diet, these foods have been termed *protective foods*. Whole milk contains fat-soluble A, water-soluble B, and a smaller quantity of water-soluble C. Its value as a food has been previously discussed (see p. 163).

Doubtless the leafy vegetables are not as generally and as constantly used as they should be. Root vegetables and cereals seem to be a much more popular form of vegetable food. The pupil should realize the importance of these foods and when possible explain their use in her home. Learning to prepare leafy vegetables so as to retain their nutriment and to make them appetizing would doubtless do much in promoting their use.

Foods Containing Water-soluble B. — Water-soluble B is more widely distributed in foods than is fat-soluble A. It occurs for the most part, however, in vegetable foods. Plants containing this vitamine include seeds, root, stem, and leafy vegetables. Whole grains, legumes, spinach, cabbage, potatoes, carrots, onions, turnips, cauliflower, and tomatoes and many other commonly used vegetables and fruits contain water-soluble B. It is thought that the layer of the wheat grain next to the germ may be richest in water-soluble B. Compressed yeast contains some of this vitamine, but none of the other two.

Foods Containing Water-soluble C include both animal and vegetable foods, but fresh fruits and green vegetables contain the largest quantity. Oranges, lemons, raspberries, lettuce, and cabbage are valuable sources of this vitamine. Meat contains only a very small quantity of water-soluble C.

Saving the Nutriment and Flavor. — It was mentioned in *Suggestions for Cooking Fresh Vegetables* (see p. 59) that a saving of ash in vegetables meant a saving of both nutriment and flavor. If vegetables of delicate flavor are to be made tasty, it is especially necessary to lose none of the ash constituents. Note that in the methods of cooking the vegetables of delicate flavor in this lesson that either the vegetables are cooked in such a way that no moisture needs to be drained from them, or the vegetable stock drained from them is used in making sauce for the vegetable. By these methods both nutriment and flavor are retained.

SPINACH

1 pound or ½ peck spinach	⅓ teaspoonful pepper
½ tablespoonful salt	2 tablespoonfuls butter

If the spinach is at all wilted, place it in cold water until it becomes fresh and crisp. Cut off the roots, break the leaves apart, and drop them in a pan of water. Wash well, and then lift them into a second pan of water; wash again, and continue until no sand appears in the bottom of the pan. Lift from the water, drain, and place in a granite utensil, and add the seasoning. Steam until tender (usually about 30 minutes). Add the butter, cut the leaves with a knife and fork. Turn into a hot dish and serve at once.

Spinach is most pleasing if served with a few drops of vinegar or a combination of oil and vinegar. If desired, the pepper may be omitted and 1 tablespoonful of sugar added. Spinach may also be garnished with slices of hard-cooked eggs, using 2 eggs to ½ peck of spinach.

Spinach may be cooked directly over the flame, as follows: wash the spinach as directed above. Then drain, and place in a saucepan or casserole. Do not add water unless the spinach is old. Add the seasoning, cover, and cook for 10 minutes, pressing down and turning over the spinach several times during the cooking. Cut with a knife and fork in the saucepan or casserole. Add the butter, and simmer for 5 minutes. Serve at once.

SCALLOPED SPINACH WITH CHEESE

1 pound spinach	½ cupful cheese, cut in pieces
1 cupful thick White Sauce (see p. 115)	2 to 3 hard-cooked eggs, sliced

2 cupfuls buttered bread crumbs (see p. 110)

Wash the spinach and cook it by either of the methods given above. Season it with ½ tablespoonful of salt.

Drain the moisture from the cooked spinach. Use this liquid combined with milk for the liquid of the White Sauce. Season the sauce with $\frac{1}{2}$ teaspoonful of salt and add the cheese to it. Stir the mixture until the cheese is blended with the sauce.

Divide the spinach, sauce, and eggs into 2 portions and the bread crumbs into 3 portions, as directed for Scalloped Corn (see p. 26). Place a layer of crumbs in a baking-dish, add a layer of spinach, sauce, and eggs. Add another layer of each material and finally the third layer of crumbs. Bake in a hot oven (400° F.) for 25 minutes or until the materials are heated and the crumbs browned. Serve hot.

DRIED CELERY LEAVES[1]

Wash celery leaves and remove the stems. Place the leaves on a platter or granite pan, cover with cheese-cloth, and set aside to dry. When perfectly dry, crumble the leaves and place them in a covered jar. Use for flavoring soups and stews.

QUESTIONS

In what kind of soil does spinach grow?

What is the advantage of using two pans in washing spinach?

What is the advantage of cooking in steam green vegetables of delicate flavor?

If green vegetables are cooked in water, what is the advantage in using a small, rather than a large quantity of water?

What is the price of spinach per pound or peck? How many persons does one pound or peck serve?

What is the price of celery per bunch?

What vitamines are present in spinach and celery leaves and stems?

[1] The stems of celery from which the leaves are cut, should be utilized. They may be used in a salad or cooked and served with White Sauce as Creamed Celery. If the vegetable is cooked, it should be steamed or cooked in a small quantity of boiling water. In case the latter method is followed, the celery stock should be combined with milk and used in the preparation of the White Sauce.

LESSON LXXX

VITAMINES — VEGETABLES OF STRONG FLAVOR

The Effect of Cooking and Storing Vitamine-rich Foods. — Since vitamines are so essential in food, the effect of cooking and storing upon the vitamine content of a food needs to be considered. There has been some difference of opinion regarding this matter. Indeed, the question of whether or not vitamines of all vitamine-rich foods are destroyed by cooking and storing has not been conclusively determined. It is thought, however, that fat-soluble A may be destroyed in part by cooking at boiling temperature especially if oxygen comes in contact with the food during cooking.

Water-soluble B is thought to be little affected by ordinary home cooking processes. Indeed, when foods containing vitamine B are cooked in water and the water discarded after cooking, greater loss of this vitamine occurs because it is soluble in water than because it is affected by heat. It is thought the water-soluble B vitamine present in foods is destroyed by cooking them in water to which baking soda or any alkali is added.

Water-soluble C is decidedly affected by ordinary home cooking processes. Some recent experiments on apples, however, show that vitamine C is destroyed largely by oxidation and that heat has little effect on vitamine C if oxidation is eliminated. Whether or not this is true of foods other than apples remains to be determined. It was found also that some foods, such as cabbage and apples, kept in storage for several months contained less of vitamine C than when freshly picked.

Since there is no question about the vitamine content of uncooked vegetables, the use of salads containing lettuce and raw vegetables such as cabbage and carrots should find favor. Spinach is a valuable food not only because it contains vitamines, but because it is rich in iron. Young beet tops so often discarded contain too much valuable material to be wasted.

Nutriment *versus* Flavor. — If vegetables of strong flavor are cooked carefully in a large quantity of boiling water (at least 4 quarts), a mild flavor results, but much of the ash is lost. If vegetables are steamed there is little loss of ash but the strong flavor is retained. In the cooking of cabbage, for example, investigation has shown that almost four times as much ash may be lost by boiling as by steaming.

In the cooking of such vegetables as cabbage and onions the question arises: Is it better to steam them and thus lose little nutriment but preserve the strong flavor; or to boil them in much water and thus lose much nutriment but secure delicate flavor? If strong cabbage flavor is not distasteful, steam it or cook it in a small quantity of water by all means. If delicate cabbage flavor is much more pleasing, cook it in much water. Onions have such a strong flavor that most housekeepers prefer to sacrifice nutriment for flavor.

CREAMED CABBAGE (Cooked in Much Water)

A head of cabbage should be cut into quarters and placed in cold water. If it is wilted, it should remain in the water until freshened. Cook the cabbage uncovered from 15 to 25 minutes in a large quantity of boiling water (1 teaspoonful of salt to 1 quart of water). The time depends upon the age of the cabbage. Drain well. With the knife and fork cut the cabbage in the saucepan. (Do not discard the core of young cabbage since it contains valuable nutrients.) Mix with White Sauce, using two parts of cabbage to one of White Sauce. Heat and serve (see *Creamed and Scalloped Vegetables*, p. 109).

Scalloped Cabbage may be prepared by placing creamed cabbage in a baking-dish, covering with Buttered Crumbs (see p. 110), and baking at 400° F. for 30 minutes or until the crumbs are brown.

Instead of using White Sauce with the cabbage, butter (or substitute), pepper, and more salt (if required) may be added. Use 1 tablespoonful of butter (or substitute) to each pint of cabbage.

CABBAGE (Cooked in Little Water)

Clean cabbage, then cut or chop both the leaves and core. Cook in a *small quantity* of boiling water from 15 to 25 minutes. The small quantity of stock which remains after cooking should be served with the vegetable to which butter (or substitute) and seasonings are added.

The stock may also be drained from the cabbage and used in making White Sauce in which the vegetable is served.

CREAMED CABBAGE (Steamed)

Cut and clean cabbage as directed above. Place in a granite utensil and steam until tender (usually about 45 minutes). Cut the leaves and add White Sauce as directed above.

ONIONS (Cooked in Much Water)

1 pound onions	1 to 2 tablespoonfuls butter
½ cupful milk	½ teaspoonful salt
	Pepper

Peel and wash the onions; then cook uncovered in a large quantity of boiling salted water; change the water at the end of 5 minutes and again in 10 minutes; cook until tender. Drain; add milk and seasonings and cook until the milk is hot.

Note. — It is advisable to save the water drained from onions, boil it down, and use it in soups, stews, or hash for flavor.

Onions may also be served with White Sauce, or they may be scalloped, *i.e.* cut into quarters, placed in a baking-dish, covered with White Sauce and Buttered Crumbs, and then browned in the oven at 400° F. for 30 minutes.

The stain and odor may be kept from the hands if onions are held under water when peeled.

If onions are cooked uncovered in a *large quantity of gently boiling water in a well-ventilated kitchen,* not much odor is noticed. The fireless cooker, however, provides satisfactory means of cooking onions without the disagreeable odor (see Lesson XXII, p. 90). Place the onions in a large quantity of water and boil for 5 minutes. Then cook in the fireless cooker from 2 to 8 hours, according to the size and the age of the onions, and the type of cooker.

QUESTIONS

Compare the three methods of cooking cabbage given in this lesson. State the advantages and disadvantages of each.

Why should the core or thick stem of cabbage be used as food?

What is the price per pound of cabbage? What is the weight of one cabbage of average size? Give suggestions for selecting a cabbage.

Why should onions be peeled under water?

What is the purpose of changing the water twice in cooking onions?

Why is it advisable to save the water drained from onions and use it in soups and other foods?

What is the price per pound of onions? How many persons will one pound of onions serve?

LESSON LXXXI

Salads (A)

Preparation of a Salad. — A well-prepared salad is a good food. It is necessary, however, to prepare it so that it may be pleasing in appearance as well as in taste. The green vegetables used for salads should be crisp, cold, and dry when served. If several food materials are used, the flavors should blend. Have the salad dressing well seasoned, and its ingredients well proportioned. Add the dressing to a salad just before serving.

LETTUCE FOR SALAD

Either leaf or head lettuce forms a part of almost all salads. It is often used as a bed for a salad, or as a border. For the latter purpose, leaf lettuce should be used and cut into strips with the scissors. Keep lettuce in a cold place; separate the leaves, and place them in cold water until crisp and fresh. Wash and look over carefully to see that no insects cling to them. Shake the water from the leaves or place them in a cloth bag or a wire basket. Then place the bag or basket in the refrigerator to drain. The leaves may also be dried with a towel.

Lettuce served with French Dressing makes a plain but pleasing salad. When lettuce is used as a bed or border for a salad, it should be eaten and not left to be turned into the garbage can.

FRENCH DRESSING

Clove of garlic *or*	1 teaspoonful salt
Slice of onion	6 tablespoonfuls salad oil
½ teaspoonful paprika	

2 tablespoonfuls vinegar or lemon juice

Rub a bowl with the clove of garlic or slice of onion. Add the remainder of the ingredients, and stir until well blended. More vinegar or lemon juice may be used, if desired. Chopped parsley or mint may be added.

Some find it convenient to put the materials for French Dressing in a bottle or jar and mix the ingredients by shaking the bottle.

For Fruit Salads, the addition of 1 tablespoonful of sugar and 1 teaspoonful of lemon juice to the French Dressing recipe above makes a pleasing flavor. Celery salt is thought by some to improve the flavor. From ¼ to ½ teaspoonful may be added.

COLESLAW

3 cupfuls shredded cabbage
½ teaspoonful salt
½ teaspoonful mustard
Cayenne
1 teaspoonful sugar
1 egg or 2 egg yolks
½ cupful milk
2 teaspoonfuls butter or substitute
¼ cupful vinegar

Heat the milk in a double boiler. Beat the eggs, add the dry ingredients. Then add the milk to them. Return the mixture to the double boiler and cook as a custard (see *Soft Custard*, p. 179). Remove from the hot water, add the fat and vinegar, and *at once* strain over the cabbage. Set aside to cool. Serve cold.

CARROT AND CABBAGE SALAD

1 medium-sized carrot
2 cupfuls cabbage
½ cupful roasted peanuts
French or Cream Salad Dressing

Clean and scrape the carrot. Wash the cabbage. Put the carrot (uncooked), cabbage, and peanuts through the food chopper. Mix with French or Cream Salad Dressing. Add more seasoning if necessary. Serve at once.

QUESTIONS

Explain why it is necessary to dry the salad materials before adding the salad dressing.

Give at least three different vegetable mixtures that would be palatable and pleasing if served with French Dressing.

How is cabbage cleaned? How should it be cut for salad?

When is the dressing usually added to salads? When is the dressing added to the Coleslaw? Give the reason for this exception.

What is the purpose of the egg in this salad dressing? What could be substituted for the egg? Give the method of preparation if this substitution were made.

What is the price per pound of leaf lettuce? Of head lettuce per pound or per head? What is the average number of leaves in a pound?

What materials in Carrot and Cabbage Salad contain vitamines? State the kind of vitamine present in each material.

LESSON LXXXII

Salads (B)

STUFFED EGGS

Cut hard-cooked eggs into halves crosswise. Remove the yolks, mash them, and for each egg add the following ingredients:

1 tablespoonful chopped chicken, ham, or other meat	6 drops vinegar
Dash salt	$\frac{1}{8}$ teaspoonful mustard
	Cayenne

1 teaspoonful vegetable oil or melted butter

Mix the ingredients. Refill the whites with the yolk mixture. Serve the stuffed eggs on lettuce leaves.

The chopped chicken or meat may be omitted from the egg mixture, or a little chopped pickle or olive or cheese may be used instead of the meat. Salad dressing may be served with Stuffed Eggs.

CREAM SALAD DRESSING

3 tablespoonfuls butter *or* substitute	$1\frac{1}{2}$ teaspoonfuls salt
4 tablespoonfuls flour	$\frac{1}{2}$ teaspoonful mustard
2 tablespoonfuls sugar	$1\frac{1}{2}$ cupfuls milk (sweet *or* sour)
Pepper	$\frac{1}{2}$ cupful vinegar

1 to 2 eggs

Make a sauce of the fat, flour, and milk. Beat the eggs, add the seasonings. Add the first mixture gradually to the egg mixture and cook over hot water as a custard (see *Soft Custard*, p. 179). Add the vinegar, strain. Cool before serving.

Less mustard may be used, if desired.

BANANA SALAD

Peel and scrape bananas. Place them on lettuce leaves or surround with a border of shredded lettuce. Cover with Cream Salad or Mayonnaise Dressing and sprinkle chopped peanuts or California walnuts over them. Serve at once.

Banana Salad may be varied by serving it with Cream Salad Dressing to which peanut butter is added, — (½ cupful salad dressing and ¼ cupful peanut butter). Do not use the chopped peanuts with this combination. A mixture of sliced apples and bananas served with the peanut butter dressing makes a pleasing salad.

QUESTIONS

Name the food materials contained in the above recipes which contain vitamines. What kind of vitamines does each contain?

Give two methods of hard-cooking eggs (see *Hard-cooked Eggs*, p. 156).

In Stuffed Eggs what meats could be substituted for chopped chicken or ham?

What material could be substituted for one of the eggs in Cream Salad Dressing?

If yolks of eggs are used in Cream Salad Dressing, how many should be substituted for two whole eggs?

Why should bananas be scraped?

Why should they be served at once after preparing?

LESSON LXXXIII

Classification of the Foodstuffs

Substances that nourish the body may be classified as follows:

$$\text{Energy Givers}\begin{cases}\text{Carbohydrates}^{1} & \begin{cases}(a)\ \text{Starch}\\(b)\ \text{Sugar}\end{cases}\\ \text{Fats}\\ \text{Protein}\end{cases}$$

[1] Carbohydrates also include cellulose. But because cellulose does not yield any appreciable amount of energy, it is not listed with starch and sugar.

- Body Builders
  - Protein
    - Complete Proteins
    - Incomplete Proteins
  - Ash
- Body Regulators
  - Ash
  - Water
  - Vitamines[1]
    - (*a*) Fat-soluble A
    - (*b*) Water-soluble B
    - (*c*) Water-soluble C

Make lists of foods rich in:

(1) Water.

(2) Ash.

(3) Carbohydrates. Subdivide foods rich in carbchydrates, into foods rich in (*a*) sugar, (*b*) starch, (*c*) cellulose (*i.e.* bulky foods).

(4) Fats.

(5) Protein. Indicate those foods that contain *complete* proteins and those that contain *incomplete* proteins.

(6) Vitamines. Subdivide foods rich in vitamines into foods rich in fat-soluble *A*, water-soluble *B*, water-soluble *C*.

Explain why certain foods are contained in two or more lists.

RELATED WORK

LESSON LXXXIV

Selecting Food

Marketing *versus* Telephoning. — Visits to food markets or grocery stores are most essential, especially if one is learning to buy. It is first necessary to find desirable market

[1] So little is known regarding the chemical composition of vitamines that it is difficult to classify them. Since the three food essentials termed as fat-soluble A, water-soluble B, and water-soluble C are individual substances and very different in character, it may be that they will be classified later as three separate foodstuffs. It could then be said that there are eight foodstuffs.

places or stores, — those that are clean and reliable. Screened windows and doors, and adequate bins, boxes, jars, or other receptacles for storing foods are necessary in keeping foods clean. After one has found desirable places for marketing, it is well to become acquainted with desirable brands of staple canned or package goods. After this knowledge is gained such foods may be ordered by telephone, or by messenger with satisfaction.

But no matter how experienced the buyer, it is more satisfactory to select at markets perishable goods such as meat, fish, fruits, and vegetables that wilt readily. In certain cases where the housekeeper has such obligations or so many duties that a personal visit to markets is impossible, food must be purchased by telephone or messenger. Such a procedure, however, is usually followed at the sacrifice of economy and satisfaction in buying.

Fresh *versus* Canned Foods. — Fresh foods of good quality are generally more desirable both from the standpoint of flavor and nutriment than canned goods. When, however, fresh foods are unseasonable, their price may greatly exceed that of canned foods. A good rule to follow is to buy fresh foods when they are in season and the canned ones when fresh foods of reasonable price cannot be secured. The practice of buying perishable foods, especially fruits, when they are abundant and canning them for later use is thrifty.

To buy factory-canned fruits and vegetables when fresh winter fruits, such as cranberries, oranges, and apples, and root vegetables may be purchased is questionable both from the standpoint of economy and nutriment. It is often more economical to purchase dried rather than canned fruits. The former usually contain more food value per pound.

Bulk *versus* Package Goods. — Time spent in placing and sealing foods in packages and the cost of the containers make the price of package foods exceed those sold in bulk.

Moreover, large packages usually cost more proportionately than small ones. On the other hand, package foods may be cleaner, require less handling, and are often much more inviting because of their attractive wrapping. It does not follow, however, that all foods sold in containers are cleaner than those sold in bulk. Unsanitary conditions sometimes prevail at factories where the foods are packed. It is a safe rule to buy in package form only those foods which cannot be washed or sterilized by cooking.

Uncooked *versus* Cooked Foods. — Not only breads, cakes, certain cereals, and canned goods may be purchased ready cooked, but other foods, such as salads and puddings, may be bought in certain markets and stores. Such foods are much higher in price than those of equal quality prepared at home. The cost of labor, fuel, and "overhead expense" as well as of materials must be paid for by the purchaser. Unless one is engaged in business other than housekeeping or one's housekeeping duties are too arduous it is generally not wise to make a practice of buying cooked foods.

Large *versus* Small Quantities. — It is usually wasteful to purchase perishable foods in large quantities. Fresh meats, perishable fruits such as berries, and green vegetables should be purchased only in quantities sufficient for immediate use. It is sometimes economical, as far as fuel and time are concerned, to buy enough fresh meat for two days' consumption, provided all of it can be cooked on the first day, and then used cold or merely reheated on the second day.

Unless storage space is limited, flour should not be purchased in less than 25 pound sacks. In less quantity than this it usually costs more per pound. It is wise for small families, however, to purchase flour and other grains in smaller quantities in the summer time since weevils may infest such food materials.

When a non-perishable food such as sugar, or any of the grains, sells for a fractional sum per pound, it is economical to buy several pounds so as not to add to the cost per pound. It is wiser, for example, to buy 2 pounds of dried beans at $12\frac{1}{2}$ cents per pound than one pound at 13 cents.

Semi-perishable foods such as eggs and fats can usually be purchased with satisfaction in quantities sufficient for a week. They should, of course, be stored in a cool place. Many persons find it economical to buy eggs in large quantities in the summer time and pack them in water glass for winter use.

Root vegetables and canned goods are cheaper when bought by the bushel and case. There must, however, be cool, dry storage space to make the purchase of the former in large quantities practical.

It is impossible to purchase certain foods for small families in small enough quantities for immediate consumption. A can of molasses, for example, is usually more than enough for use at one time. When this is the case, the greatest care should be exercised to store such foods carefully and to utilize them before they spoil.

Coöperative buying usually means a saving. Such foods as flour, potatoes, dried vegetables, sugar, apples, and dried fruits may be purchased by the barrel, box, or other measure. If several families jointly purchase such quantities of foods, the expense is reduced. It is also of advantage to buy from the producer. The middle man's profit is thus eliminated.

LESSON LXXXV

Cooking and Serving a Luncheon or Supper

Cook and serve a luncheon or supper. The following menu is suggested:

Cream of Pea Soup — Croutons
Macaroni and Cheese
Lettuce Salad
Bread and Butter
Oatmeal Cookies Tea

Follow the English or family style of serving (see p. 122). Serve the luncheon or supper without a maid. Calculate the cost of the meal per person (see p. 242).

LESSON LXXXVI

Review: Meal Cooking

MENU

Chopped Steak
Boiled or Steamed Potato
Coleslaw
Tea

See Lesson XIV, p. 68, for suggestions regarding the preparation of the lesson.

LESSON LXXXVII

Home Projects [1]

Suggestions for Home Work. — Prepare salads or other foods containing leafy vegetables at least twice a week.

Calculate the quantity of milk used by each member of your household.

Suggested Aims:

(1) To prepare salads which are both pleasing in appearance and tasty. (Make sure that they are properly seasoned.)

[1] See Lesson IX, p. 51.

(2) To vary either the materials used in salad-making or the method of serving and preparing the same salad materials.

(3) If the vegetable is cooked, to prepare it in such a way that no nutriment is lost.

(4) To compare the quantity of milk used by each member of the family with the quantities suggested at the top of p. 164.

DIVISION EIGHT

FLAVORING MATERIALS: FOOD ADJUNCTS

LESSON LXXXVIII

Food Adjuncts — Dishes Containing Food Adjuncts

Food Adjuncts. — Besides the foodstuffs there are edible substances called *food adjuncts*. These cannot be termed foods, as they do not perform the functions of such, but they give flavor to them and they may excite the secretion of the digestive juices, and thus aid in the digestion of real foods. For the most part, food adjuncts are contained in these classes of materials, — condiments, flavoring extracts, and beverages.

Condiments. — Seasoning materials and spices are called *condiments*. They are used with foods to give the latter a pleasing flavor. But condiments should be eaten in moderation. They are often used to cover up the flavor of inferior or poorly prepared foods and they are often used to excess in sauces. Highly seasoned sauces should be served only with foods that are insipid in taste, but valuable for their nutritive properties. Good foods, well cooked, have a flavor which needs little change. We should train ourselves to enjoy the natural flavor of foods, so that there is no craving for condiments.

Salt may be classed both as a condiment and as a food (see *Ash*, p. 57). When used in moderation, it has undoubted value in diet. It is used in many types of foods, especially meats and vegetables. The flavor of sweet foods such as cakes and sweet sauces is invariably improved by the addition of a small quantity of salt.

Vinegar is an acid flavoring material prepared by fermenting apple or grape juice or other materials. It contains acetic acid.

Cinnamon is a spice obtained from the inner bark of a small tree. Like most spices, it contains a volatile oil, *i.e.* an oil which evaporates. Cinnamon is sometimes adulterated with *cassia*, a spice prepared from the bark of the cassia tree which grows in China and Dutch West Indies. Cassia is similar to cinnamon in flavor.

Cloves are the flower buds of an evergreen tree which grows in Brazil, Ceylon, and West Indies.

Nutmeg is the dried kernel of a fruit which grows on a tree native to the Malay Archipelago.

Ginger is the root of a tropical plant. It contains starch and oil of ginger.

Mustard is prepared from the seed of mustard plants.

Black pepper is obtained from the unripe berry of a tropical vine while *white pepper* is prepared from the ripe berries. The latter is not as pleasing in flavor as black pepper and is more expensive. It is sometimes desired, however, because of its more pleasing appearance.

Cayenne pepper is prepared from the dried ripe fruit of the Capsicum plant.

Paprika is also prepared from the fruit of the Capsicum plant, but the seeds and stems of the fruit are removed. It is a much milder spice than cayenne pepper.

Marjoram, *savory*, and *thyme* are the leaves of herbs used for flavoring.

Flavoring Extracts. — Alcoholic solutions of volatile oils derived from plants are termed flavoring extracts. By dissolving the vanilla bean and lemon and orange peel in alcohol *vanilla*, *lemon*, and *orange* extracts are prepared. Since volatile oils evaporate readily, especially when heated, flavoring extracts should be added, if possible, to cold foods.

Beverages. — The stimulating materials contained in the common beverages, — tea, coffee, cocoa, and chocolate, — are food adjuncts.[1] Except for the value of the water they contain, in carrying on the needs of the body, and for the small quantity of sugar and cream used with them, tea and coffee have no food value. But cocoa and chocolate are rather rich in food value (see *Cocoa and Chocolate*, p. 166). These beverages contain both foodstuffs and food adjuncts.

CURRY OF KIDNEY BEANS

1 pint kidney beans	1 teaspoonful curry powder[2]
2 tablespoonfuls fat	1 teaspoonful salt
1 onion	2 tablespoonfuls flour
1 pint tomatoes	

Wash and soak the beans overnight. Boil gently until tender.

Brown the onion in the fat, then add the curry powder, salt, and flour, and proceed as for Tomato Sauce (see *Tomato Sauce*, p. 112). Add the cooked beans to the mixture and cook all together for a few minutes. Serve hot.

Chili con carni may be prepared by adding 1 pound chopped beef to the ingredients above and substituting chili powder for curry powder. If this change is made, brown the onion in the fat, then add the meat. Stir and cook until the meat loses its red color. Add the cooked beans and seasonings. Mix the flour with a small quantity of cold tomato. Add this and the remainder of the tomatoes to the meat mixture. Stir and cook for a few minutes. Serve hot.

[1] *Caffeine* is the stimulating material in coffee; *theine*, in tea; and *theobromine*, in cocoa and chocolate.

[2] Curry powder is a mixture of various spices including turmeric and coriander-seed powders.

SPICED BAKED APPLES

5 apples	Water
5 tablespoonfuls sugar	1 lemon
Whole cloves	

Wash and core the apples. They may be pared if desired. Stick 2 or 3 whole cloves in each apple. Place the apples in a baking-dish, put 1 tablespoonful of sugar in the cavity of each apple, and a slice of lemon on the top. Add enough water to cover the bottom of the baking-dish. Cover, bake at 400° F. until soft. Serve cold.

If the apples are very sour, more sugar should be used.

SAVORY TOAST

2 cupfuls canned tomatoes	½ onion, sliced
1 cupful water	3 tablespoonfuls flour
2 cloves	½ teaspoonful mustard
3 allspice berries	2 teaspoonfuls salt
3 peppercorns	Dash cayenne
2 sprays parsley	¼ pound cheese
2 tablespoonfuls fat	1 egg
8 slices toast	

In a covered saucepan, cook the tomatoes, water, cloves, allspice berries, peppercorns, and parsley at simmering temperature for at least 15 minutes.

Brown the onion in the fat. Mix the flour, mustard, salt, and cayenne. Add these ingredients to the onion and fat. Mix well and add the cooked tomatoes. Stir and cook until the mixture reaches the boiling point, then strain. Add the cheese, stir and cook until the cheese is blended with the other ingredients.

Beat the egg, add a portion of the hot tomato mixture to it. Mix thoroughly and add it to the remainder of the tomato mixture. Stir and cook on the back of the range or over hot water until the egg is thickened. Pour over toast. Serve at once.

Canned tomato soup may be used instead of canned tomatoes. If this substitution is made, the cloves, allspice berries, peppercorns, and parsley should be omitted. For economy, the egg may be omitted. If no egg is used, the flour may be increased to 4 tablespoonfuls and the fat to 3 tablespoonfuls.

Compare this recipe with that for Tomato Sauce on page 112. In what ways are the ingredients and method of preparation similar? In what ways do they differ?

QUESTIONS

In which ingredients of the Curry of Kidney Beans and Spiced Baked Apples are the food adjuncts found?

Beans contain what ingredients that require long cooking?

What material can be added during cooking that will soften them (see *Cooking Dried Legumes*, p. 234)?

What is the purpose of covering apples during baking? Why should they be baked in a slow oven (see *Suggestions for Cooking Fruits*, p. 65)?

What kind of substance do all spices contain?

Why should spices be used in moderation?

Explain why flavoring extracts should be added, if possible, to cold foods.

Mention at least two forms in which the following spices may be purchased:

Cinnamon, cloves, nutmeg, ginger, mustard, and black pepper.

What materials in the recipe for Savory Toast are used merely for flavoring?

What materials are removed by straining? How is the flavor extracted from these materials before straining?

RELATED WORK

LESSON LXXXIX

Spending for Food

What to Buy. — Dr. Langworthy of the United States Department of Agriculture has listed foods into five groups and has advised that food from each group be used daily. The five groups follow:

"1. Fruits and Vegetables.

2. Milk, Cheese, Eggs, Fish, Meat, Beans, Peas, Peanuts.

3. Cereals — Corn-meal, Oatmeal, Rice, Rye, Wheat, Flour, Bread.

4. Sugar, Sirups, Jelly, Honey, Candies.

5. Fats — Butter, Margarine, Cottonseed Oil, Olive Oil, Drippings, Suet, Bacon, Chocolate."

From studying the previous contents of this textbook the pupil will doubtless recognize in these groups foods to supply all the needs of the body. By following this plan of using some food from each group every day, the needs of the body will be supplied.

How Much to Spend for Food. — Any one no matter how ignorant or thoughtless can get rid of money. But it takes a wise person, one who understands values and quality, to get value received for money spent. Whether one is purchasing food for all the meals of a family or is only selecting a luncheon or one meal, it is desirable to spend money wisely.

The five food groups may serve as a basis for the purchase of foods. It has been suggested that each dollar used in buying foods be divided into 5 parts of 20 cents each.

"Out of every dollar spent use: [1]

20 cents, *more or less*, for vegetables and fruits
20 cents, or *more*, for milk and cheese
20 cents, or *less*, for meat, fish, eggs, etc.
20 cents, or *more*, for bread and cereals
20 cents, or *less*, for sugar, fat, tea, coffee, chocolate, flavoring"

[1] From *United States Thrift Leaflet* # 15.

NOTE. — Compare these groups of food with those given on p. 269. Note that the first division of money should be used for the foods of Group 1; the second and third divisions for the foods of Group 2; the fourth division for the foods of Group 3; and the fifth division for the foods of Groups 4 and 5.

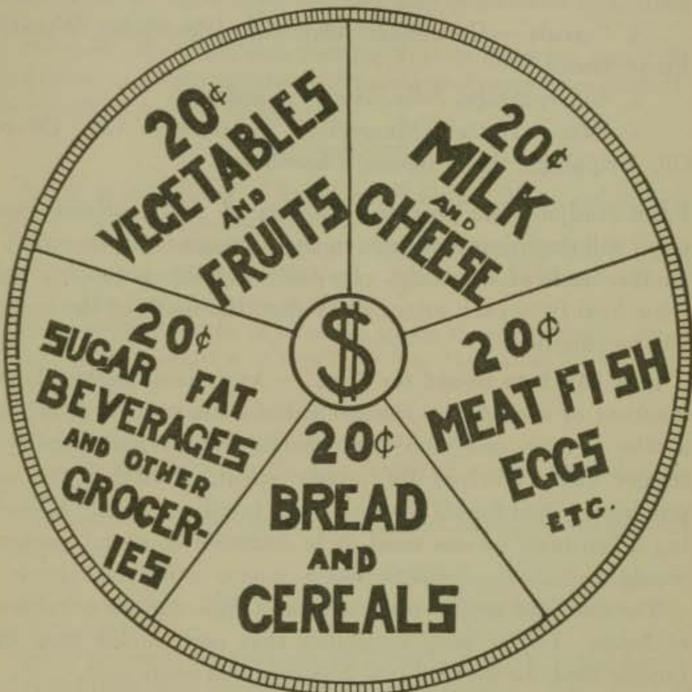


FIGURE 61. — A SUGGESTION FOR THE DIVISION OF EACH DOLLAR SPENT FOR FOOD.

According to Lucy H. Gillett of the Dietetic Bureau of Boston, when strictest economy is necessary, *one fourth* of each dollar spent for food should be used to purchase bread and other grain products. The remainder of the dollar should be spent about equally for the groups of food mentioned above. If 25 instead of 20 cents is spent for cereal products, however, care should be taken to buy sufficient milk to meet the needs of each member of the family (see *Milk, an Invaluable Food,* p. 163). This is especially necessary where there are young children in the family.

Comparing the Cost of Foods. — The pupil should note that the different foods contained in the same groups (see p. 269) differ in cost. One can economize by using the cheaper foods in the group or by using the more expensive only occasionally. If you find that fresh vegetables cost less than fruits, use the latter more sparingly than the former.

Meats are more expensive than dried peas or beans and cheese, especially Cottage Cheese. Cottage Cheese or peas and beans in combination with milk or eggs may take the place of meat. A small quantity of meat may be combined with the dried legumes or cereals and a saving effected.

The third, fourth, and fifth groups contain energy-giving foods (see Divisions IV and V, pp. 70 and 131). Of the three groups of foods, cereals are by far the cheapest source of energy. A generous use of cereals is economical. In buying grains one gets much nutriment at little cost (when compared with other foods). If the food bills must be curtailed, use cereals generously and meat sparingly. Do not eat cereals, however, to the exclusion of the foods of the other groups. It is especially necessary to use milk and leafy vegetables with cereals. The latter are lacking in the fat-soluble A vitamine.

The fats included in Group 5 differ in cost. It is necessary to select these wisely in order to economize. A wise and economical use of fats is discussed on p. 137.

Planning before Buying. — It is not only an obligation but a necessity to waste no food. The bit of cereal left from breakfast, the crust of bread, and the scrap of meat represent money. They must be utilized.

The thrifty housekeeper sees to it that left-over food is properly cared for so that it need not be wasted because of spoilage. She covers food and stores it in a cool place. She uses it before it begins to spoil.

In order to buy wisely it is necessary to take account of the foods already in the house or in the garden. It is necessary to decide before going to market just what is needed to supplement the materials already on hand.

LESSON XC

Cooking and Serving a Luncheon or Supper

Cook and serve a luncheon or supper. The following menu is suggested:

Salmon Timbale with White Sauce
Stuffed Baked Potatoes
Stewed or Scalloped Tomatoes
Bread and Butter
Prune Pudding with Top Milk

Analyze this menu. Is food from each of the groups given on p. 269 contained in it?

Follow the English or family style of serving (see p. 122). Serve the luncheon or supper without a maid. Calculate the cost of the meal per person.

LESSON XCI

Review: Meal Cooking

MENU

Cream of Tomato Soup
Cheese Pudding
Spiced Baked Apples

See Lesson XIV, p. 68, for suggestions regarding the preparation of the lesson.

LESSON XCII

Home Projects[1]

Suggestions for Home Work. — If possible secure lists of foods purchased for use at your home during a week or a month. List each article and price in one of the five groups, viz.,

Vegetables and Fruits	Milk and Cheese	Meat, Fish, Eggs, etc.	Bread and Cereals	Sugar, Fat and Other Groceries

Add up the cost in each column. Compare the sums.

Suggested Aims:

(1) To determine if the money for the various groups of food has been spent according to the plan suggested on p. 269.

(2) If not, to use the food lists actually purchased as a foundation and change them so as to embody the division of the dollar suggested on p. 269.

[1] See Lesson IX, p. 51.

DIVISION NINE

FOOD COMBINATIONS

LESSON XCIII

Vegetables with Salad Dressing (A)

Food Combinations. — From a dietetic standpoint, it is well to combine foods of different compositions. If a food is lacking in one or more of the foodstuffs, it should be combined with a food that supplies the missing nutrient. Bread contains little fat, and butter contains no carbohydrates; hence these two foods make a desirable combination. Vegetable oils, butter, and other fats make desirable additions to vegetables. Macaroni contains little fat, while cheese is rich in this foodstuff. Moreover, macaroni contains a small quantity of incomplete protein, while cheese is rich in complete protein. Hence macaroni and cheese make a good combination. In selecting foods to be used together, careful attention should be given to their composition.

Emulsion of Oil; Salad Dressing. — As has been stated (see *Breaking Up of Fats*, p. 139), to emulsify fat it is necessary to separate it into tiny globules, and to coat each globule with some materials, so that the droplets will remain separate. Various materials serve to emulsify fats. During digestion, fat is emulsified by means of *a soap* (see Experiment 36, p. 139). Egg is another material which emulsifies fats. This fact is made use of in making Mayonnaise Dressing from vegetable oil and eggs. If one understands

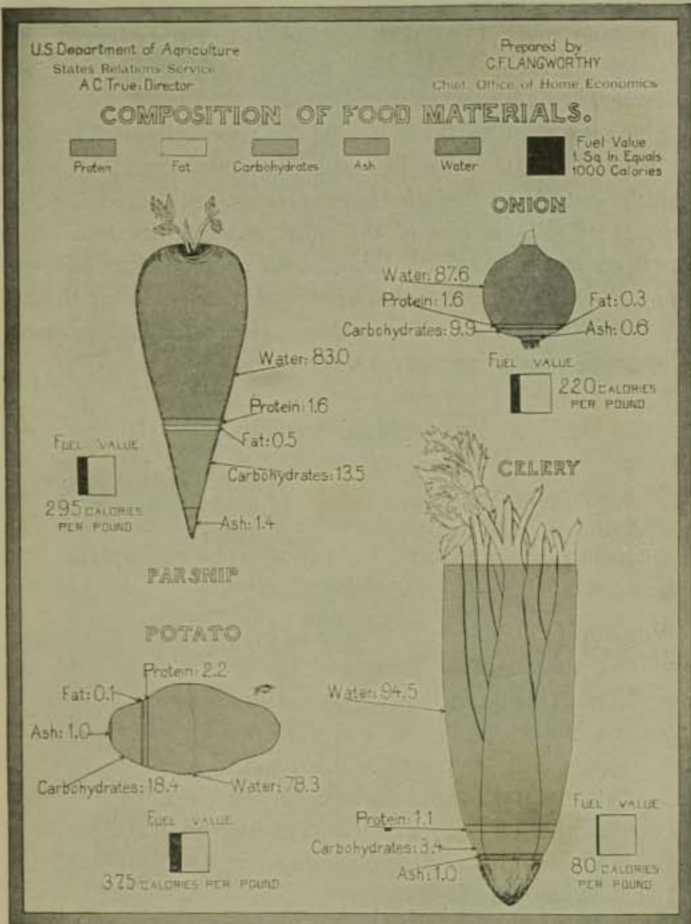


FIGURE 62.—THE COMPOSITION OF ROOTS AND SUCCULENT VEGETABLES. (Revised edition)

that the oil must be divided into globules, and that each globule must be coated with egg, the preparation of salad dressing becomes interesting and successful. It is evident that the fat should be added to the egg slowly and should be beaten while being added. If the oil and other ingredients are cold, a thicker dressing results. Quick mayonnaise, however, is an exception to this rule.

Since emulsion of fat is one of the processes of digestion, it would seem that fat in emulsified form would be most readily digested. This is true of some emulsified fats, — the fat of milk is one of the most readily digested. But when an emulsified fat is mixed with protein as in Mayonnaise Dressing, the digestion of the mixture is slower than if either of the foodstuffs were alone. Hence to some persons, Mayonnaise Dressing proves distressing.

MAYONNAISE DRESSING

1 egg yolk	$\frac{3}{4}$ teaspoonful salt
1 tablespoonful vinegar	$\frac{1}{2}$ teaspoonful sugar
1 tablespoonful lemon juice	Cayenne
$\frac{1}{4}$ teaspoonful mustard	1 cupful vegetable oil

2 tablespoonfuls boiling water

Put the egg yolk into a mixing bowl, add hot vinegar, and mix thoroughly. Then add the lemon juice and dry ingredients. Let the mixture stand until cool. Then beat it with a Dover egg beater and while beating add the oil in small quantities, — about $\frac{1}{2}$ tablespoonful at a time. Continue beating and adding the oil. When the mixture begins to thicken, the oil can be added in greater quantities. After all the oil is added, add the boiling water. Beat until the latter is thoroughly blended.

It has been found that the oil may be added more rapidly if the egg is acidified before mixing it with the oil.[1] The

[1] This is due to the fact that the acid reacts with the albumin of the egg to form a kind of salt which hydrates and takes up water from the mixture. The more water that can be taken out of an emulsion in the form of hydrates, the more easily will an emulsion be formed.

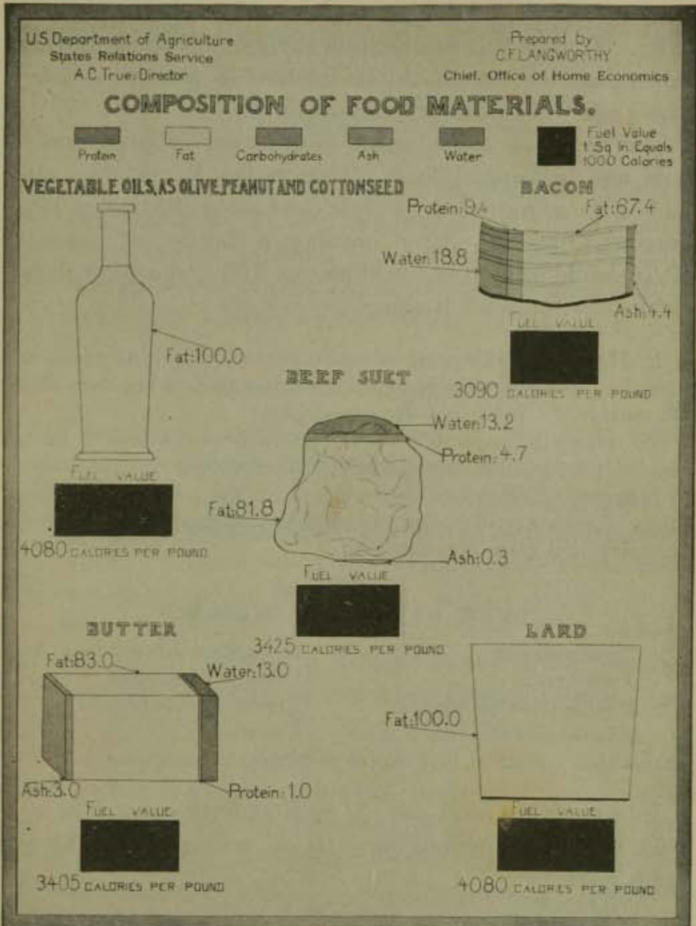


FIGURE 63. — THE COMPOSITION OF BUTTER AND OTHFR FAT-YIELDING FOODS. (Revised edition)

addition of boiling water to the mixture after the egg and oil have been blended, prevents the oil from separating from the other ingredients.

If desired, the *whole egg* may be used in place of the egg yolks. In case this substitution is made, all the ingredients other than the egg should be doubled in quantity, since 1 whole egg will emulsify 2 cupfuls of oil.

The flavor of refined corn, cottonseed, or peanut oil is mild and pleasing. These oils have less flavor than olive oil but are as nutritious. Their use lessens the cost of Mayonnaise Dressing. After opening a bottle of vegetable oil, it should be kept in a cold place. If it is rancid, it should not be used in salad dressing.

If Mayonnaise Dressing is made successfully, it is thick and smooth. If the dressing is thin and curdled, the oil has been added too quickly, *i.e.* it has not been emulsified.

To remedy Mayonnaise that has curdled, beat the yolk of an egg slightly, then add the dressing to it gradually, beating constantly.

Mayonnaise Dressing may be varied by the addition of chili or celery sauce (see p. 501), chopped hard-cooked eggs, chopped parsley, pimentos, and green peppers.

QUICK MAYONNAISE DRESSING[1]

2 egg yolks *or*	$1\frac{1}{4}$ teaspoonfuls salt
1 whole egg	1 teaspoonful sugar
2 tablespoonfuls vinegar	$\frac{1}{2}$ teaspoonful mustard
2 tablespoonfuls lemon juice	Cayenne

1 cupful vegetable oil

Into a mixing bowl put the eggs and vinegar. Mix well. Add the other ingredients. (It is not necessary to stir them.)

[1] Adding the entire quantity of oil at one time and mixing it with hot paste may seem an unusual procedure for making an oil dressing. The fact that the method is successful may be explained as follows: Mixing the acid with the egg forms a salt which hydrates the mixture, and thus aids in making favorable conditions for emulsifying the oil as explained in the footnote of a previous page. The starch paste also takes up water from the mixture. This makes it possible to emulsify the oil easily, and also to make a stable emulsion.

Prepare a thick paste as follows:

In the top part of a double boiler put

$\frac{1}{3}$ cupful flour	1 cupful cold water
1 tablespoonful butter	

Mix thoroughly. Then stir and cook over boiling water at least 10 minutes. At once (while it is hot) turn this paste into the egg and oil mixture. Beat all the ingredients with a Dover egg beater until a thick, uniform dressing results. (Adapted from a recipe by Mrs. Hill.)

SEASONABLE VEGETABLE SALADS

Use seasonable vegetables in salads. Cucumbers, tomatoes, celery, and cooked cauliflower may be used in the fall. Cooked beets, cabbage, carrots, and olives may be used in the winter, and head lettuce, radishes, and cooked asparagus in the spring. Vegetables should be chilled, cut into desirable shapes, and served on lettuce with salad dressing. Beets are greatly improved by cutting into pieces, after cooking, and soaking for one hour in vinegar to which salt has been added. They may also be soaked in French Dressing (see p. 254).

A combination of vegetables and fruits makes a pleasing salad. Cucumbers and pineapple, celery and apples, olives and cooked cranberries are successful salad mixtures. The use of cheese, nuts, and peanuts with vegetables and fruits adds to the flavor and food value of salads. Uncooked carrots, cabbage, and peanuts dressed with French Dressing make a tasty salad (see p. 255).

Canned vegetables, "left over" cold vegetables, meat, and fish have a better flavor in salads if they are mixed with French Dressing and allowed to stand in a cold place for one hour before serving. This process is called *marinating*.

If several meats or vegetables are used in the same salad, they should be marinated separately. Just before serving, Cream Salad Dressing or Mayonnaise Dressing (see p. 256) may be added to marinated salad materials.

A salad consisting of lettuce or other uncooked leafy vegetables should not be dressed until it is ready to be served. The acid in salad dressing wilts the leaves.

QUESTIONS

Explain why it is necessary to add the oil to the egg mixture in small quantities.

Explain why it is that a curdled dressing can be remedied by adding it gradually to an egg.

What is the price per quart of olive oil? Of peanut oil? Of cottonseed oil? Of corn oil?

Find the difference in cost between a Mayonnaise Dressing made with corn, cottonseed, or peanut oil and one made with olive oil.

From the standpoint of composition, explain why fresh vegetables and Mayonnaise Dressing make a suitable combination (see Figures 62 and 63, pp. 275 and 277).

How much Mayonnaise Dressing is generally used for one serving? How many will the above recipe serve?

Make a list of combinations of materials which make tasty salads.

LESSON XCIV

Vegetables with Salad Dressing (B)

Salad Garnishing. — Successful garnishing of a salad requires a sense of good color combination, judgment in blending flavors, and ingenuity in arranging materials. Usually it is well to use only edible materials for garnishing. Certain flowers and greens may be used to advantage, however, in garnishing the salad for an occasional dinner or luncheon. Celery with "fringed ends," stuffed olives cut in slices, lettuce shredded or whole, pimentos, parsley, hard-cooked eggs sliced or pressed through strainer, and vegetables of pronounced color (as beets or carrots) cut into slices, cubes, or fancy shapes, — all these make pleasing garnishes.

PERFECTION SALAD

2 tablespoonfuls granulated gelatine	½ cupful sugar
½ cupful cold water	1 teaspoonful salt
½ cupful vinegar	1½ cupfuls sliced celery
1 lemon, — juice	1½ cupfuls shredded cabbage
2 cupfuls boiling water	3 pimentos chopped

Prepare all ingredients, except the vegetables, as for a gelatine mixture (see *Lemon Jelly*, p. 223). When the mixture begins to set, stir in the vegetables, and pour into a mold. Serve on lettuce leaves with Mayonnaise Dressing.

Other vegetable mixtures such as cucumbers and tomatoes or peas and celery molded in jelly make tasty salads.

QUESTIONS

Mention at least four different kinds of salads, with a suitable garnish for each.

What should be the condition of all green vegetables used in salads?

How should lettuce be kept and prepared for salads?

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of tomatoes, cucumbers, spinach, cabbage, lettuce, celery, and onions.

Which contains the most water? Which contains the most ash?

Aside from the fact that sugar improves the flavor of Perfection Salad, why is it a valuable ingredient of the salad mixture (see Figure 94, p. 524)?

Explain why Mayonnaise Dressing with wafers or rolls would make a valuable food addition to Perfection Salad.

LESSON XCV

Fish Salad and Salad Rolls

SALMON OR TUNNY SALAD

1 can salmon or tunny (or tuna) fish	1 cupful shredded cabbage or sliced celery

Drain the oil from the fish; remove the bone and bits of skin. Add the cabbage or celery, and Mayonnaise or Cream Salad Dressing (see p. 256). Arrange on lettuce and garnish as desired.

If Cream Dressing is used with salmon, the oil drained from the salmon may be used for the fat of Cream Dressing.

The salmon may be marinated before adding the other ingredients. When this is done, the salad dressing may be omitted. Salmon contains so much fat that it is not well to add more oil after marinating.

SALAD ROLLS

2 cupfuls flour	4 tablespoonfuls vegetable oil or melted butter or substitute
3½ teaspoonfuls baking powder	½ cupful milk
½ teaspoonful salt	1 egg

Sift some flour, then measure 2 cupfuls of it. Add the baking powder and salt to the flour. Beat the egg, add the milk and oil or melted fat to it. Through a sifter add the dry ingredients to the milk mixture. Thoroughly mix the ingredients by cutting them with a knife. Roll out on a floured board, cut into oblong pieces, and with a floured knife make a deep crease through the center of each roll. Brush the top with diluted egg (use 2 tablespoonfuls of water to 1 egg) and sprinkle granulated sugar over it. Bake in a very hot oven (475° F.) 10 to 12 minutes.

QUESTIONS

Why is the top of the salad roll mixture brushed with egg? Why should the egg be diluted for such purposes?

What reason is there for combining fish, salad dressing, and rolls?

How much fat and protein does canned salmon and tunny contain (see *U. S. Department of Agriculture*, Bulletin No. 28)?

Compare this with the quantity of fat and protein in beef steak (see Figure 68, p. 295).

LESSON XCVI

Cream of Tomato Soup and Cheese Straws

Combining Milk with Acid. — In the preparation of Cream of Tomato Soup, it is necessary to combine milk with tomatoes, — a food containing acid. If the following experiments are performed, and applications drawn from the results of the experiments, it should be possible to make this soup successfully.

Experiment 61: Effect of Acid on Milk. — Put a small quantity of milk in a test tube, heat it slightly, and add a few drops of some acid substance, — tomato juice, lemon juice, or vinegar. What is the result?

Experiment 62: Neutralization of Acid by Means of Soda. — Put a small quantity of any of the acids mentioned above in a test tube and add ¼ teaspoonful baking soda. What happens? Now add a little milk to the mixture. Does the milk curdle? How has the acid been changed so that it does not curdle the milk? What conclusions may be drawn from this as to the use of soda in cooking tomato and milk mixtures?

CREAM OF TOMATO SOUP

1 can tomatoes	⅓ cupful flour
¼ teaspoonful baking soda	¼ cupful butter or substitute
1 quart milk	1 tablespoonful salt

⅛ teaspoonful pepper

Turn the tomatoes into a saucepan, cover them; cook at simmering temperature for about fifteen minutes. Press

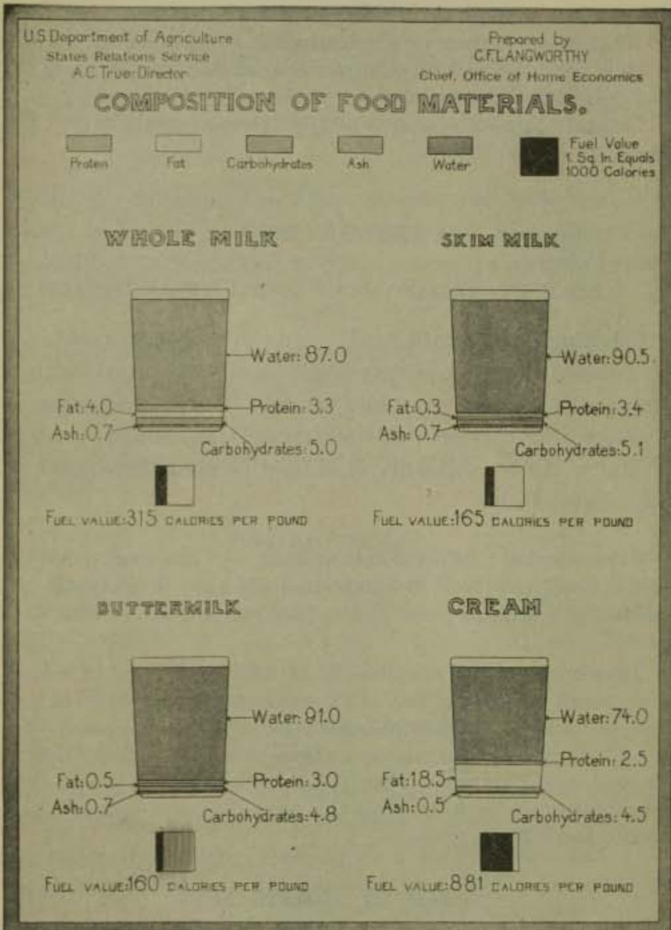


FIGURE 64.—THE COMPOSITION OF MILK AND MILK PRODUCTS.

through a strainer and add the baking soda. Make a White Sauce of the milk, flour, and fat; *remove from the fire*. Add the *hot* tomatoes slowly to the White Sauce, stirring constantly. Add the seasonings. *Do not heat the mixture after combining the tomatoes and White Sauce. Serve at once.*

Cream of Tomato Soup may also be prepared by making a sauce of the tomatoes, flour, and fat, adding the baking soda and pouring the sauce into the hot milk and finally adding the seasonings.

Note that in either method of preparation, the tomato is added to the milk and the salt is added just before serving. Only enough baking soda is used to affect a portion of the acid of the tomatoes so that the pleasing acid flavor of the tomatoes still predominates.

CHEESE STRAWS

$\frac{2}{3}$ cupful flour	1 cupful soft bread crumbs
$\frac{1}{4}$ teaspoonful salt	1 cupful grated cheese
Cayenne	2 tablespoonfuls milk

Mix the ingredients in the order given in the recipe. (The milk should merely moisten the ingredients so they will stick together. It may be necessary to increase the quantity.) On a slightly floured board roll the mixture to $\frac{1}{4}$ inch thickness. Cut in strips $\frac{1}{4}$ inch wide and 4 to 6 inches long. Place on an oiled pan. Bake until brown in a moderate oven (375° F., for 20 to 25 minutes).

QUESTIONS

Why should tomatoes be covered when cooked for soup?

Why should they be cooked at simmering rather than boiling temperature?

From the results of your experiments (see Experiments 61 and 62) explain why soda is added to the tomatoes in Cream of Tomato Soup.

What is the purpose of adding the strained tomatoes or Tomato Sauce *slowly* to the White Sauce or milk?

Why should the soup be served *at once* after combining the tomato and milk mixture?

If enough Cream of Tomato Soup were prepared for two meals, how and when should the tomatoes and White Sauce be mixed?

What is the price per can of tomatoes?

How many cupfuls in one can of tomatoes?

With the aid of *United States Department of Agriculture*, Bulletin No. 28 and illustrations in this text, tabulate the composition of tomatoes, whole milk (see Figure 64), cheese (see Figure 75, p. 311), flour, and bread (see Figure 77, p. 314). Explain why Cream of Tomato Soup and Cheese Straws make a desirable combination from the standpoint of composition and use in the body.

LESSON XCVII

Veal and Potatoes

Muscle of Young Animals. — The muscle of an undeveloped animal contains more water than does the muscle of a mature animal. It is also lacking in flavor and usually

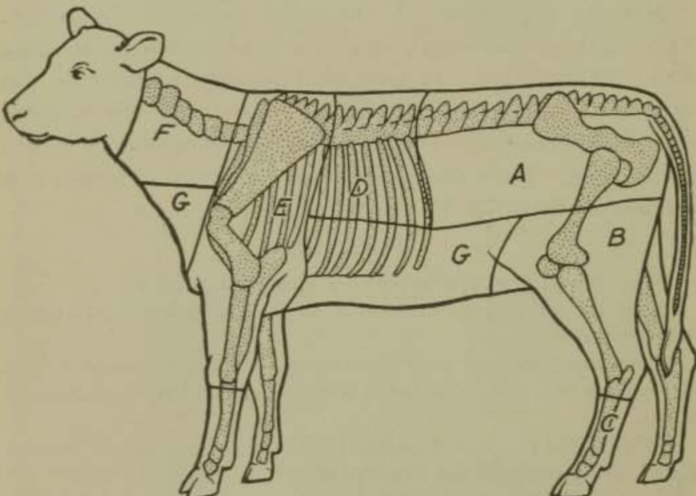


Figure 65. — Cuts of Veal.

contains little fat. The meat does not keep so well as that of a mature animal; therefore it should be used at once and not allowed to hang.

Cuts of Veal (see Figure 65).

Name of Cut	Form of Cut	Method of Cooking
A. Loin.	Chops. Thick Pieces.	Sautéing. Roasting.
B. Leg.	Steaks — veal cutlets or veal steak. Thick Pieces.	Sautéing. Stewing. Roasting.
C. Knuckle.	Whole.	Stewing. Soup-making.
D. Rib or Rack.	Chops. Thick Pieces.	Sautéing. Roasting.
E. Shoulder.	Thick Pieces. Whole.	Stuffing and Roasting. Braising.
F. Neck.	Thick Pieces.	Stewing.
G. G. Breast.	Thick Pieces. Whole.	Roasting. Stewing.
Sweetbreads (thymus glands) — "Throat" and "Heart" Sweetbreads.	Whole — in pairs.	Parboiling and Sautéing, Broiling, etc.

Veal. — Veal is the muscle of the calf or young cow. It has the characteristic qualities of undeveloped muscle. Because it is lacking in flavor, it should be seasoned with herbs and spices, or served with a sauce of pronounced flavor. It is also improved by adding some fat, or some meat containing considerable fat such as pork. A calf is usually killed when it is six or eight weeks old. The season for veal is spring; it can usually be purchased, however, throughout the year. The muscle of the veal should be pink in color, and the fat, white. The meat of a calf less than six weeks old is lacking in color.

The connective tissue in veal is abundant, but it is easily changed to gelatine by cooking. Veal is generally considered difficult of digestion.

VEAL CUTLETS (STEAK)

Clean the meat; then remove the bone and tough membranes. Cut the meat into pieces for serving. Cover the bone and the tough pieces of meat with cold water and cook at a low temperature. (This stock is to be used in the sauce.) Small pieces of meat may be put together by using wooden toothpicks for skewers. Season the veal with salt and pepper. Roll in dried bread crumbs, dip in beaten egg, then in crumbs again. Put 2 tablespoonfuls of drippings or other fat in a frying pan. Brown the cutlets in the fat. Remove the veal; in the frying pan prepare the following:

SAUCE FOR CUTLETS

3 tablespoonfuls drippings	$\frac{1}{8}$ teaspoonful pepper
$\frac{1}{4}$ cupful flour	2 cupfuls stock or water
$\frac{1}{2}$ tablespoonful salt	2 tablespoonfuls chopped parsley

1 teaspoonful Worcestershire sauce

Make a brown sauce, using all ingredients except the Worcestershire sauce (see *Brown Sauce*, p. 207). Add the cutlets to the sauce, and cook them at simmering temperature for 1 hour or until tender. Just before serving, add the Worcestershire sauce.

Beef may be prepared in the same way.

VEAL WITH EGG DRESSING

1 pound veal steak, sliced thin	¾ cupful flour
2 eggs	Salt and pepper

Cut the meat into pieces of suitable size for serving. Brown each piece in fat. (Use scraps of fat cut from the meat.)

Mix the egg, flour, and seasoning. Spread both sides of each piece of meat with the egg mixture. Again brown the pieces of meat in fat. Then add boiling water and let the meat cook at *simmering temperature* for at least 2 hours. Serve hot.

Beef may be substituted for veal.

POTATO PUFF

2 cupfuls mashed potatoes	1 teaspoonful salt
2 tablespoonfuls milk	Pepper
1 tablespoonful butter or substitute	1 egg

Mix all the ingredients except the egg. Separate the egg, and beat the white and the yolk. Beat the yolk into the potato mixture; then add the white by cutting and folding-in. Turn into a buttered baking-dish or drop by spoonfuls on a buttered baking-sheet. Bake until brown (450° F. for 15 minutes). Serve at once.

The egg may also be added unbeaten to the potatoes, and the entire mixture beaten vigorously.

QUESTIONS

Why is cold water, rather than hot, used for making meat stock?

How does veal stock compare in color with beef stock? What is the stock called that is made from veal?

Why is this meat cooked at simmering rather than at boiling temperature?

Why is it desirable to use parsley and Worcestershire sauce with veal? Is it desirable to use Worcestershire sauce with beef or mutton? Explain your answer. Why is Worcestershire sauce not cooked with the brown sauce?

Locate veal cutlets or veal steak (see Figure 65). To what cut of beef does it correspond?

What cut of veal corresponds to the tenderloin cuts of beef?

How does the cutting and the using of the rib section of veal differ from that of beef?

What are the prices per pound of each cut of veal? Arrange in tabulated form and record the date.

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of veal cutlets or veal steak. Compare with the percentage composition of beef steak (see Figure 68, p. 295).

Potato Puff may be prepared from either hot or cold mashed potatoes. Should the temperature of the oven be the same for each? Explain your answer.

What is the purpose of the egg in the potato mixture?

Which would give the better result when added to the potato mixture, beaten egg or unbeaten egg? Give the reason for your answer.

How many persons will the Potato Puff recipe serve?

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of fresh potatoes (see Figure 62, p. 275) and boiled potatoes. How much nutriment is lost by boiling one pound of potatoes? By what method can potatoes be cooked in order to retain the most nutriment?

Give reasons for combining veal and potatoes.

LESSON XCVIII

Mutton and Lamb Dishes

Mutton. — Mutton is the meat obtained from the sheep. The animal is usually about three years of age when killed. Like beef, mutton needs to hang a few days before using. It is considered as nutritious and as easily digested as beef. Its strong flavor may be destroyed by removing the " pink skin " and much of the fat. The latter has such a strong flavor, that it cannot be used for cooking unless it is tried out with onion, apple, and dried herbs. Mutton fat so prepared is sometimes termed *savory fat*. It is thought that the fat dissolves certain flavoring materials present in the fruit, vegetable, and herbs. The caramelized carbohydrate formed by browning the apple and onion also adds to the flavor.[1]

Mutton fat is useful for soap-making (see p. 143).

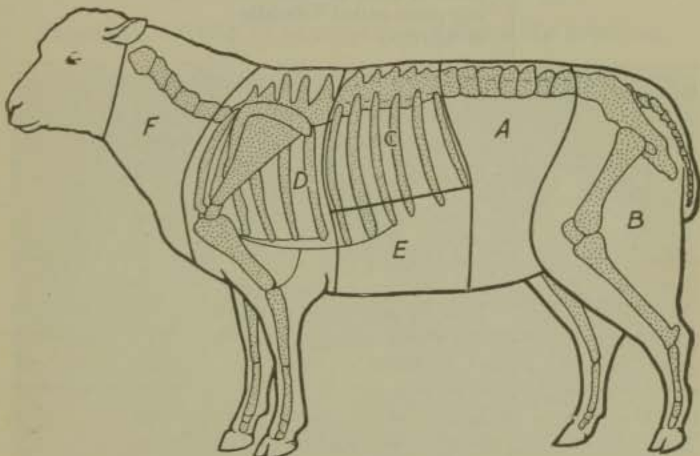


FIGURE 66. — CUTS OF LAMB OR MUTTON.

Lamb. — Lamb is meat obtained from the young sheep, killed when from six weeks to one year old. As the animal matures, the blood recedes from its joints; hence the joints of lamb are pink in color, while those of mutton are white.

Lamb has the characteristics of the meat of immature animals. It contains more water and a little less fat than mutton, and should not be allowed to hang. It is more delicate in flavor than is mutton. Lamb should be well cooked; mutton is sometimes served rare.

[1] See *Department of Agriculture, Farmers' Bulletin*, No. 526.

CUTS OF LAMB AND MUTTON (see Figure 66).

NAME OF CUT	FORM OF CUT	METHOD OF COOKING
A. Loin.	Chops — Loin chops (see Figure 67, p. 293). Thick Pieces (loin sections of both hind quarters in one piece called "Saddle of Mutton").	Broiling. Roasting.
B. Leg.	Slices. Thick Pieces.	Broiling. Roasting. Stewing.
C. Rib.	Chops—rib chops (see Figure 67) (when trimmed called "French" chops, see Figure 67). Thick Pieces (rib sections of both fore quarters in one piece called "Rack of Mutton").	Broiling. Roasting.
D. Shoulder.	Chops — blade shoulder chops (see Figure 67) and round shoulder chops (see Figure 67). Thick Pieces. Whole.	Broiling. Braising. Roasting. Stuffing and Roasting.
E. Breast.	Thick Pieces.	Stewing. Broth-making.
F. Neck.	Thick Pieces.	Stewing. Broth-making.

STUFFED SHOULDER OF LAMB

4 to 5 pounds shoulder of lamb, boned, cleaned, and stuffed with the mixture used in Stuffed Meat Roast (see p. 205). (Double the quantity of ingredients for the shoulder of

lamb.) Add the stuffing to the meat; then "lace" (see *Baked Fish*, p. 230) or skewer into shape. Season, and dredge with flour. Place the meat in a roasting pan (provided with a rack), put bits of drippings or other fat on top of the meat and sear in a hot oven (500° F. for 20 minutes). Then add boiling water; cover; and finish baking in a slow oven (300° F.), allowing *25 minutes to the pound.*

Shoulder of veal may be prepared and stuffed in the same way.

Courtesy of *Bureau of Publications*, Teachers College.

FIGURE 67. — LAMB CHOPS.

Upper row: Rib chops, — French Loin chops
Lower row: Rib chops Blade shoulder chop Round bone shoulder chop.

MINT SAUCE

1 cupful fresh mint ½ cupful vinegar
¼ cupful sugar

Chop the leaves and the tender tips of the mint. Dissolve the sugar in the vinegar, and add the mint. Let the sauce stand one hour before using. Heat over hot water before serving.

LAMB OR MUTTON IN THE CASSEROLE

2 pounds neck, breast, or shoulder of lamb or mutton	4 carrots
Flour	2 cupfuls peas
Fat for browning	2 teaspoonfuls salt
2 cupfuls water or stock	Pepper
3 allspice berries	½ bay leaf

Cut the meat into pieces suitable for serving. Roll in flour, and brown in a frying pan with hot fat. Remove to the casserole, and cover with boiling water or stock. Wash, scrape, and cut the carrots into halves. Add them and the spices to the meat in the casserole. Cover, and cook on the surface burner at simmering temperature, or in the oven at 300° F. for 2 hours. Then add the peas and the seasoning. Cook until tender. Serve hot from the casserole.

One half cupful of cooked rice may be used instead of the carrots and peas. Tomatoes also make a pleasing addition.

The Casserole. — The casserole is a popular utensil for cooking and serving. It is suitable for foods that need to be cooked at a low temperature for a long period of time; hence its adaptability to tough cuts of meat. Because the casserole is tightly covered, foods may be cooked in it with little loss by evaporation. The flavor is retained also, if the cooking is carefully done. The use of the casserole in serving is a distinct advantage, since the foods may be served hot. The casserole may be used in the oven or on top of the range.

If a covered crock is used in place of the regulation casserole, a dinner napkin should be folded neatly around it for serving.

QUESTIONS

Tell how lamb can be distinguished from mutton. Give two reasons for adding dried herbs to the stuffing for lamb.

Give two reasons for serving Mint Sauce with lamb. What is the purpose of first browning the lamb that is to be roasted?

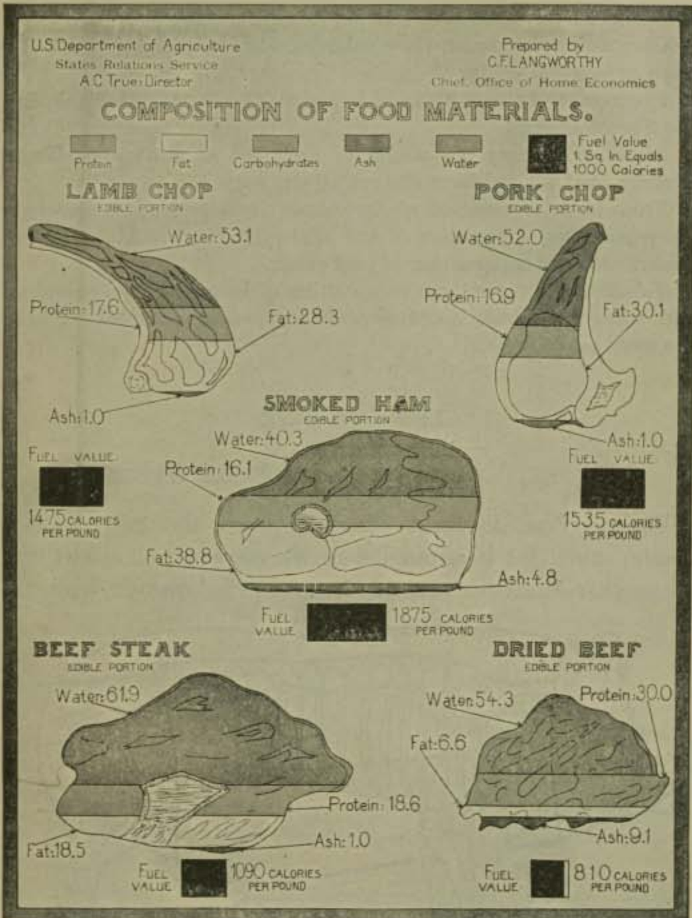


FIGURE 68.—THE COMPOSITION OF FRESH AND CURED MEATS.
(Revised edition)

What is the easiest method of adding extra flour to the sauce around lamb or mutton in the casserole (see *Thickening the Sauce of Meat Cooked in Water*, p. 216)?

How many persons will this recipe serve?

Name the advantages of cooking meat in a casserole.

Give a dietetic reason for combining carrots, peas, or rice, with lamb or mutton.

Distinguish between rib and loin chops of lamb or mutton. What is a French chop?

Obtain the prices per pound of each cut of mutton or lamb. Arrange in tabulated form and record the date.

From *U. S. Department of Agriculture Bulletin No. 28*, tabulate the percentage composition of the hind quarter of mutton. Compare it with the composition of beef steak.

Tabulate the percentage composition of beets, carrots, parsnips, and turnips. Which contains the most carbohydrates? Which the most ash?

LESSON XCIX

Pork, Vegetables, and Apple Sauce

Pork. — Pork is meat obtained from the pig. In all meats, much fat is entangled in the network of connective tissue that binds the muscle fibers. Pork, however, contains

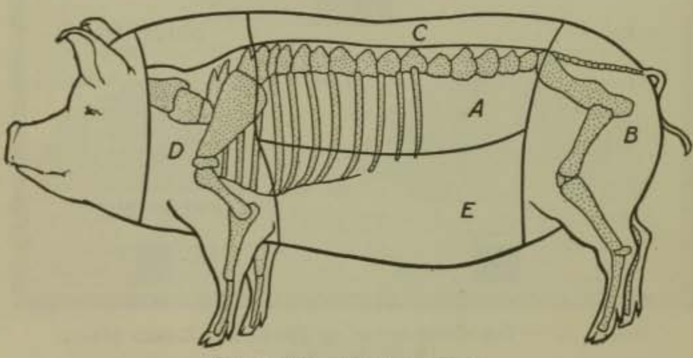


Figure 69. — Cuts of Pork.

more fat than does any other meat. The fat is most intimately mingled with the lean. For this reason it is digested slowly. Fresh pork should be used sparingly. Its use should be confined to the winter months. Pork should be thoroughly cooked. It sometimes contains organisms which may produce serious results, if not destroyed in the cooking. Pork is made more wholesome by curing, salting, and smoking. The fat of bacon is readily digested.

Cuts of Pork (see Figure 69).

Name of Cut	Form of Cut	Method of Cooking
A. Loin.	Chops — rib and loin chops (freed from fat called "spare ribs") — cut into chops or thick pieces.	Sautéing. Roasting.
B. Ham (usually smoked).	Slices. Whole.	Sautéing. "Boiling." Roasting.
C. Back (all fat).	Strips. Slices.	"Tried out" (its fat used for sautéing, frying, and flavoring). Larding.
D. Shoulder (smoked or fresh).	Slices. Whole.	Sautéing. "Boiling." Roasting.
E. Bacon (smoked) or Salt Pork.	Thin or thick slices.	Sautéing. Broiling.

PORK CHOPS WITH SWEET POTATOES

Pare sweet potatoes, and place them in the bottom of a roasting pan. Wipe the pork chops, and place them on top of the potatoes. Place the roasting pan in a hot oven (500° F.), in order to brown the chops. Brown on one cellulose — fibres

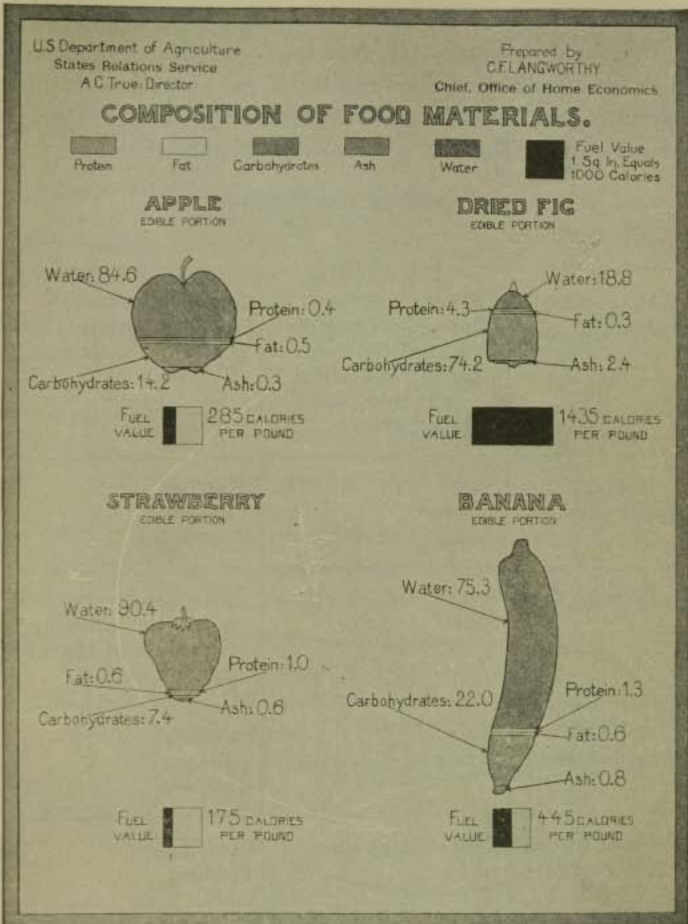


FIGURE 70. — THE COMPOSITION OF FRESH AND DRIED FRUITS.
(Revised edition)

side; turn the chops with a fork, and brown on the other side. Then remove the roasting pan from the oven, sprinkle the chops with salt, pepper, and powdered sage. Add a little boiling water. Return to the oven.

Cover and bake at reduced temperature (300° F.) for 1 hour, or until the potatoes are tender.

Remove the chops to the center of a hot platter, and surround them with the potatoes. Serve at once with Apple Sauce (for preparation of Apple Sauce, see *Fruit Sauces*, p. 66).

TURNIPS WITH FRESH PORK

$1\frac{1}{2}$ pounds fresh pork (shoulder)	1 tablespoonful salt
3 medium sized turnips	2 tablespoonfuls flour

Pepper

Clean the meat, put it in a saucepan, and add enough boiling water to cover. Cook at simmering temperature for $1\frac{1}{2}$ hours.

Pare the turnips, cut them into cubes. When the meat has cooked $\frac{1}{2}$ hour, add the turnips and salt and continue cooking for 1 hour or until the meat and vegetables are tender. Mix the flour with enough cold water (about 2 tablespoonfuls) to make a thin batter. Add it to the meat and turnips. Stir and cook for at least 10 minutes. Add a dash of pepper. Serve hot.

BROILED HAM

Parboil in boiling water for 10 minutes a slice of ham about $\frac{1}{2}$ inch thick. Place in a broiler and broil, or place in a "frying" pan and pan-broil, turning often. Garnish with parsley and serve at once.

BACON

Place thin slices of bacon (from which the rind has been removed) in a hot frying-pan. As the fat tries out, drain it from the bacon. Scorching of the fat is thus prevented. Cook the bacon until it is brown and crisp, turning once.

Bacon fat should be saved. It can be used in cooking.

SCALLOPED POTATOES WITH BACON

4 medium potatoes	Salt, used sparingly
$\frac{1}{4}$ pound sliced bacon	Pepper
Flour	Milk

Pare the potatoes and cut them into thin slices. Cook the bacon until brown; cut each slice of bacon into several pieces. Oil a baking-dish and place a layer of potatoes in it, then a layer of bacon and some of the tried-out bacon fat. Sprinkle with flour, salt, and pepper. Repeat, until all the ingredients are used; the top layer should be of bacon. Add milk until it reaches the top layer. Bake in a moderate oven for one hour, or until much of the milk has evaporated and the potatoes are tender. Serve hot.

$\frac{1}{4}$ cupful of bacon drippings may be used instead of sliced bacon.

QUESTIONS

Why should fresh pork be used in winter rather than in summer?

Why is pork slow in digesting?

Explain why vegetables and Apple Sauce are desirable foods to serve with pork (see Figure 62, p. 275, Figure 68, p. 295, and Figure 70).

For what reason should pork be cooked thoroughly?

What is the purpose of parboiling ham before broiling it?

What ingredient, invariably used in Scalloped Potatoes, is omitted in Scalloped Potatoes with Bacon? What is substituted for this material?

Why should salt be added sparingly to potatoes cooked with bacon?

How many persons does the given quantity of Scalloped Potatoes with Bacon and of Turnips with Fresh Pork serve?

To what cut of beef does ham correspond?

From *U. S. Department of Agriculture Bulletin No. 28*, tabulate the percentage composition of fresh and salted ham. Compare it with the composition of beef steak (see Figure 68).

Obtain the price per pound of each cut of pork. Arrange in tabulated form and record date.

LESSON C

Chicken and Rice

Poultry. — Poultry includes chicken (or common fowl), turkey, duck, and goose — domestic birds suitable for food. Pigeon and squab are not considered poultry. Chickens that are three or four months old are called *spring chickens*

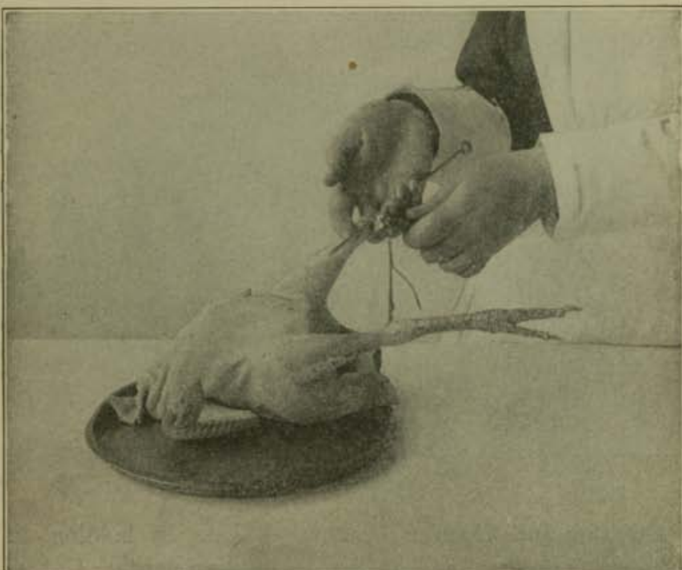


Figure 71. — Removing Tendons from the Leg of a Foul.

or broilers. Birds older than one year are sometimes called *fowls*.

Selection of Chicken and Fowl. — Chickens and fowls have certain characteristics which make them readily distinguishable. Chickens have soft feet, a soft and flexible breast bone, many pin feathers, and little fat. Fowls have hard and scaly feet, rigid breast bone, long hairs, and much fat surrounding the intestines.

Digestion of Poultry. — The muscle of chicken, fowl, and turkey contains little fat; the fat that exists is in layers directly under the skin and around the intestines. The fibers of the muscle are short. For this reason, and also because they have so little fat, these meats are readily digested. The white meat contains less fat than the dark.

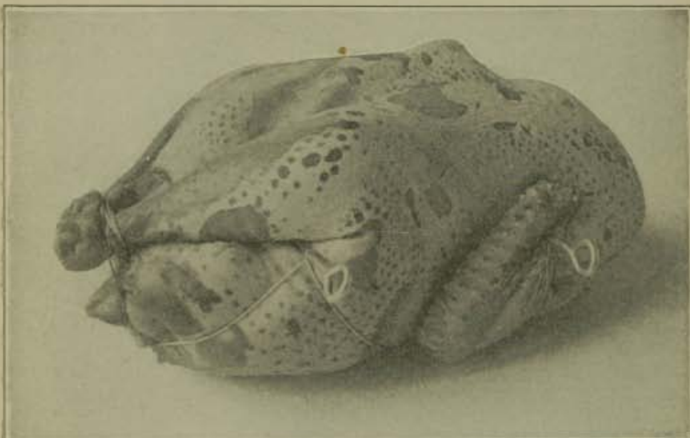


FIGURE 72. — FOWL TRUSSED FOR ROASTING. — BREAST VIEW.

Dressing and Cleaning Poultry. — Singe, by holding the bird over a flame of gas, alcohol, or burning paper. Cut off the head, push back the skin, and cut off the neck close to the body. Cut through the skin around the leg one inch below the leg joint. If it is a fowl, take out the tendons; remove them separately, using a skewer (see Figure 71). Remove the pin feathers with the point of a knife or with a strawberry huller. Cut the oil bag from the tail.

The internal organs are not always removed before the chicken is sold. If they have not been removed, make an opening under one of the legs or at the vent, leaving a strip of skin above the vent. Remove the organs carefully, — the intestines, gizzard, heart, and liver should all be removed together. Care must be taken that the gall bladder, which lies under the liver, is not broken; it must be cut away carefully from the liver. The lungs and kidneys, lying in the hollow of the backbone, must be carefully removed. Press the heart to extract the blood. Cut off the outer coat of

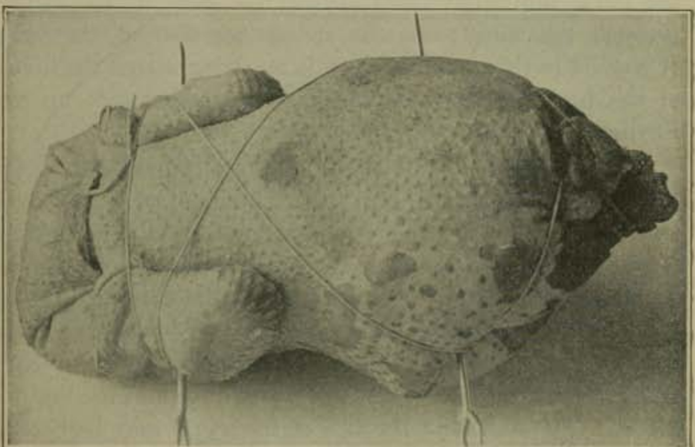


FIGURE 73. — FOWL TRUSSED FOR ROASTING. — BACK VIEW.

the gizzard. The gizzard, heart, and liver constitute the *giblets* to be used in making gravy. Wash the giblets. Place them all, with the exception of the liver, in cold water; heat quickly and cook (at simmering temperature) until tender. Add the liver a short time before removing the other giblets from the stove, as it does not require long cooking.

Clean the bird by wiping it thoroughly inside and out with a damp cloth, stuff and truss for roasting, or cut into pieces for fricassee or stew. If the bird is stuffed, the incision in the skin may be fastened together as directed for *Baked Fish* (see p. 230).

Trussing Fowl. — Insert a skewer through the fowl just underneath the legs, then thrust another skewer through the wings and breast. With a piece of string, tie the ends of the legs together and fasten them to the tail. Then wind the ends of the string fastened to the tail, around the ends of the skewer beneath the legs. Cross the strings over the back, and wind them around the ends of the skewer through the wings; tie the strings together at the back. If trussed in this manner, there is no string across the breast of the fowl. A fowl should be served breast side up (see Figures 72 and 73).

Cutting a Fowl. — Cut off the leg, and separate it at the joint into "drumstick" and second joint. Cut off the wing and remove the tip; make an incision at the middle joint. Remove the leg and wing from the other side; separate the wishbone with the meat on it, from the breast, cut through the ribs on each side, and separate the breast from the back. Cut the breast in half lengthwise and the back through the middle crosswise. There should be twelve pieces. The neck and the tips of the wings may be cooked with the giblets for making gravy.

STEWED CHICKEN [1]

Cover the pieces of chicken with boiling water, and cook at boiling temperature for 15 minutes; then add one tablespoonful of salt and cook at simmering temperature until tender.

Arrange the pieces on a platter, placing the neck at one end of the platter and the "drumsticks" at the other, and the remaining pieces in order between. Cover with a sauce.

[1] Stewed Chicken may be utilized for *Chicken Croquettes* (see p. 305) or *Creole Stew* (see p. 317).

The chicken may be placed on pieces of *toast* or served in a border of cooked *rice* (see p. 86).

SAUCE FOR CHICKEN

3 tablespoonfuls tried-out chicken fat or butter or substitute
¼ cupful of flour
1 teaspoonful salt
2 tablespoonfuls chopped parsley
1 pint stock
2 egg yolks or 1 egg
⅛ teaspoonful pepper

Prepare the sauce (see *Cream Toast*, p. 104), and pour it over the well-beaten eggs, stirring until thoroughly mixed. Cook until the eggs are coagulated. Serve at once over chicken.

QUESTIONS

Why is chicken more readily digested than other meat?

What is the reason for cooking stewed chicken 15 minutes in *boiling* water? Why is the salt not added at first? Why should the chicken finally be cooked at simmering temperature rather than at boiling?

What use can be made of the fat of a fowl?

What is the purpose of the eggs in Sauce for Chicken?

Explain fully why rice or toast makes a desirable addition to Stewed Chicken.

LESSON CI

Chicken and Peas

CHICKEN CROQUETTES

2½ cupfuls chopped chicken or fowl
Onion juice
2 tablespoonfuls lemon juice
1 tablespoonful parsley

SAUCE

1 pint cream or milk
⅓ cupful fat
½ cupful flour
1½ teaspoonfuls salt
⅛ teaspoonful pepper
1 teaspoonful celery salt

Chop the chicken very fine; add the seasonings. Make the sauce (see *Cream Toast*, p. 104). Add the chicken to the sauce. Cool the mixture. Shape into cones. Cover with dried bread crumbs and egg, and cook in deep fat (see *Fried Oysters*, p. 134). Drain on paper. Serve at once with green peas.

An egg may be beaten and added to the sauce, before mixing it with the meat.

QUESTIONS

What is the purpose of cooling the chicken mixture before shaping it into croquettes (see Experiment 17, p. 80)?

How many croquettes does this recipe make?

How many cupfuls of chopped meat can be obtained from fowl of average weight?

What is the average weight of a chicken one year old? How long does it take to cook it?

What is the average weight of a spring chicken?

What is the present market price of spring chicken? Of fowl?

Compare the composition of fowl with that of round steak, using *U. S. Department of Agriculture Bulletin No. 28*. Also record the percentage of refuse in a fowl when it is purchased. Considering the refuse in fowl, what is the price per pound?

Tabulate the percentage composition of fresh and dried peas and beans, and of dried lentils. Which are richer in protein, the fresh or the dried vegetables (see Figure 76, p. 313)?

LESSON CII

Oyster Dishes

Experiment 63. Protein in Oyster Liquor. — Pour a small quantity of oyster liquor into a test tube and boil it. What change takes place? From your previous experience with eggs, what foodstuff would you infer that oysters contain? What inference can you draw from this as to the temperature at which oysters should be cooked?

Oysters. — An oyster is an animal covered with shell. The shell, which consists of mineral matter, protects the animal

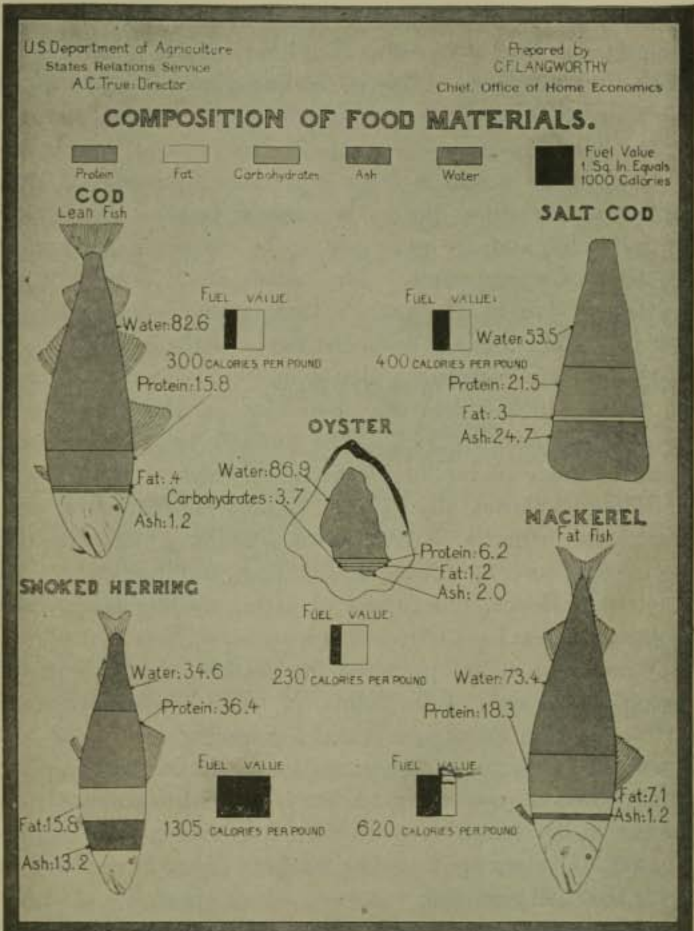


FIGURE 74. — COMPOSITION OF FISH, FISH PRODUCTS, AND OYSTERS. (Revised edition.)

The oyster has no head, arms, or legs, but it has a mouth, liver, gills, and one strong muscle. The mouth is near the hinge-end of the shell; by means of the hinge, the shell is opened and water and food taken in; by means of the muscle, the shell is closed. (Find the muscle in an oyster; then the dark spot, — this is the liver; also find the fluted portions that partly surround the liver, — these are the gills.)

Oysters are in season from September until May. They are sometimes eaten during the summer months, but are not so palatable and are more apt to be contaminated by the bacteria of warm water. The bluish green color of some oysters is due to the oyster's feeding upon vegetable materials. This does not harm the flavor of the oyster.

Oysters are sometimes placed in fresh water streams or in water which is less salt than that in which they have grown to "fatten them." The animals take in the fresh water, become plump, and increase in weight. If the water is sewage-polluted, the oysters become contaminated with dangerous bacteria. Methods of cooking usually applied to oysters, such as stewing and boiling, may not destroy all bacteria. Hence, the danger in eating oysters taken from polluted water.

When oysters are prepared for market, they are sorted according to size. Blue points, or small oysters originally grown in Blue Point, are prized for serving raw in the half shell. This name, however, no longer indicates the place from which the oysters come, but is applied to small oysters in the shell. Large oysters selected for frying may be purchased. Oysters are found at markets either in the shell or with the shell removed.

Since oysters spoil readily, they must be kept cold during transportation. They are now shipped in containers surrounded by ice. Formerly ice was placed in contact with the oysters.

Note the percentage composition of oysters (see Figure 74). With such a large quantity of water, the oyster has little food value. Oysters are prized for their flavor, but make an expensive food. Cooking makes oysters somewhat tough, but it sterilizes them and makes them safer to use. It is considered that oysters properly cooked are easily digested. They should be eaten when very fresh. They spoil quickly and develop poisonous products.

Cleaning Oysters. — Drain off the liquor. If the liquor is to be used, strain it through a fine strainer. Place the oysters in a strainer or colander, and wash them. Do not allow oysters to stand in water after washing. Run each oyster through the fingers to remove pieces of shell that may be clinging to it.

OYSTER STEW

1 cupful milk	Salt and pepper
1 pint oysters	1 tablespoonful butter

Heat the milk in a double boiler; add the seasonings and butter. Clean the oysters; cook them in a saucepan until they become plump and the edges curl. Add the hot milk and serve at once.

The milk may be thickened with 1 tablespoonful of flour (see recipe for *Thin White Sauce*, p. 114).

Serve crackers or bread with Oyster Stew.

SCALLOPED OYSTERS

1 pint oysters	3 cupfuls soft bread crumbs
½ teaspoonful salt	3 tablespoonfuls butter or substitute
Cayenne	¼ cupful oyster juice or milk

Wash the oysters, strain the juice, and butter the crumbs. Add the seasoning to the oysters. Place one fourth of the buttered crumbs in the bottom of a buttered baking-dish. Add one half of the oysters, another fourth of the crumbs, then the remainder of the oysters, the liquid, and finally the remaining half of the buttered crumbs. Bake in a hot oven (400° F.) from 30 to 40 minutes.

If baked in individual baking-dishes, only 15 minutes will be required for baking.

QUESTIONS

Count and record the number of oysters in one pint.

From Figures 64, p. 284, and 74, p. 307, tabulate the percentage composition of oysters and milk.

Find the weight of one cupful of oysters and of one cupful of milk. How do they compare as to the amount of water, protein, and fat contained in one pint of each?

What is the difference in cost of one pint of each?

What is the purpose of straining the oyster liquor?

Why should not oysters stand in water after washing (see Experiment 38, p. 153)?

Explain why oysters should be cooked only a short time. What is the effect of long cooking upon oysters?

In Scalloped Oysters, why is the liquid added before the last layer of crumbs?

How many persons do each of these oyster recipes serve?

What dietetic reason can be given for combining oysters and bread?

From *U. S. Department of Agriculture Bulletin No. 28*, tabulate the percentage composition of the following fish: Fresh and salt cod, fresh and smoked herring, fresh and salt mackerel, fresh and canned salmon, fresh perch, and fresh white fish. Which contains the most fat? How can fish be classified with regard to fat content (see *Classes of Fish*, p. 227)? Which fish contains the most protein?

How do fish, shellfish, and beef compare in protein content? Which is the cheapest source of protein (see Figures 68, p. 295, and 74, p. 307)?

LESSON CIII

Meat-substitute Dishes

Meat-substitute Materials. — Cottage cheese, eggs, peanuts, and other legumes are valuable substitutes for meat (see pp. 189, 153, and 234). The legumes with the exception of soy-beans and peanuts, however, do not contain complete protein (see p. 153). Hence, their use with eggs or milk is desirable.

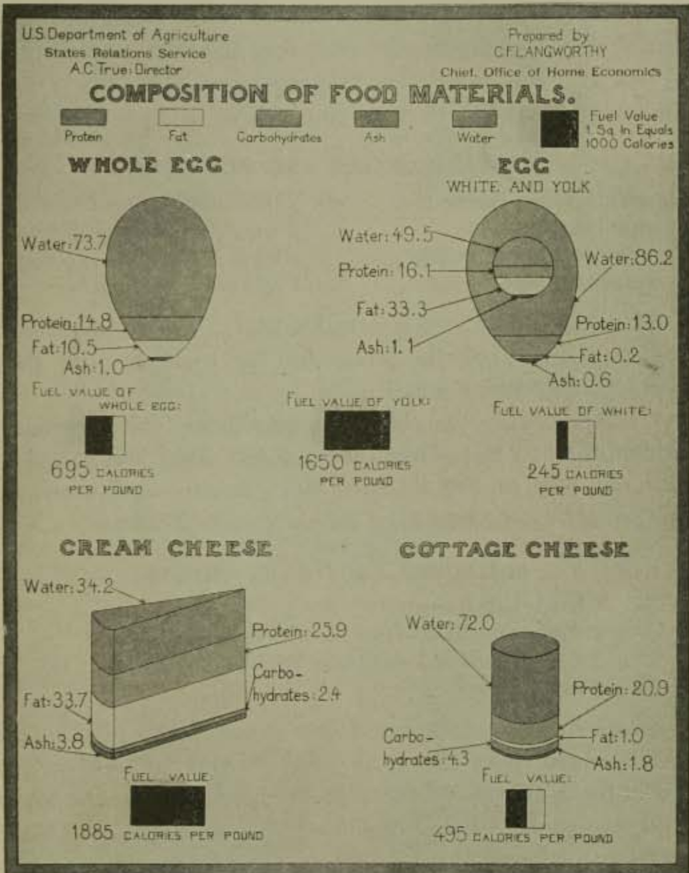


FIGURE 75.—THE COMPOSITION OF EGGS AND CHEESE.
(Revised edition.)

Nuts are a form of fruit. They are rich in nutritive materials. If they can be digested readily, they make a valuable food. They need to be ground fine or chewed thoroughly, however, to make them digestible. Nuts contain much fat, protein, and little carbohydrates. Chestnuts, however, contain much of the latter foodstuff. Because they contain protein, nuts may be used as substitutes for meat. But most nuts are expensive. For this reason in many households they are impractical as everyday foods.

COTTAGE CHEESE AND NUT LOAF

1 cupful cottage cheese	$\frac{1}{8}$ teaspoonful pepper
1 cupful chopped nuts	2 teaspoonfuls lemon juice
1 cupful soft bread crumbs	$\frac{1}{4}$ teaspoonful scraped onion
1 teaspoonful salt	1 tablespoonful fat

Mix the cheese, nuts, bread crumbs, lemon juice, salt, and pepper. Cook the onion and fat together until they are brown. Add a small quantity of water and then add the onion mixture to the other ingredients. If necessary, add more water to moisten the mixture. Pour into a baking-dish and bake at 400° F., 25 to 30 minutes or until brown.

(From *United States Food Administration Leaflet.*)

SCALLOPED EGGS WITH CHEESE

6 hard-cooked eggs
2 cupfuls medium White Sauce (see p. 114).
2 cupfuls buttered soft bread crumbs (see p. 110).
$\frac{3}{4}$ cupful cheese

Grate the cheese, or cut it into pieces, and add it to the White Sauce. Cut the eggs in slices. Oil a baking-dish, and place the materials in the dish in layers, having the lower and top layers of bread crumbs. Bake at 400° F., 15 to 20 minutes or until the mixture is heated through and the crumbs are browned. Serve hot in place of meat.

PEANUT ROAST

$1\frac{1}{2}$ cupfuls dried bread crumbs	4 teaspoonfuls baking powder
Milk	1 egg
$1\frac{1}{2}$ cupfuls shelled peanuts	Salt and pepper

Cover the bread crumbs with milk, and soak them until soft. Chop the peanuts very fine, and mix with the bak-

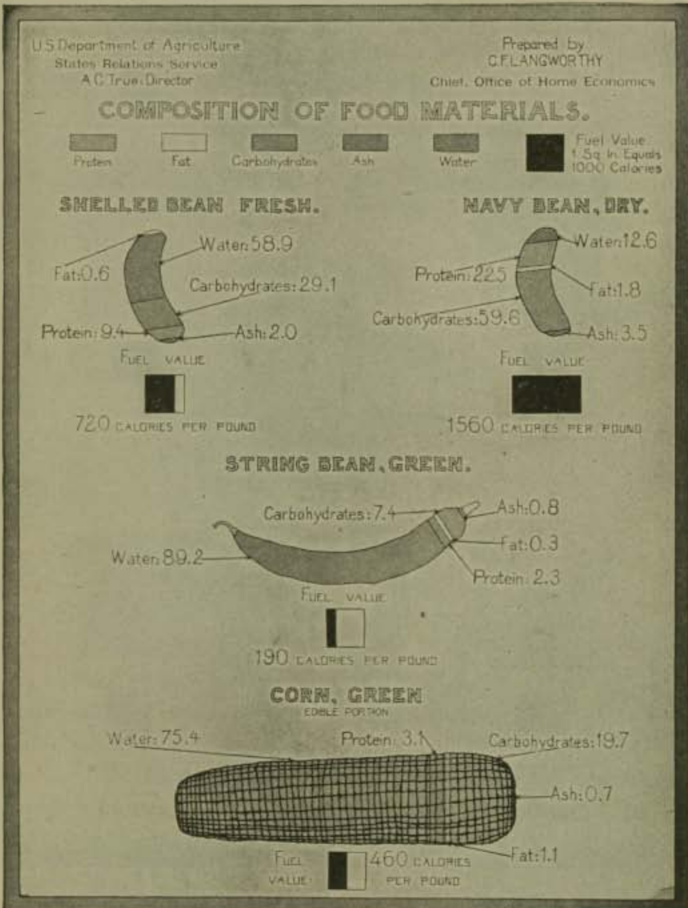


FIGURE 76.—THE COMPOSITION OF LEGUMES AND CORN. (Revised edition.)

ing powder; beat the egg. Mix thoroughly all the ingredients, and turn into an oiled bread pan. Bake about 45

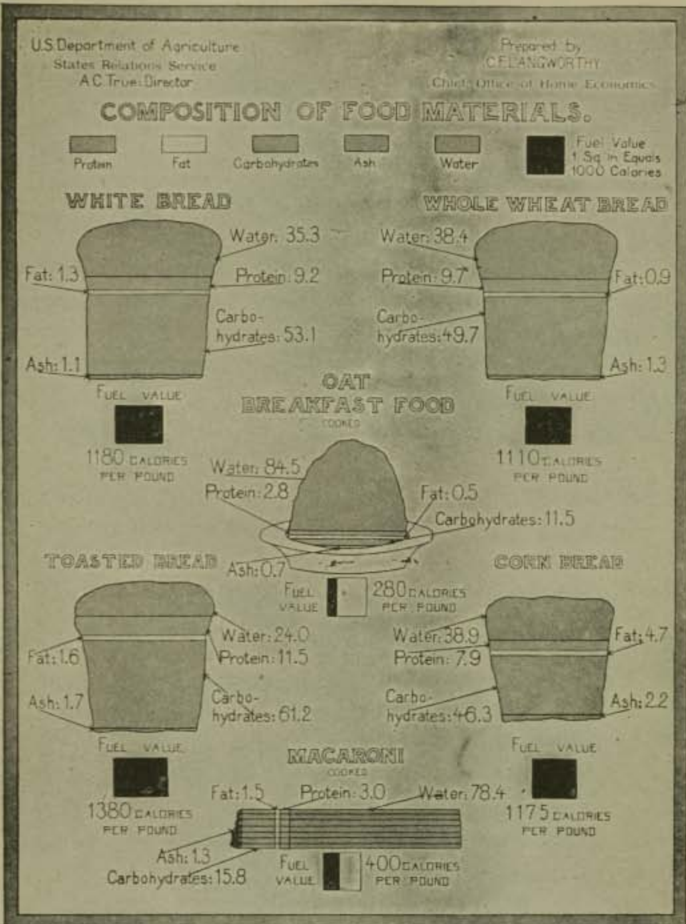


FIGURE 77. — THE COMPOSITION OF BREAD AND OTHER CEREAL FOODS. (Revised edition.)

minutes in a moderate oven (*i.e.* 375°F.). Serve hot with Tomato Sauce (see p. 112) or with Brown Sauce (see p. 207).

Commercial salted peanuts may be used for Peanut Roast.

QUESTIONS

From *U. S. Department of Agriculture Bulletin No. 28,* find the percentage of protein in Cream and Cottage Cheese, eggs (see Figure 75), walnuts, peanuts, dried peas, and beans (see Figure 76), and beef. How many ounces of protein does a pound of each of these foods contain? What is the price per pound of each of these foods? Which food is the cheapest source of protein?

Why are bread crumbs a valuable addition to Scalloped Eggs with Cheese (see Figure 77)?

Name other meat-substitute foods and dishes.

LESSON CIV

Meat Extenders and One-dish Meals

Meat Extenders. — The flavor of meat is generally liked. Doubtless the flavor accounts more than any other characteristic for the popularity of meat. By using a small quantity of meat and combining it with various cereals and vegetables, the flavor of meat permeates the mixture although its quantity is reduced and price consequently lowered. Foods containing such a combination of food materials are termed *meat extenders.* Those desiring to reduce the quantity of meat consumed either for the sake of health or economy will find meat-extending dishes desirable.

One-dish Meals. — When many demands other than those of housekeeping are made upon homekeepers it is often wise to lessen housekeeping duties. It is both possible and satisfactory to cook an entire meal in one dish. A meal consisting of one dish with a few accessories is termed a one-dish meal. It is obvious that the one-dish meal is both simple and economical; it saves time, fuel, and food; it is a wise conservation measure.

In preparing the one-dish meal use a combination of two or more of the following groups of food:

(1) Vegetables,
(2) Milk, or cheese, or eggs, or fish, or meat, or beans, or nuts,
(3) Cereal, such as corn, barley, rice, oats, or buckwheat.

To two or more of these groups of food a small amount of fat or oil is generally added.

The use of such foods with a dessert or fruit or a plain salad makes a meal that satisfies the most exacting.

It is most interesting to select foods from the groups above that would "eat well" together. The one-dish meal gives one the opportunity for a fascinating study of food combinations. If the casserole or fireless cooker is used in their preparation, the possibilities are limitless (see pp. 294 and 90).

An examination of the meat-substitute dishes and meat extenders will show that most of these foods make one-dish meals.

MUTTON WITH BARLEY

1 pound mutton	2 quarts water, boiling
1 onion	4 potatoes
½ cupful pearled barley	Celery leaves (fresh or dried)

1½ teaspoonfuls salt

Cut the fat from the meat, cut the meat into pieces. Put the fat and sliced onion in a frying pan. Brown the meat in the fat. Add the barley and water and let the mixture cook at simmering temperature for at least 1½ hours. Pare the potatoes, cut them into quarters. Add the potatoes and celery leaves and cook the mixture at boiling temperature until the potatoes are tender. Serve hot.

(Adapted from *Department of Agriculture Leaflet.*)

TAMALE PIE

¾ cupful corn-meal	1 pound chopped meat
1½ teaspoonfuls salt	2 cupfuls tomatoes
3 cupfuls boiling water	Dash Cayenne pepper, *or*
1 onion	1 small chopped sweet pepper
1 tablespoonful fat	1¼ teaspoonfuls salt

Make a mush by stirring the corn-meal and 1½ teaspoons salt into boiling water. Cook in a double boiler or over water for 45 minutes. Brown the onion in the fat, add the chopped meat, and stir until the red color disappears. Add the tomato, pepper, and salt. Grease a baking-dish, put in a layer of corn-meal mush, add the seasoned meat, and cover with mush. Bake at 400° F. for 30 minutes.

(Adapted from *United States Department of Agriculture Leaflet.*)

CREOLE STEW

1 pound lean beef or 1 medium fowl
1 tablespoonful fat
¼ cupful chopped onion
½ cupful chopped sweet peppers
2 cupfuls boiling water
½ cupful rice
1 cupful carrots or okra (cut into small pieces)
2 cupfuls tomatoes
2½ teaspoonfuls salt

Cut the meat into small pieces or cut the fowl into joints (see p. 304). In a frying pan melt the fat, add the onions, peppers, meat, or chicken. Brown for a few minutes.

Pour these materials into a casserole or kettle of the fireless cooker and add the other ingredients. If the casserole is used, bake in a moderate oven or at 375° F. If the stew is to be cooked in the fireless cooker, cook it directly over the flame for ½ hour and then place it in the fireless cooker from 2 to 3 hours. Serve hot.

With chicken and okra this is the famous Creole Chicken of the South.

(Adapted from *United States Department of Agriculture Leaflet.*)

QUESTIONS

Make a list of meat-extending dishes.
Make a list of foods suitable for the main food of one-dish meals.
How many persons will one pound of meat serve?

How many persons will the dishes of this lesson (each containing one pound of meat) serve?

Tell why the foods comprising these dishes are desirable food combinations.

RELATED WORK

LESSON CV

Menu-making

Representation of All Essentials of Diet. — All the foodstuffs or nutrients should be represented in the foods of a meal, or at least in the foods composing a day's diet. The meal, or the day's ration, should consist of:

Food rich in carbohydrates and fat, to supply energy to the body.

Food rich in protein[1] and ash, to build the body.

Food in the form of ash and water, to regulate the processes of the body.

Food containing vitamines, to promote the health and growth of the body.

Food containing cellulose, to give bulk to diet.

Water is supplied to some extent with almost all the foods of a meal, but as mentioned previously (see p. 46), a generous quantity should be used as a beverage.

A consideration of the kinds of food to meet the different needs of the body follows:

A. *Food for Energy.* — Although both *starch* and *sugar* are carbohydrates which furnish energy to the body, this need of the body should be supplied for the most part by

[1] Protein is not only a body-builder, but also a fuel. But since it should be used chiefly for body-building (see *Daily Carbohydrate and Fat Requirement*, p. 381) its energy-giving power is not considered in meal planning.

starch. The harmful effects of excessive sugar eating were mentioned on p. 71.

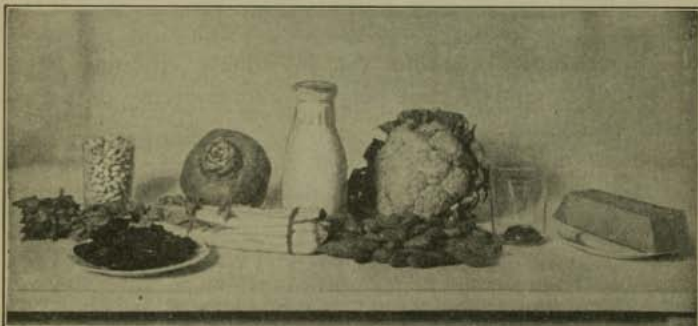
A certain amount of *fat* is needed for energy-giving. A meal containing fat "stays by" a person for a longer time than one devoid of foods rich in fat. This is because fat is more slowly digested than other foodstuffs (as explained on p. 140). Hence a vigorous person leading an active outdoor life may feel much more comfortable when fat is included in his diet. On the other hand, those exercising little find that fat-rich foods distress them greatly, since they are too slowly digested. For many persons, the use of much fat is harmful. Since butter contains the fat-soluble vitamine (see p. 246), it is valuable not only for energy-giving, but for growth-promoting.

B. *Food for Body-building and Repairing.* — Both *protein* and *ash* are needed for body-building. The former foodstuff contains the element nitrogen, — one of the necessary elements for the growth and maintenance of the body.

Since there are several kinds of food containing protein, the question arises whether protein is best supplied by meat, eggs, milk, cheese, or vegetable protein foods. There are some who contend that meat is the least desirable source of protein food. The use of much meat may lead to the formation of an excess of uric acid which is eliminated by some persons with difficulty. It may also cause intestinal putrefaction.

Many find that by using meat once a day their health is normal. Others find that by using meat but several times a week a more desirable condition is maintained. Doubtless many people would find themselves much benefited by using less meat. If the quantity of meat eaten is greatly lessened, care should be taken that protein is supplied by other foods, such as eggs, legumes, cheese, and the various meat-substitute dishes. Care should also be taken to see that complete proteins (see p. 153) are included in diet. If foods containing incomplete protein such as some of the legumes and cereals are used for body-building, they should be supplemented by foods rich in complete protein such as milk and eggs. If much meat is eaten, a generous quantity of water and of fresh vegetables and fruits should be used.

While all the *mineral materials* found in the body[1] are necessary for its growth and maintenance, calcium, phosphorus,



a b c d e f g h i

FIGURE 78. — FOODS CONTAINING CALCIUM.

a, Dried beans; *b*, dried figs; *c*, rutabaga; *d*, celery; *e*, milk; *f*, cauliflower; *g*, almonds; *h*, egg yolk; *i*, cheese.

and iron are the elements most likely to be used in insufficient quantities (see Figures 78, 79, and 80).

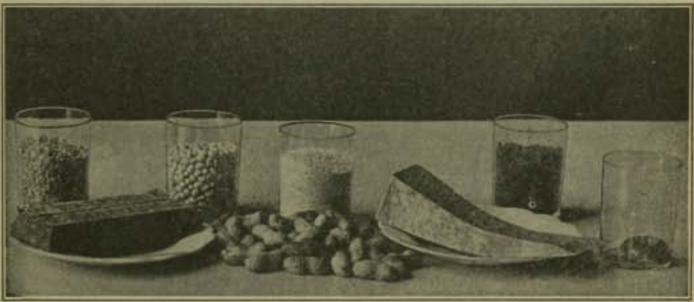
Calcium is needed for building the hard tissues such as the teeth and bones. A diet deficient in calcium is sometimes the cause of poor teeth. Calcium is equally important for body-regulating functions. It is especially necessary that calcium-rich food be given to children.

[1] The ash constituents existing in the body in largest quantity are:

Sulphur	Chlorine	Calcium	Iron
Sodium	Magnesium	Potassium	Phosphorus

The most practical and effective way of obtaining calcium is to use a generous supply of milk. Cheese, eggs, and the leaves and stems of plant-foods are also valuable sources of calcium.

Milk, egg yolk, cheese, whole grains, and vegetables are the most satisfactory sources of phosphorus. A free use of these foods is especially desirable since it has been found that phosphorus is quite as necessary as nitrogen. The whole grains are a very valuable source of ash. Many of the ash constituents in cereals are found next to the outer coat of



a *b* *c* *d* *e* *f* *g* *h*

FIGURE 79. — FOODS CONTAINING PHOSPHORUS.

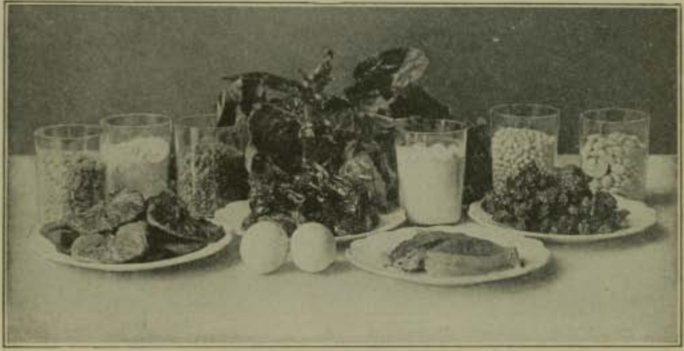
a, Dried peas; *b*, chocolate; *c*, dried beans; *d*, whole wheat; *e*, peanuts; *f*, cheese; *g*, cocoa; *h*, egg yolk.

bran, hence fine white flour is not so rich in ash as whole wheat flour.

In the formation of blood and for the welfare of the body as a whole, iron is needed. For this reason, it is often a constituent of "tonics." If foods rich in iron were more generally used, the body would not be so likely to get into a condition requiring such tonics. The iron found in eggs, milk, and vegetable foods is thought to be more completely assimilated than that found in meat. Spinach and prunes are valuable sources of iron. This is one of the reasons why they are most desirable foods for children. *The need of eggs, dried fruits, fresh vegetables, and whole grain in diet to furnish iron should be emphasized.*

Sulphur is one of the necessary elements of the body. It is usually found, however, as a component of protein; hence if enough protein is supplied to the diet, sulphur will be present in sufficient quantity.

As mentioned on p. 246, leafy vegetables not only supply calcium but *sodium* and *chlorine,* — two of the needed



a b c d e f g h i j k l

FIGURE 80. — FOODS CONTAINING IRON.

a, Dried peas; *b*, dried figs; *c*, whole wheat; *d*, lentils; *e*, spinach; *f*, dried dates; *g*, eggs; *h*, rye; *i*, lean beef; *j*, dried beans; *k*, raisins; *l*, dried lima beans.

minerals of the body. If fresh vegetables and fruits along with foods rich in calcium, iron, and phosphorus are used, and these foods are cooked and served so as to retain all their nutriment, one can be assured that the diet contains *all* the necessary ash constituents.

C. *Food for Regulating.* — Although ash is needed for body-building, it also serves to regulate certain body processes as explained on p. 58. Hence if the mineral matter valuable for building is used, the body is also supplied with regulating materials.

D. *Food for Promoting Growth.* — A discussion of vitamines, — the materials essential for growth of the body and the maintenance of health, — was given in a previous lesson (see p. 245). It is most necessary that foods rich in vitamines be included in diet.

E. *Food for Bulk.* — The use of foods containing cellulose, which adds bulk to diet, is needed by most persons (see p. 81). Many foods rich in mineral matter also contain much cellulose. Vegetables, fruits, and whole grains furnish both of these materials.

Other Factors to Be Considered in Menu-making. — For successful menu-making, a number of factors other than the selection of foods to meet the needs of the body should be considered. A discussion of these follows:

A. *Appetizing Foods.* — If the appetite needs stimulation, foods which have an appetizing effect may be used for the first course of meals. Fruit is very often served for the first course of a breakfast and sometimes for the first course of a luncheon. Soup may serve as the appetizer of either a luncheon or dinner. Cream soup being especially nourishing because of its milk content not only serves as an appetizing food, but as one of the nutritious foods of a meal.

B. *Foods of Contrasting Flavor.* — If beef or some other protein-rich food is chosen for the main dish of a meal (such as dinner), root vegetables or grains rich in starch, but bland in flavor, are good additions. By combining foods of decided flavor with those of less pronounced taste and those rich in one foodstuff with those abounding in another nutrient, combinations that are both pleasing and varied in flavor may be secured. A housekeeper needs to use "imagination" in selecting foods that will taste well together.

C. *Variation of Foods.* — The same food should not be used twice in the same meal, even though it is prepared in a different form. It would be monotonous to serve tomato soup and tomato salad, or bean soup and baked beans at the same meal. Neither would one care to have hash served for both breakfast and luncheon on the same day. Of course such foods as bread and butter may be used with every meal.

D. *Moist and Dry Foods.* — A combination of "moist" and "dry" foods is more pleasing than a combination of foods of equal dryness or moisture. This does not mean that dry foods should be "rinsed down" with liquids; that is unwise from a physiological standpoint. To the majority of persons, creamed potatoes are more desirable with broiled steak than plain boiled potatoes. The latter would be more pleasing with meat served with a sauce or gravy.

E. *Sweet Foods.* — A sweet food should not be eaten at the beginning of a meal. Such sugar-rich foods as preserves and jellies may be served with the main course of a meal or at its close. As explained previously (see p. 71), the sugar is then diluted with other food materials and proves less irritating. If desserts are included in a menu, the practice of serving them at the close of a meal is desirable from a dietetic viewpoint. When the appetite is partially appeased, there is less tendency to eat large quantities of sweet foods.

A dessert that is rich in both fat and sugar such as pastry should be served only with a light meal, while a light dessert such as fruit or gelatine may be used at the close of a heavy meal.

Very often dried fruits and nuts are used as accessories after a meal. They are then often digested with difficulty, because the meal itself has taxed the digestive organs. These foods should be considered as a part of the meal and should not be added after enough other nutrients have been eaten.

There is no reason why a wholesome dessert should not be considered one of the nutritious foods of a meal.

F. *Milk and Beverages.* — Since milk is necessary for perfect nourishment it is well for adults to use it as a beverage for at least one meal each day. Children should use it at all meals. If milk is distasteful to any or all members of a family, cocoa made with much milk may be served in its stead. In meal planning, a housekeeper should see to it that the proper quantity of milk either as a beverage or constituent of such dishes as cream soup, vegetables, and custards is used by each member of the family.

When tea and coffee are included in meal plans, the fact that these beverages have no food value except the milk and sugar added to them, should be taken into consideration.

G. *Foods on Hand.* — When menus are made the thrifty housekeeper considers those materials she has on hand and especially those which would spoil if not used at once. Very often left-over material serves as a basis on which to plan one or more meals.

A housekeeper may drain from a vegetable the water in which it was cooked. But she sees in it for the next meal or for the next day several possible uses. The vegetable stock may be used in soup or it may be combined with milk or cheese and serve as a sauce for some left-over vegetable. Bread crumbs combined with milk, peanuts, or egg make a tasty meat substitute one week; or they may be utilized in making bread pudding the second week; a scalloped dish the third week; and a meat loaf the fourth. If several pieces of dry cake are on hand, a tasty dessert may be made by pouring over them some hot sauce such as apple or chocolate. Dry cake may also be crumbed and used in place of flour and sugar in a steamed pudding.

It is possible, of course, for a housekeeper to spend an undue amount of time in utilizing left-overs or to defeat her efforts in thrift and buy expensive supplementary foods in order to use food on hand. Often it is wise to cook just enough so that there are no left-overs. On the other hand, it is sometimes economical as far as fuel and time are concerned to plan to cook enough food at one time for more than one meal. This is especially true of foods requiring long cooking such as baked beans and other dried foods.

Menu Plans. — Serving meals in a number of courses should be attempted only where the housekeeper is assisted in her work. For everyday living the meals of most families are served only in one or two courses.

Although there are a great many things to be considered in menu-making, it is not necessary to use a great variety of foods to meet the requirements of successful meal planning. A breakfast consisting of fruit, rolled oats, and top milk, for example, is simple, but it embraces all the factors involved in the planning of a desirable meal.

As previously mentioned, the groups of foods on p. 269 may serve as a basis for menu planning. After selecting foods from each group that are seasonable, economic, and that will " taste well " together it is wise to analyze the menu. See if it contains all the essentials of diet to meet the needs of the body as explained on p. 318. Some housekeepers find it helpful to have lists of dishes found to be satisfactory for serving, such as lists of meat dishes, vegetables, salads, desserts, etc., and glance over these when planning meals.

The menu plans which follow are merely suggestive. Both simple and more elaborate menus are given for each of the three meals.

A breakfast may consist of:

Fruit		Fruit or Cereal (or both)
Cereal or Eggs and Toast	*or*	Meat, Egg, or Vegetable Bread and Butter
Beverage		Beverage

A luncheon or supper may consist of:

Cream Soup Bread and Butter Salad or Fruit Beverage	*or*	Fruit or Cream Soup Fish or Meat Substitutes Vegetables Bread and Butter Salad Dessert Beverage

A dinner may consist of:

Meat Vegetables Bread and Butter Salad or Dessert Beverage	*or*	Clear Soup Fish Meat Vegetables Bread With or Without Butter Salad Dessert Beverage

QUESTIONS

Mention several combinations of two or more foods that are varied in moisture, dryness, and composition, and that are of contrasting flavor. Give reasons for making the combinations.

Make out suitable menus in your home for a week. Compute the cost of the week's menus. If the cost does not come within the limit that can be spent for food in your home, change the menus so that the cost does not exceed the food allowance.

LESSON CVI

Planning, Cooking, and Serving a Luncheon or Supper

Plan a luncheon or supper,[1] making it a one-dish meal or using a meat substitute instead of meat. Also use seasonable food-materials and follow the suggestions given in

[1] If the laboratory period is limited to 90 minutes, all this time will be required to cook and serve the meal and wash the dishes. Hence, it will be necessary to do the meal planning in a previous lesson.

Lesson CV (p. 318). Compute the cost of the menu. If it exceeds 20 cents per person, change the menu so that its cost comes within this amount. Analyze the menu. Is food from each of the groups given on p. 269 contained in it?

Cook and serve the luncheon or supper. Follow the English or family style of serving (see p. 122). Serve the meal without a maid.

LESSON CVII

Review: Meal Cooking

MENU

Seasonable Vegetable Salad
Salad Dressing
Salad Rolls

See Lesson XIV, p. 68, for suggestions regarding the preparation of the lesson.

LESSON CVIII

Home Projects[1]

Suggestions for Home Work. — Plan and prepare one-dish meals or meals containing meat-substitute, — at least one a week.

Plan and prepare meals containing meat, — at least one a week.

Compute the cost of these meals. Also note the time required to prepare them.

Suggested Aims: (1) To determine the difference in time required to cook a one-dish meal and a meal containing several different dishes.

(2) To determine the difference in cost of a meal without meat and one containing a meat-substitute.

[1] See Lesson IX, p. 51.

DIVISION TEN

QUICK BREADS: POUR BATTERS

LESSON CIX

Leavening with Steam and Air: Popovers

When flour is to be moistened and baked to make bread or cake, other ingredients are usually added to improve the grain, texture, and flavor.

To understand some of the principles of mixing and lightening baked flour mixtures, try the following:

Experiment 64: Leavening with Steam and Air.[1] — Mix ⅓ cupful of flour and ⅓ cupful of cold water. Beat thoroughly with a Dover egg beater. Note the consistency of the batter. Pour at once into an oiled muffin pan. Bake in a hot oven for at least 20 minutes. Remove from the pan, break it open, and answer the following questions:

What happened during baking to the cold air inclosed in the mixture? With what material did the flour combine during baking? Into what form was a part of the water changed during baking? Explain fully how the mixture was made porous.

Experiment 65: Comparison of Thick and Thin Quick Breads. — Repeat Experiment 64, using ½ tablespoonful of cold water instead of ⅓ cupful. After baking, examine and compare with the bread of Experiment 64. Which is the more porous? Explain how the difference in quantity of moisture accounts for the difference in grain. If a mixture is to be leavened with steam and air, what should be the consistency of the mixture?

[1] Note to the Teacher. — Experiments 64 and 65 can be performed most expeditiously by dividing the class into groups of two and having each group do the two experiments.

Some simple flour mixtures are lightened by the method indicated above. In most cases, however, more air is introduced into the mixture by using lightly beaten eggs, or by using ingredients that produce gas, on being moistened and heated.

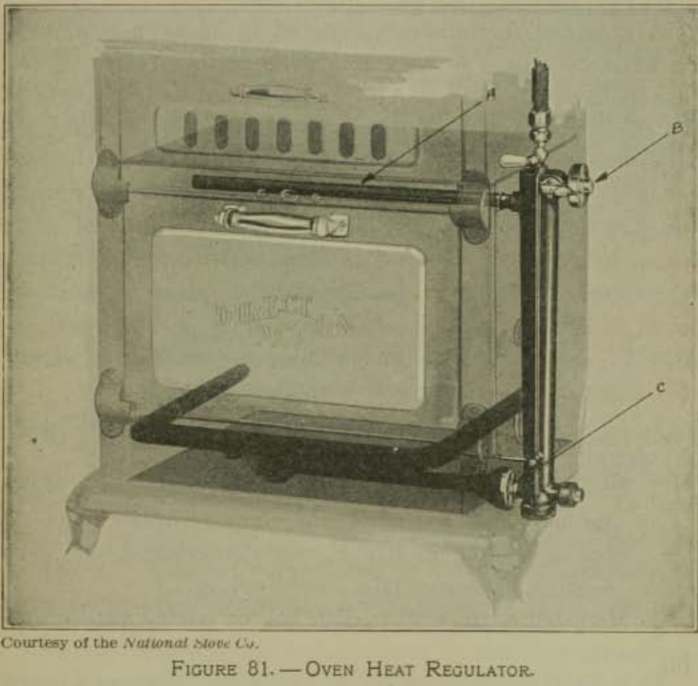
Experiment 66: Preparation of Flour for Quick Breads. — Measure ½ cupful of pastry flour just as it comes from the can. Sift it, and return it carefully to the measuring cup, using a teaspoon. How much does the flour measure now? What does this experiment teach with regard to sifting flour before measuring? Of what advantage is it to sift flour not only before measuring, but when adding it to the other ingredients of a quick bread?

[NOTE. — Use this sifted flour for making Popovers.]

In preparing all quick bread mixtures, *pastry flour* (see *Wheat Flour*, p. 408) should be used. It should be sifted before measuring. Usually any other powdered ingredient, such as baking powder, soda, or spices, is added to the flour and mixed thoroughly (by sifting) into the other materials. Baking powder and soda need not be sifted before measuring, but should be stirred.

Oven Thermometers and Temperatures. — The ovens of a number of ranges are equipped with thermometers. Although it is possible to secure more satisfactory results with a thermometer than without, oven thermometers do not always indicate the temperature of an oven accurately. If a thermometer is fastened on an oven door, for example, and the door does not heat as quickly or to as high a degree as the interior of the oven, the true temperature of the oven cannot be ascertained by this device. By making allowance for the difference, however, such a thermometer may prove very useful. It is much more accurately and conveniently read than a thermometer which is hung or rests inside the oven unless the oven is provided with a glass door.

A device known as an "Oven Heat Regulator" (see Figure 81) may be attached to gas ranges. These devices do not merely measure the heat of an oven, but control it and keep the oven temperature constant. A "temperature wheel" (shown at B) is set for a desired temperature and the oven burner lighted. By the expansion or contraction of a sensitive copper tube placed in the top of the oven (shown at



Courtesy of the *National Stove Co.*

FIGURE 81. — OVEN HEAT REGULATOR.

A) the gas valve (shown at C) is opened or closed. When the valve is opened the amount of gas burning is increased or decreased so that the temperature of the oven is kept constant, *i.e.* at the temperature at which the wheel is set. Insulated ovens, *i.e.* ovens which are constructed so as to retain heat and allow little to escape, are found on some of the modern gas, electric, and kerosene stoves. Some of the insulated electric ovens are provided with clocks or dials which may be adjusted so that the current is cut off automatically at the expiration of a certain length of time, or when a certain temperature is reached (see Figure **16**, p. **35**). Because of the insulated walls on such ovens, the food continues to cook on " stored heat."

A chemical thermometer inserted in an oven is a fairly satisfactory means of obtaining oven temperatures. If one has the use of an oven provided with a chemical thermometer in the school kitchen, tests may be obtained so that the temperature of the oven in the home kitchen may be estimated. The tests are as follows: Heat the oven; when it reaches a temperature of 250° F.,[1] place a piece of white paper in the oven. After 5 minutes, remove the paper, note the color. Continue to heat the oven; place paper in the oven at 350° F., 400° F., 425° F., 450° F., 475° F., 500° F., 525° F., and 550° F. Note the color of each piece of paper.

Baking temperatures have been classified as follows:

1. Slow oven (250° to 350° F.) for custards, meringues, sponge and angel loaf cakes.
2. Moderate oven (350° to 400° F.) for bread, gingerbread, layer and loaf cakes containing fat,[2] cookies, small cakes.
3. Hot oven (400° to 450° F.) for Parkerhouse rolls, popovers, muffins, two-crust pies, baked apples.
4. Very hot oven (450° to 550° F.) for pastry shells, searing meats.

Oven temperatures may be estimated also as follows: (*a*) note the number of minutes required to change white

[1] See footnote, p. 353, regarding the use of the Fahrenheit scale.

[2] Read Technical Education Bulletin, No. 22, "Some Attempts to Standardize Oven Temperatures for Cookery Processes," by May B. Van Arsdale, Teachers College, Columbia University.

[3] 325° F. to 350° F. for loaf cakes containing fat and 375° for layer cakes, cookies, and small cakes.

paper, flour, or bread to a light brown or to a golden brown; (*b*) note the number of "counts" (one count per second) that the hand may be held in the oven.

Pour Batter. — All breads may be divided into two classes: (*a*) Quick Breads and (*b*) Yeast Breads. The former are so named because a much shorter time is required in their preparation. Quick breads are divided into several classes, depending upon the proportion of flour and moisture in the batter. A *pour batter* is the thinnest quick bread mixture. It usually contains about equal parts of flour and moisture. A definite proportion cannot be stated, since the thickening quality of different flours varies, and the wetting quality of different moist materials varies. Many pour batters contain a little more flour than moisture. Popover mixture is a typical pour batter.

POPOVERS

1 egg	1 cupful milk
½ teaspoonful salt	1 cupful flour
½ teaspoonful fat (melted)	

Oil iron gem pans; place them in the oven, heat until very hot. Put all the Popover ingredients in a mixing bowl, and beat the mixture with a Dover egg beater. Pour it into the hot pans and bake 35 to 45 minutes in a hot oven, at 425° F. Earthen cups placed in a dripping pan may be used instead of iron pans.

Popovers may be served hot as a bread, for breakfast or luncheon; or may be used as a dessert with custard or lemon filling or sauce. Fruit makes a pleasing addition to Popovers. Before baking, drop a piece of apple, peach, or other fruit, into the batter in each cup.

QUESTIONS

What change, other than moistening the flour, takes place in the milk that helps to lighten the Popovers?

What changes take place in the eggs and in the air inclosed in them when they are heated quickly?

What is the purpose of beating the Popover mixture thoroughly?

How many Popovers will the given recipe make?

LESSON CX

Leavening with Baking Soda and Sour Milk: Spider Corn Bread

Besides the air that is beaten into the eggs and into the combined ingredients of quick bread mixtures, a gas — carbon dioxide — is often introduced into such mixtures. To find how this gas may be formed, try the following:

Experiment 67: Action of Baking Soda on Sour Milk. — Place a teaspoonful of sour milk in a test tube and add a pinch of baking soda. Do you notice any change in the ingredients? Apply heat to the contents of the tube. What kind of material (solid, liquid, or gas) is indicated by the bubbling (see Experiment 7, p. 41)? What does this experiment teach with regard to the use of baking soda and sour milk, for lightening a mixture?

Experiment 68: Chemical Change. — Measure ¼ cupful of thick sour milk.[1] Dip the end of a piece of blue litmus paper in it. What change in color takes place in the paper? When blue litmus changes to pink, an *acid* is present. The sour milk therefore contains acid. Measure ⅛ teaspoonful of baking soda. Mix this with a little water. Test with pink litmus paper. When pink litmus paper changes to blue, an *alkaline* substance is present. Baking soda is therefore alkaline in reaction.

Pour the milk into a saucepan, add about ¾ of the soda mixture, stir and heat until effervescence (bubbling) has ceased. Test the mixture in the saucepan with blue litmus paper. If the blue litmus paper changes color, carefully add a little more of the soda solution. Test with litmus again. If there is still a change in color, add soda solution until the litmus does not change. Then test with pink litmus. When neither pink nor blue litmus paper changes color a *neutral* substance is present, *i.e.* a substance neither acid nor alkaline.

[1] The amount of acid in sour milk varies slightly.

When this occurs, the mixture in the pan is no longer acid in reaction. Neither sour milk nor baking soda exists in the pan. A *chemical change* has taken place. From the union of sour milk and soda, entirely different materials are formed; one is the neutral substance in the pan; another is the carbon dioxide gas which has escaped, and the third is water. When an acid and an alkaline material are mixed, a chemical change always occurs. Chemical changes are constantly taking place when certain food mixtures are cooked and digested.

Experiment 69: Quantity of Baking Soda to Use with Sour Milk. — To the contents of the saucepan of Experiment 68, add ⅛ teaspoonful more of baking soda. Stir, heat, and test with pink litmus. What is the reaction — acid or alkaline? Has the last quantity of soda been neutralized as was the first quantity? Explain.

If more baking soda than is necessary to neutralize the acid of the sour milk is used, some *unneutralized* soda will remain in the mixture. This is undesirable, since soda has a "bitter taste." An excessive quantity of unneutralized soda also discolors the mixture.

Experiments 68 and 69 indicate that the *approximate* proportion of baking soda to sour milk is:

½ teaspoonful of baking soda to 1 cupful of thick sour milk.

The following "equations" indicate the importance of using the proper amount of baking soda to neutralize the acid materials:

1 cupful of sour milk +[1] ½ teaspoonful of baking soda →[1] water + carbon dioxide gas + neutral material.

1 cupful of sour milk + 1 teaspoonful of baking soda → water + carbon dioxide gas + neutral material + unneutralized "soda."

SPIDER CORN BREAD

½ cupful corn-meal	½ teaspoonful baking soda
½ cupful flour	1 egg
1 tablespoonful sugar	1 cupful sour milk
½ teaspoonful salt	1 tablespoonful butter or substitute

[1] The plus sign is read "with"; the arrow is read "yields."

Mix the dry ingredients. In a mixing bowl, beat an egg, add the sour milk, then the dry ingredients. Beat the mixture until the ingredients are well blended.

Melt the butter or substitute in a hot "spider" or frying pan. Pour the corn-meal mixture into it. Bake in a hot oven (400° F.) until sufficiently baked, usually about 25 minutes (see tests below). Serve hot.

Tests for Sufficient Baking of Quick Bread. — Quick Bread is usually sufficiently baked: (*a*) when it is a golden brown in color; (*b*) when the mixture shrinks from the pan; (*c*) when the crust springs back into place, if pressed gently with the fingers; or (*d*) when no batter or dough clings to a wire skewer or knitting needle (see Figure 1) that has been inserted. Usually it is not necessary to apply this last test, unless the quick bread is baked in a loaf or in a very thick layer.

QUESTIONS

Mention the materials used in Spider Corn Bread to make it light. Explain their action.

Explain why satisfactory results could not be obtained by using $1\frac{1}{2}$ teaspoonfuls of baking soda in this Spider Corn Bread recipe.

What is the price per half-pound of baking soda?

How many persons does this Spider Corn Bread recipe serve?

LESSON CXI

Leavening with Baking Soda, Sour Milk, and Molasses: Gingerbread

Experiment 70: Action of Baking Soda on Molasses. — Place a teaspoonful of baking molasses in a test tube and dilute with a little water. Test it with litmus paper. What is its reaction? Add a pinch of baking soda. Heat. What does effervescence indicate? What do we call the gas formed by the action of the baking soda and a substance having an acid reaction? Explain how baking soda and molasses could be used to lighten a quick bread.

Experiment 71: Quantity of Baking Soda to Use with Molasses. — Carefully measure ⅛ cupful of molasses.[1] Dilute it with much water. Carefully measure $\frac{1}{16}$ teaspoonful of baking soda and mix it with water. Add about ¾ of the soda mixture to the molasses solution. Stir and heat. Test with blue litmus. If it changes color, keep adding the soda mixture, until the litmus paper does not change, as in Experiment 68. When neither blue nor pink litmus paper changes color, what kind of substance, — acid, alkaline, or neutral, — is present? What change has taken place in the materials placed in the saucepan?

This experiment shows that the *approximate* proportion of baking soda to molasses is:

½ *teaspoonful of baking soda to* 1 *cupful of molasses.*

This "equation" expresses the chemical change in the experiment:

1 cupful molasses + ½ teaspoonful of baking soda → neutral material + carbon dioxide gas + water.

GINGERBREAD

2 cupfuls flour	⅛ teaspoonful cloves
½ teaspoonful salt	1 egg
¾ teaspoonful baking soda	1 cupful thick sour milk
1 teaspoonful cinnamon	½ cupful molasses
2 teaspoonfuls ginger	½ cupful sugar

2 to 4 tablespoonfuls fat

Mix all the dry ingredients except the sugar. Beat the egg in a mixing bowl. Add the sour milk, molasses, and sugar. If solid fat is used, melt it. Add the fat to the molasses mixture. Through a sifter, add the dry ingredients to other materials. Beat thoroughly and turn at once into a shallow oiled pan. Bake in a moderate oven (375° F. to

[1] The acidity of molasses may be due to fermentation or to the preservatives used in many brands. Its intensity varies.

400° F.) 20 minutes or longer (see *Tests for Sufficient Baking of Quick Bread*, p. 336)

Gingerbread without Eggs may be made. Omit the egg from the recipe above. To the dry ingredients, add 1 teaspoonful of baking powder.

Water Gingerbread may be made by substituting $\frac{7}{8}$ cupful cold water for the sour milk, and using $\frac{1}{4}$ teaspoonful baking soda (instead of $\frac{3}{4}$ teaspoonful) and adding 3 teaspoonfuls of baking powder.

QUESTIONS

Mention the leavening materials used in this Gingerbread, and explain their action.

What is the price per quart of molasses?

How many persons does this recipe serve?

LESSON CXII

Leavening with Baking Powder: Griddle Cakes

Experiment 72: Effect of Cold Water on a Mixture of Cream of Tartar and Baking Soda. — Test a bit of cream of tartar with moistened litmus paper. Is it acid or alkaline in reaction?

Put $\frac{1}{8}$ teaspoonful of baking soda and twice the quantity of cream of tartar in a dry test tube. Does any change take place? Add about 1 teaspoonful of cold water to the mixture and examine. What change takes place? What substance is being formed?

Experiment 73: Effect of Hot Water on a Mixture of Cream of Tartar and Baking Soda. — Repeat Experiment 72, using hot water instead of cold with the baking soda and cream of tartar. Which causes greater effervescence, — hot or cold water? Is it desirable to have more of the gas formed before or after the mixture is placed in the oven? What, then, should be the temperature (hot or cold) of liquids and other materials used in the quick bread mixtures?

Experiment 74: Effect of Hot Water on Baking Powder. — Add about 1 teaspoonful of hot water to $\frac{1}{4}$ teaspoonful of baking powder. Compare the effervescence with that of Experiment 73. From the comparison of Experiments 72 and 73, with Experiment 74, what two kinds of substances do you infer this baking powder contains?

(Save the contents of the tube for the following experiment.)

Experiment 75: Starch in Baking Powder. — Filter the contents of the tube used in Experiment 74 through filter paper (see p. 102, Figure 30). Add a drop of tincture of iodine to the insoluble material left on the filter paper. What is the insoluble constituent of this baking powder?

Composition of Baking Powder. — Baking powder consists of

(*a*) baking soda,
(*b*) a substance having an acid reaction,
(*c*) a starchy material.

The substance of acid reaction varies in different baking powders. Some powders in common use contain either cream of tartar, calcium or sodium acid phosphate, or alum [1] as the "acid" material. Certain baking powders contain a mixture of materials with acid reaction, such as cream of tartar with tartaric acid, and alum with calcium acid phosphate.

The starch is added to keep the other materials apart, and thus prevent the possible formation and consequent loss of carbon dioxide.

The trade name of a baking powder does not usually suggest its composition. But the latter is always stated on the label of the can.

Experiment 76: Comparison of the Time of Action of Different Types of Baking Powders. — Put ½ cupful of water of the same temperature into each of 3 tumblers or glass measuring cups. To one tumbler add ½ teaspoonful of tartrate baking powder; to the second, the same quantity of phosphate baking powder; and to the third an equal quantity of alum (or alum and phosphate) baking powder. Stir each and note the length of time that chemical change occurs in each tumbler. Which type of baking powder reacts the longest time?

[1] Alums differ in composition. They are sulphates of various metals. The alum most commonly used in alum baking powder is sodium aluminium sulphate.

Difference in Types of Baking Powders. — Although there has been much discussion regarding the superiority of one type of baking powder over another, it is thought that one standard baking powder is as little harmful as another. But, as shown by Experiment 76, the action of certain types is slower than that of others, *i.e.* the formation of the gas continues for a longer time. Certain types of baking powders which react very quickly when moisture is added may react to some extent while still in the can and thus lose some of their effectiveness in leavening. It is well to buy those baking powders in such quantities so that a fresh can can be purchased often. The price of certain types of baking powders is much greater than that of others.

Quantity of Baking Powder in Quick Breads. — Since baking powder contains both acid and alkaline materials, the quantity of baking powder used in a quick bread is dependent not upon another leavening material, but upon the quantity of flour and eggs. *When no eggs are used, 2 teaspoonfuls of baking powder should be used with 1 cupful of flour.* When eggs are added to a quick bread, the quantity of baking powder should be lessened $\frac{1}{2}$ teaspoonful for each egg.

Two and one half teaspoonfuls of baking powder should be used with 1 cupful of coarse wheat flour or flour or meal other than wheat.

Suggestions for Preparing Griddle Cakes. — The general rules for mixing quick breads apply also to griddle cakes. When the yolk and white of the egg are separated, the mixture will be somewhat lighter. Most housekeepers, however, beat the eggs together quickly, and find the result satisfactory.

The consistency of griddle cake batter is most important. As suggested in the recipe (p. 341), the moisture should be added cautiously. Since the quantity of baking powder depends upon the amount of flour, it is better to change from a thick to a thinner batter by increasing the moisture, rather than to change from a thin to a thicker batter by increasing the flour. After mixing the batter, drop a small cake on the hot iron. The thickness as well as the grain of the browned cake depends largely upon the consistency of the batter. If too much moisture has been used, the cake is thin, " pasty," and coarse grained.

A griddle should be heated slowly, and should be hot when the cakes are mixed. If sufficient fat is used in the batter, it is not necessary to oil the griddle. The recipes for griddle cakes given in this book contain one and one half times the quantity of fat generally used in griddle cake batters. Hence oiling the griddle is unnecessary. It is well after each baking to wipe off the griddle with a cloth or paper.

Drop the batter by the spoonful (from the end of the spoon) on the hot griddle, brown on the under side thoroughly. When the cakes have risen, when the tops are full of bubbles, and when the edges are brown, the cakes should be turned and browned on the other side. Serve cakes at once after baking.

PLAIN GRIDDLE CAKES

2 cupfuls flour	1 egg
½ teaspoonful salt	1½ cupfuls milk
3½ teaspoonfuls baking powder	3 tablespoonfuls fat

Prepare according to the directions above. Add the milk cautiously. More or less (according to the absorbing property of the flour) than the given quantity may be required.

¼ cupful of sugar or molasses may be added to the mixture. If desired, one more egg may be used in this recipe. Serve with maple or other sirup (see *Sirup*, p. 98).

BREAD GRIDDLE CAKES

$1\frac{1}{2}$ cupfuls bread crumbs	1 to 2 eggs
$1\frac{1}{2}$ cupfuls hot milk	$\frac{1}{2}$ cupful flour
3 tablespoonfuls fat	$\frac{1}{2}$ teaspoonful salt

3 teaspoonfuls baking powder

Soak the bread in the hot milk until soft. Add the other ingredients in the order given.

1 cupful of cooked cereal may be used instead of bread crumbs. *Rice Griddle Cakes* are especially pleasing.

QUESTIONS

Account for the quantity of baking powder used in each of these recipes.

What is the price per pound of cream of tartar? Of tartrate baking powder? Of phosphate baking powder? Of alum baking powder? Of alum-phosphate baking powder?

What would be the effect of exposing baking powder to moist air? How should baking powder be stored?

What kind of griddle cakes result when the batter is too thin? When too thick?

What indicates that the griddle is too hot? Too cool?

How should griddle cakes be served?

LESSON CXIII

Leavening with Baking Soda, Sour Milk, and Baking Powder: Sour Milk Griddle Cakes

Additional Leavening for Sour Milk Mixtures. — Some housekeepers maintain that a superior flavor and quality is given to quick bread by the use of sour milk. It has been found that most quick breads are sufficiently light and porous when made with sour milk and baking soda, provided they contain as much or almost as much sour milk as flour and provided they contain eggs. If *the quantity of sour milk is* *much less than that of flour* and *no eggs are present*, it is often desirable to add leavening materials other than sour milk and baking soda.

From the results of Experiment 69, p. 335, we know that an increased quantity of baking soda will not produce satisfactory results. Hence more carbon dioxide gas must be obtained by other means. Since baking powder consists of both baking soda and an "acid" material, it makes a desirable substance for additional leavening. A combination of baking soda, sour milk, and baking powder is therefore used for leavening some quick bread mixtures, especially those that contain only a small quantity of sour milk and no eggs. This involves a double reaction:

(*a*) Baking soda + sour milk $\rightarrow$ neutral material + carbon dioxide gas + water.

(*b*) Baking powder (moistened and heated) $\rightarrow$ neutral material + carbon dioxide gas + water.

About $\frac{1}{4}$ of baking powder is baking soda. Hence $\frac{1}{4}$ teaspoonful of baking soda (with the necessary quantity of "acid" material) is equivalent to 1 teaspoonful of baking powder in leavening. If 2 teaspoonfuls of baking powder are used to leaven 1 cupful of flour, $\frac{1}{2}$ *teaspoonful of baking soda* (with the necessary quantity of "acid" material) *should be used to leaven* 1 *cupful of flour.*

Two thirds teaspoonful of baking soda (with the necessary quantity of "acid" material) *should be used to leaven* 1 *cupful of coarse flour or flour or meal* other than wheat.

In determining the quantity of baking powder to use in materials leavened with sour milk and baking soda, note the quantity of baking soda and flour. Assuming that $\frac{1}{2}$ teaspoonful of baking soda (with "acid") or 2 teaspoonfuls of baking powder leavens 1 cupful of flour, determine the amount of flour that the given quantity of baking soda (with "acid") will leaven and then use sufficient baking powder to leaven the remainder of the flour. For example, if a recipe states (among other ingredients) ½ teaspoonful of baking soda and 2 cupfuls of flour, the baking soda (with "acid") will leaven 1 cupful of flour. Hence baking powder sufficient to leaven 1 cupful of flour (*i.e.* 2 teaspoonfuls) should be used. Again, if a recipe states that ¾ teaspoonful baking soda and 2 cupfuls of flour, the baking soda (with "acid") will leaven 1½ cupfuls of flour. Hence baking powder sufficient to leaven ½ cupful flour (*i.e.* 1 teaspoonful) should be used.

SOUR MILK GRIDDLE CAKES (without eggs)

2 cupfuls flour	⅞ teaspoonful baking soda
½ teaspoonful salt	1¾ cupfuls sour milk
½ teaspoonful baking powder	3 tablespoonfuls fat

Turn the sour milk into a mixing bowl. Melt the fat and add it to the sour milk. Add the dry ingredients (through a sifter) to the mixture. Mix thoroughly. If more moisture is needed, add water.

CORN-MEAL GRIDDLE CAKES

1 cupful corn-meal	1 cupful flour
2 cupfuls water	1 teaspoonful salt
3 tablespoonfuls fat	½ teaspoonful baking soda [1]
1 cupful sour milk	2½ teaspoonfuls baking powder [1]

1 to 2 tablespoonfuls sugar

Add the corn-meal to the water, mix thoroughly, and cook 5 minutes. Add the fat. Cool. Then add the milk and dry ingredients. Mix thoroughly. Drop at once on a hot griddle.

[1] The ½ teaspoonful of baking soda (with "acid") is sufficient to leaven the 1 cupful of flour. Then 2½ teaspoonfuls of baking powder should be added, since 1 cupful of corn-meal is contained in the recipe (see *Quantity of Baking Powder in Quick Breads*, p. 340).

FRUIT SIRUP

Cook fresh fruit, or dried fruit that has been soaked in water, in a generous quantity of water until it is very soft. Press through a strainer. If it is not of the consistency of catsup, add more hot water. Add from one eighth to one fourth cupful of sugar for each cupful of sirup, or "sweeten to taste." Serve on griddle cakes, or use as a sauce for Bread Pudding or Rice Pudding.

Fruit butters, marmalades, or jams may be diluted with water, heated, and used in the same way.

QUESTIONS

If an egg or two were added to griddle cakes made with sour milk, how should the recipe be changed? Give reasons for the change.

Explain the action of the leavening agents in Sour Milk Griddle Cakes (without eggs).

In a quick bread leavened with baking soda, sour milk, and baking powder, upon what ingredient does the quantity of baking soda depend? Upon what ingredients does the quantity of baking powder depend? Explain your answers.

What is the purpose of cooking the corn-meal before adding the other ingredients? Why should the cooked mixture be cooled before adding the other ingredients?

LESSON CXIV

Leavening with Baking Soda, Sour Milk, and Cream of Tartar: Steamed Brown Breads

Additional Leavening for Sour Milk Mixtures. — Instead of using prepared baking powder as additional leavening for sour milk mixtures (see previous lesson) cream of tartar with sour milk and baking soda may be used. Enough baking soda must be used, however, to neutralize both the sour milk and the cream of tartar. This involves a double reaction:

(*a*) Baking soda+sour milk ⟶ water+carbon dioxide gas +neutral substance.

(*b*) Baking soda+cream of tartar ⟶ water+carbon dioxide gas+a neutral substance.

If molasses is used with the sour milk and baking soda, a third reaction occurs:

(*c*) Baking soda+molasses ⟶ water+carbon dioxide gas +neutral substance.

It has been found that the following proportion of cream of tartar and baking soda is effective in leavening: $1\frac{1}{4}$ *teaspoonfuls of cream of tartar with* $\frac{1}{2}$ *teaspoonful of baking soda.* These quantities of materials are sufficient to leaven 1 cupful of flour. $1\frac{1}{2}$ *teaspoonfuls of cream of tartar with* $\frac{2}{3}$ *teaspoonful of baking soda are required to leaven* 1 *cupful coarse wheat flour or flour or meal other than wheat.*

In determining the quantity of cream of tartar and baking soda to use with mixtures containing sour milk or other acid food, note the quantity of flour (or other cereal) in the recipe. Assuming that $\frac{1}{2}$ teaspoonful of baking soda (with the necessary "acid" material) leavens 1 cupful of flour, determine the total quantity of baking soda, which (with the necessary "acid" material) will leaven the flour. Then determine how much of the baking soda will be neutralized by the sour milk or other "acid" food. Assuming that $1\frac{1}{4}$ teaspoonfuls of cream of tartar are needed to neutralize $\frac{1}{2}$ teaspoonful of baking soda, use enough cream of tartar to neutralize the remainder of the baking soda. For example, if a recipe calls for (among other ingredients) 2 cupfuls flour and 1 cupful of sour milk, 1 teaspoonful of baking soda (with the necessary "acid" material) will be needed to leaven the flour. Since 1 cupful of sour milk will neutralize only $\frac{1}{2}$ teaspoonful of baking soda, enough cream of tartar (*i.e.* $1\frac{1}{4}$ teaspoonfuls) will be needed to neutralize the remainder of the baking soda.

General Suggestions for Steamed Quick Bread Mixtures. — A quick bread mixture that is to be steamed should be placed in a covered utensil. If the mold or the can used for steaming has no cover, an oiled paper should be tied over the top. As with all quick breads, the molds for steamed mixtures should be oiled. If the quick bread is a pour batter, the mold should be oiled and then sprinkled with flour. It should never be filled more than two thirds full.

A steamer placed over boiling water may be used for the steaming; or a kettle of boiling water containing a rack may be used. If the latter device is employed, the boiling water in the kettle should come halfway to the top of the molds. As the water evaporates, add more *boiling* water. Less time is required in the steaming, if the mold is placed directly in the water.

At least one hour is required for steaming breads. The longer brown bread is steamed, the darker it becomes. A mixture in an earthen mold requires more time than does one in a tin or granite mold (see Experiment 46, p. 169).

PLAIN BROWN BREAD

2 cupfuls graham flour	$\frac{2}{3}$ teaspoonful salt
$\frac{2}{3}$ cupful white flour	$1\frac{2}{3}$ teaspoonfuls baking soda
$\frac{2}{3}$ cupful brown sugar	$1\frac{1}{2}$ teaspoonfuls cream of tartar

2 cupfuls sour milk

Mix all dry ingredients thoroughly. Turn the sour milk into a mixing bowl. Add the dry ingredients; mix well. Turn at once into an oiled bread pan, and bake in the oven from 50 to 60 minutes; or fill one-pound baking powder cans (which have been oiled) two thirds full, and steam at least 4 hours. If the bread is steamed, remove it (after steaming) from the molds and dry in the oven for a few minutes.

BOSTON BROWN BREAD

$\frac{1}{4}$ cupful sugar	2 teaspoonfuls baking soda
1 cupful corn-meal	2 teaspoonfuls cream of tartar
2 cupfuls graham flour	2 cupfuls sour milk
$\frac{3}{4}$ teaspoonful salt	$\frac{1}{2}$ cupful molasses

Mix the dry ingredients (except the sugar) thoroughly. Turn the molasses, sugar, and sour milk into a mixing bowl. Add the dry ingredients; mix well. Turn at once into oiled molds, and steam at least 4 hours. Remove from the molds, and dry in the oven for a few minutes.

Rye meal or bread crumbs may be substituted for 1 cupful of graham flour.

If dried bread crumbs are used, moisten them with a little cold water before adding to the other ingredients.

1 cupful of raisins may also be added to the ingredients of the above recipe. If raisins are used, cut them in two and sprinkle flour over them.

BUTTER BALLS

Cut firm butter into half-ounce pieces and place in a pan of ice water. Scrub the butter paddles; place in boiling water for 10 minutes; and then in the pan of ice water until chilled. Place a piece of butter on one of the paddles and hold the paddle stationary. Shape the butter with the other butter paddle, moving it in a circular direction. Hold the paddle over the ice water while shaping. Place the butter balls in a cool place.

QUESTIONS

What gas is formed in these mixtures to leaven them? By what means is the gas formed in each mixture?

How much baking soda and cream of tartar should be used in a recipe containing 2 cupfuls of flour, 1 cupful of sour milk, and $\frac{1}{2}$ cupful molasses?

Account for the quantity of baking soda used in each of the Brown Bread recipes.

Give two reasons why the paper used to cover a steamed quick bread mixture should be oiled. Why are molds for steamed mixtures filled only two thirds full?

Why should *boiling* water be used to replenish the water in steaming kettle? Why is a longer time required for steaming than for baking quick bread mixtures?

Why should butter paddles be cleaned with a brush rather than with a cloth?

What is the purpose of placing butter paddles in boiling water before using?

Why hold the paddles over ice water while shaping the butter balls?

LESSON CXV

Formulating Recipes — Waffles

Leavening Formulas. — A practical housekeeper needs to be able to formulate fundamental recipes. In preparing quick bread recipes, she should know the required consistency of flour mixtures, *i.e.* the approximate proportion of moisture and flour for each bread; and the proportion of leavening, seasoning, and "shortening" (fat) materials to use with flour.

In previous lessons, general statements have been made concerning the quantity of leavening materials to use under various conditions. The following is the approximate amount of leavening material to be used for quick breads that contain little or no sugar:

BAKING SODA AND SOUR MILK

½ teaspoonful baking soda to 1 cupful of sour milk

BAKING SODA AND MOLASSES[1]

½ teaspoonful of baking soda to 1 cupful molasses

[1] See footnote, p. 337.

FLOUR AND BAKING POWDER

2 teaspoonfuls baking powder to 1 cupful of flour when no eggs are used.

When eggs are used, reduce the entire quantity of baking powder by ½ teaspoonful for each egg.

COARSE WHEAT FLOUR, OR FLOUR (OR MEAL) OTHER THAN WHEAT, AND BAKING POWDER

2½ teaspoonfuls of baking powder to 1 cupful of coarse flour or meal.

FLOUR, CREAM OF TARTAR, AND BAKING SODA

1¼ teaspoonfuls of cream of tartar and ½ teaspoonful of baking soda to 1 cupful of flour.

COARSE WHEAT FLOUR, OR FLOUR (OR MEAL) OTHER THAN WHEAT, CREAM OF TARTAR AND BAKING SODA

1½ teaspoonfuls of cream of tartar and ⅔ teaspoonful of baking soda to 1 cupful of flour.

Examine a number of recipes previously given, and note the quantity of salt and fat used with 1 cupful of flour.

In general, the following quantities of salt and fat are used for quick breads that contain little or no sugar:

FLOUR AND SALT

¼ teaspoonful of salt to 1 cupful of flour

FLOUR AND FAT

1 tablespoonful of fat to 1 cupful of flour

While these data are helpful in formulating recipes, the pupil should remember that they are all approximate and for plain breads only. When recipes are modified by the addition of a cereal, a fruit, or a flavoring material, some of the quantities will need to be changed.

WAFFLES

2 cupfuls flour	1 to 2 eggs
3 to $3\frac{1}{2}$ teaspoonfuls baking powder	$1\frac{1}{2}$ cupfuls milk
$\frac{1}{2}$ teaspoonful salt	2 tablespoonfuls fat

Mix according to the directions for Plain Griddle Cakes (see p. 341). The quantity of baking powder depends upon the number of eggs. The greater quantity should be used with one egg. Before using the waffle irons, they should be heated slowly on both sides and oiled thoroughly. Oleomargarine, oil, or lard may be used for this purpose.

Pour the batter quickly into the hot irons, close the irons at once, and brown the waffles on both sides. Serve with sirup or gravy.

QUESTIONS

Write a recipe for waffles, using sweet milk and baking powder and 3 eggs.

Write two recipes for waffles, using sour milk and soda (with additional leavening, if necessary) and 1 egg in the one, and 2 eggs in the other.

How many waffles does the given recipe make?

RELATED WORK

LESSON CXVI

Measurement of the Fuel Value of Foods

How Food is Assimilated. — The uses of the foodstuffs, — carbohydrates, fats, protein, ash, water, and vitamines, — were given (see p. 257). It was stated that these foodstuffs either (*a*) "burned" (*i.e.* united with oxygen) and produced energy, (*b*) built the body, or (*c*) aided in regulating body processes.

All parts of the body are composed of microscopic cells. By the process of digestion the foodstuffs are made entirely soluble (see *Solution and Digestion*, p. 40); they are then further altered, *i.e.* split to their end products and absorbed through the walls of the alimentary canal. The blood carries the digestion products to all parts of the body. The blood also carries oxygen, — which has been breathed into the body from the air, — to all parts of the body. The body cells then select the foodstuffs that they need to carry on their work. Some cells pick out the fuel materials — carbohydrates, fat, or protein — and oxygen. Fuel foods when oxidized, produce energy. Other body cells select some of the body builders — protein or ash — and use these for building or repairing tissue. The cells which build bone choose ash and the other materials needed for building bones; the cells which build muscle choose protein and the other materials needed for building muscle.

Little is known regarding the use of vitamines by the body cells, other than that they are indispensable for the growth and maintenance of the body.

How Energy or Fuel Value is Measured. — It was stated (pp. 70 and 152) that the human body could be compared to an automobile, *i.e.* the "burning" of the fuel foods in the body produced the ability to do work. The quantity of energy that fuel food is capable of giving off is termed the *fuel value* of that food. Energy has been defined as the ability to do work. Since heat is energy, the fuel value of foods shows, in part,[1] their nutritive value. *If the quantity of heat that is produced by burning a food is measured, the meas-*

[1] Although ash, water, and vitamines nourish the body, it is impossible to measure their nutritive value in terms of fuel value. Fuel value expresses the nutritive value only of the combustible foodstuffs, — carbohydrates, fats, and protein. However, according to Sherman, "the most conspicuous nutritive requirement is that of energy for the work of the body." Hence, the fuel value of a food is often spoken of as its nutritive value (see "Chemistry of Food and Nutrition," Second Edition, by Henry C. Sherman, Ph.D., p. 138).

urement indicates the quantity of energy that the food is capable of giving to the body.

Heat cannot be measured by weight or length, but by the change in temperature which it produces in a given weight of a certain material. The heat unit is not a pound or yard, but a *Calorie*, or a definite quantity of heat, which, when applied to materials, will produce change of temperature in those materials. If the temperature of one pound [1] of water is 70° Fahrenheit,[1] and it is desired to increase the temperature of that water to 74° Fahrenheit, a certain quantity of heat will have to be applied. It has been found that the quantity of heat required to raise the temperature of one pound of water through any four degrees of the Fahrenheit scale is practically the same, *i.e.* the quantity of heat required to raise the temperature of one pound of water from 32° to 36° F. is about the same as the quantity of heat that must be applied to raise the temperature of one pound of water from 60° to 64° F. The unit of measurement of heat is taken as the quantity of heat required to raise the temperature of one pound of water through about 4° F.

The Calorie,[2] used for food calculation, *is approximately the quantity of heat required to raise the temperature of one pound (pint) of water through* 4° F. If one pint of water were placed over a lighted burner and heated until it increased four degrees in temperature, approximately one Calorie of heat would have been applied to the water (see Figure 82).

[1] NOTE TO THE TEACHER. — The avoirdupois system of measurement and the Fahrenheit scale of temperature are used in this text. It is believed by the author that less than ten per cent of all pupils taking this course will enter college. Hence, the use of the measurements that are more in keeping with the pupils' practical needs. For the small minority who will enter college, a thorough drill in the metric system is urged. The following formula gives the necessary information for changing from the Fahrenheit to the Centigrade scale: Subtract 32 and multiply by $\frac{5}{9}$.

[2] *I.e.* greater Calorie, distinguished from the lesser calorie by the capital C.

How the Fuel Value of a Food Material is Measured. — Scientists have worked with care to obtain accurate data for the measurement of the heat produced by foods burning in the body. The data accepted to-day differ from those given by Rubner some years ago.[1]

1 gram protein yields 4 Calories
1 gram fat yields 9 Calories
1 gram carbohydrate yields 4 Calories
Expressing grams approximately in ounces, these data become:
1 ounce of protein yields 113 Calories
1 ounce of fat yields 255 Calories
1 ounce of carbohydrate yields 113 Calories

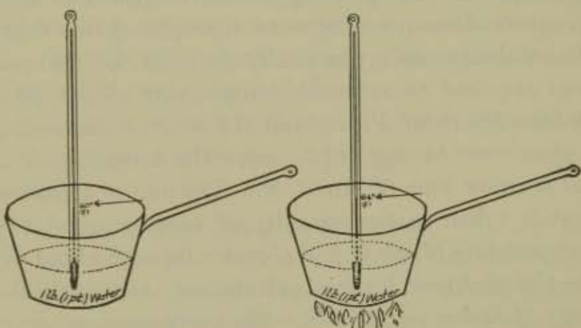


FIGURE 82. — ILLUSTRATING THE AMOUNT OF HEAT REPRESENTED BY ONE CALORIE.

In order to find the fuel value of foods, it is necessary to know their composition. For such data *United States Department of Agriculture* Bulletin No. 28 is a valuable source.

Flour. — The fuel content of flour is (see *United States Department of Agriculture*, Bulletin No. 28, p. 58, All Analyses Average):

10.6 per cent protein; 1.1 per cent fat; 76.3 per cent carbohydrates. Then, 1 ounce of flour contains, 0.106

[1] See "Chemistry of Foods and Nutrition," Second Edition, by Henry C. Sherman, Ph.D., p. 143, "Physiological Fuel Values."

ounce of protein; 0.011 ounce of fat; 0.763 ounce carbohydrates.

The protein in one ounce of flour yields ($113 \times 0.106 =$) 11.97 Calories.

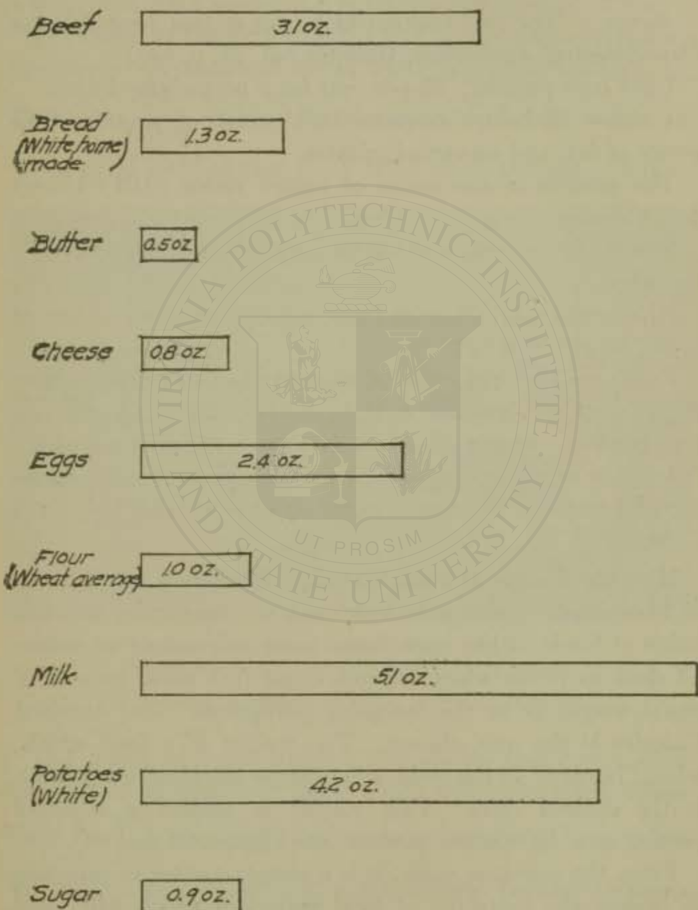


FIGURE 83. — COMPARATIVE WEIGHTS OF 100-CALORIE PORTIONS OF FOODS.

The fat in one ounce of flour yields ($255 \times 0.011 =$) 2.80 Calories. The carbohydrates in one ounce of flour yield ($113 \times 0.763 =$) 86.21 Calories.

Total Calories furnished by 1 ounce of flour are ($11.97 + 2.80 + 86.21 =$) 100.98.

Butter. — The fuel content of butter is (see *United States Department of Agriculture*, Bulletin No. 28, p. 54):

1 per cent protein; 85 per cent fat; no carbohydrates.

1 ounce of butter contains 0.01 ounce of protein, 0.85 ounce of fat, and no carbohydrates.

The protein in one ounce of butter yields ($0.01 \times 113 =$) 1.13 Calories.

The fat in one ounce of butter yields ($0.85 \times 255 =$) 216.75 Calories.

Number of total Calories furnished by one ounce of butter is ($1.13 + 216.75 =$) 217.88.

Sugar. — The fuel content of sugar is (see *United States Department of Agriculture*, Bulletin No. 28, p. 65) no per cent protein; no per cent fat; 100 per cent carbohydrates.

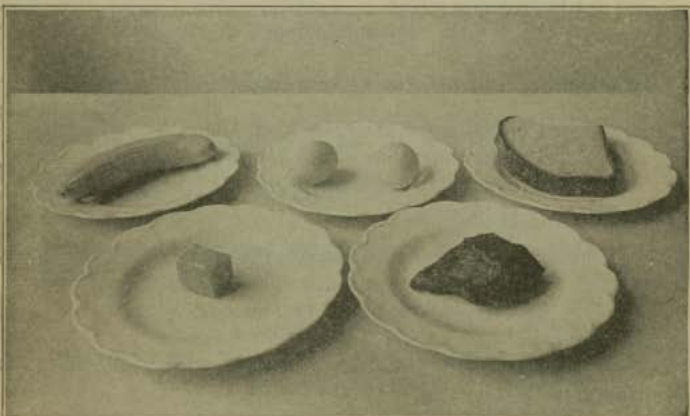
1 ounce of sugar contains no protein, no fat, and 1 ounce carbohydrates. 1 ounce sugar yields ($113 \times 1 =$) 113 Calories.

How the Weight of Food Materials Producing 100 Calories is Measured. — For practical work in computing the fuel value of foods, it has been found more convenient to reduce all data to terms which express equal fuel value instead of equal weight as in the foregoing paragraph. One hundred Calories is the unit chosen. The weight of a food which, when "burned" in the body, will produce one hundred Calories is the desired data. This weight is termed a *standard portion* or a *100-Calorie portion* (see Figures 83 and 84).

From the previous work, it is a simple matter to compute in ounces the quantity of food materials which will yield 100 Calories.

If 1 ounce of flour yields 100.98 Calories and x represents the number of ounces of flour which will yield 100 Calories, then $\frac{x}{1}=\frac{100}{100.98}$ or $x=0.99$, the number of ounces of flour which yield 100 Calories, *i.e.* a 100-Calorie portion of flour.

If 1 ounce of butter yields 217.88 Calories and x represents the number of ounces of butter which will yield 100 Calories, then $\frac{x}{1}=\frac{100}{217.88}$ or $x=0.45$, the number of ounces of butter which yield 100 Calories, *i.e.* a 100-Calorie portion of butter.



a *b* *c* *d* *e*

FIGURE 84. — 100-CALORIE PORTIONS OF FOODS.

a, banana; *b*, butter; *c*, eggs; *d*, meat; *e*, bread.

If 1 ounce of sugar yields 113 Calories and x represents the number of ounces of sugar which will yield 100 Calories, then $\frac{x}{1}=\frac{100}{113}$ or $x=0.88$, the number of ounces of sugar which will yield 100 Calories, *i.e.* a 100-Calorie portion of sugar.

How the Fuel Value of a Combination of Food Material is Measured. — It is possible to compute the fuel value of a food that is made up of several food materials. To do this one must know or find:

(*a*) Recipe for food.

(*b*) Weight and measure of combustible food materials.

(*c*) Number of Calories yielded by one ounce of each of the combustible foodstuffs.

The recipe for one loaf of bread is (see p. 406):

1 cupful water	½ tablespoonful butter
1 teaspoonful salt	¼ cake compressed yeast
1 teaspoonful sugar	¼ cupful water
3½ cupfuls flour	

By weighing and measuring one finds:

1 pound sugar measures 2 cupfuls
1 pound butter measures 2 cupfuls
1 pound flour measures 4 cupfuls

Then,

1 teaspoonful sugar weighs 0.16 ounce
½ tablespoonful butter weighs 0.25 ounce
3½ cupfuls flour weigh 14.0 ounces

(From data of *How the Fuel Value of a Food Material is Measured* (p. 354).)

1 teaspoonful sugar yields ($113 \times 0.16 =$) 18.08 Calories
½ tablespoonful butter yields ($217.88 \times 0.25 =$) 54.47 Calories
3½ cupfuls flour yield ($100.98 \times 14 =$) 1413.72 Calories
1 loaf of bread yields ($18.08 + 54.47 + 1413.72 =$) 1486.27 Calories

For the practical method of calculating diet (which is more fully treated on p. 393), it is convenient to have the 100-Calorie portion of a recipe, or a "made" food.

The 100-Calorie portion of bread is estimated from the result above in the following manner:

Since 1486.27 Calories are yielded by one loaf of homemade bread, then 100 Calories are yielded by ($100 \div 1486.27 =$) .06 or 6 per cent of a loaf of homemade bread; hence, $\frac{1}{18}$ (6%) or 1 slice of homemade bread yields 100 Calories.

QUESTIONS

Find the number of Calories produced by one ounce of milk.

Find the number of Calories produced by one ounce of egg.

Weigh out 100-Calorie portions of flour, butter, and sugar.

Measure these quantities, using a cup for the flour, a tablespoon for the butter, and a teaspoon for the sugar.

Compute 100-Calorie portions of milk and the edible portion of eggs, then weigh these portions.

Measure this portion of milk in a cup. How many eggs make a standard portion?

Why are water, salt, and yeast not considered when the fuel value is computed?

Compute the fuel value of 1 pint of Soft Custard (for data see p. 179).

Find the 100-Calorie portion of Soft Custard.

Note. — Forms A and B given on the following pages will be found convenient in recording the results of these calculations.

LESSON CXVII

Planning, Cooking, and Serving a Dinner

Plan a plain dinner.[1] Use seasonable foods. Follow the suggestions given in Lesson CV (p. 318). Plan the menu so that the cost of the materials used does not exceed 25 cents per person. Analyze the menu and see that it meets the requirements stated in Lesson CV.

Cook and serve the dinner. Follow the English or family style of serving (see p. 122). Serve the meal without a maid.

[1] See footnote, p. 327.

FORM A: CALCULATION OF 100-CALORIE PORTIONS OF FOODS

Food:	Percentage Composition			Calories Produced by			Total Calories Produced by 1 oz. of Food	Weight in Ounces of 100-Calorie Portion	Quantity of 100-Calorie Portion	Calories Produced by Protein in 100-Calorie Portion	Cost per Pound, Quart, etc.	Cost of 100-Calorie Portion
	Protein	Fat	Carbo-hydrate	Protein in 1 oz. of Food	Fat in 1 oz. of Food	Carbohydrate in 1 oz. of Food						

Signature ______________________________ Date ______________________

FORM B: CALCULATION OF FUEL VALUE OF RECIPES

Food:...Number to Serve...

Ingredient	Quantity	Weight	Percentage Composition			Total Calories Produced by 1 oz. of Food	Total Calories Produced by Given Weight of Food	Calories Produced by Protein in Given Weight of Food	Cost per Pound, Quart, etc.	Cost of Given Weight of Food
			Protein	Fat	Carbo-hydrate					
Total										

Percent of Total Calories produced by Calories derived from Protein..........................

Weight in Ounces of 100 Calorie portion..................

Approximate Measure of 100-Calorie portion..............

Cost of 100-Calorie portion...

Signature...

Date...

LESSON CXVIII

Review: Meal Cooking

MENU

Cereal Griddle Cakes		Butterscotch Apples
Fruit Sirup	*or*	Gingerbread
Coffee		Tea

See Lesson XIV, p. 68, regarding suggestions for the preparation of the lesson.

LESSON CXIX

Home Projects [1]

Suggestions for Home Work. — Prepare a quick bread such as Popovers or Gingerbread in your home at least once a week.

If griddle cakes are served in your home, prepare cakes at least once a week.

Calculate the cost of these breads.

Suggested Aims:

(1) To use various leavens in quick breads. To compare results secured by using sweet milk or water with baking powder, and sour milk with baking soda, or sour milk with baking soda and baking powder.

(2) To use different liquids in Gingerbread, viz., sour milk, water, sweet milk. To compare results obtained by the use of each.

[1] See Lesson IX, p. 51.

DIVISION ELEVEN

QUICK BREADS: DROP BATTERS

LESSON CXX

Fine and Coarse Flours — Muffins

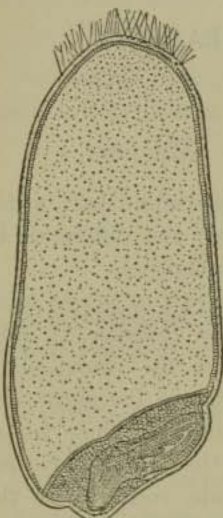
Differences in Wheat Flours. — Examine white flour, whole wheat flour, and graham flour. Notice the difference in color, grittiness, and quantity of bran (cellulose).

As has been mentioned before, all cereals or grains have an outer hard covering of cellulose (see *Cellulose*, p. 80). Cereals also contain a germ from which the young plant springs. In the preparation of fine flours, the germ and most of the cellulose covering are removed. Whole wheat (erroneously named) has part of the outer covering removed. Graham[1] flour, properly made, contains all the materials of the wheat grain. The germ is rich in fat, protein, and ash. The outer part, called *bran*, contains more ash, fat, and protein than does the center of the grain. Hence with the removal of the germ and bran, much of the protein and ash is lost (see Figure 85, p. 364). However, much graham flour is a mixture of inferior flour and bran.

The Milling of Flour. — In the milling of fine flour, the wheat kernels are passed through a series of rollers and sifters that crush the wheat and separate the bran from the other materials. The greater the number of times the flour

[1] Graham flour is so called because Dr. Sylvester Graham advocated the use of the entire grain and devised a method of preparing it.

is subjected to the rolling and sifting process, the more thoroughly are the parts of the grain separated and the more finely are they crushed. When the separation is complete, the resulting fine flour consists almost entirely of the center of the crushed grains (called *middlings*). Flour made with fewer rollings and siftings contains more of the outer coats. In general, the term *patent* is applied to flour made from the middlings. The flour containing more of the outer coats is called *baker's* or family flour. Patent flour contains more starch than does baker's flour while baker's flour contains more protein than does patent flour. The terms *patent* and *baker's* vary in meaning, however, in different localities.



From *Maine Agricultural Experiment Station Bulletin No. 103.*

FIGURE 85. — LONGITUDINAL SECTION OF WHEAT GRAIN SHOWING BRAN (outer coatings), FLOURY PART (interior of grain), AND GERM (base of grain).

Value of Coarse Flour. — Analyses show that graham and whole wheat flours contain more protein and ash than fine white flour. So it would seem that breads made from these coarser flours furnish more body-building material. But investigations have shown that the protein contained in the coarse flours is not entirely assimilated and that about the same quantity of protein is digested and absorbed from fine as from coarse flours.

The coarser grain products, however, have more available ash than the fine flours. Indeed, experiments show that the bran of coarse cereals is a valuable source of ash[1] and that

[1] See "Chemistry of Food and Nutrition," Second Edition, H. C. Sherman, p. 306, "Grain Products," and p. 308.

whole wheat flour is a more complete food than fine or bolted wheat flour.[1] Doubtless, for many persons, whole wheat foods are more beneficial than fine flour products.

Per Cent of Nutrients; Nutritive Values. — The per cent of nutrients in a food does not always indicate the quantity of nourishment it will yield. The nutrient must be in a condition to be absorbed. Wheat grains contain as much protein when whole as when ground into meal, yet uncooked whole wheat grains yield little nourishment to the body. They pass through the system with much nutriment unextracted. Even if the unbroken grains are thoroughly cooked, they will not furnish as much nourishment to the body as they will when in the form of meal.

In the consideration of nutritive value, the personal factor enters, for some persons assimilate food much more easily or completely than others. In summing up what has been said, it will be seen that three factors determine the nutritive value of a food: (*a*) per cent of nutrients, (*b*) form of nutrients, and (*c*) personal digestive characteristics.

Drop Batters. — All batters can be stirred with a spoon. Drop batters are somewhat stiffer than pour batters. They contain, approximately, *two parts of flour to one part of moisture.* Compare the Plain Muffin recipe below with that for Popovers (see p. 333). Note how the recipes differ in the quantity of flour used. Why do muffins contain baking powder, while popovers do not? Muffin mixture is a typical drop batter.

PLAIN MUFFINS

2 cupfuls flour	1 to 2 tablespoonfuls sugar
3½ teaspoonfuls baking powder	1 egg
½ teaspoonful salt	1 cupful milk

2 tablespoonfuls fat

[1] See "The Newer Knowledge of Nutrition," E. V. McCollum, p. 140.

Break the egg into a mixing bowl, beat it. Add the milk to it. Melt the fat, add it to the egg mixture.

Measure the dry ingredients thoroughly. Add them (through a sifter) to the other ingredients. Mix quickly and thoroughly, and drop into buttered muffin pans. Bake in a hot oven (400° F.) from 25 to 30 minutes.

Whole wheat flour may be substituted for fine white flour.

For *graham* muffins, use 1 cupful of fine white flour and 1 cupful of graham flour.

1¼ cupfuls of *sour milk* may be used instead of 1 cupful of sweet milk. If this substitution is made, use ½ teaspoonful baking soda and decrease the baking powder to 2 teaspoonfuls.

Molasses may be substituted for sugar.

QUESTIONS

Account for the quantity of baking powder in the muffin recipes. What determines the quantity of baking powder?

Write a recipe for muffins, using sour cream instead of milk. What ingredients may be decreased in quantity if sour cream is used?

If all the cups in the muffin pan are not filled with batter, how should the empty cups be protected while in the oven?

How many muffins will the recipes above make?

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of patent wheat flour, of graham flour, and of "entire" wheat flour. Which contains the most protein and ash? Which probably yields the most protein to the body? Account for the discrepancy (see *Value of Coarse Flour*, p. 364).

Tabulate the percentage composition of baker's flour and of a high grade of wheat flour (patent roller process). Which contains the more protein? Which, the more carbohydrates?

What is the weight of a barrel of flour? Of an ordinary sack of flour?

What is the present price per sack of baker's and of high-grade patent flour?

How many cupfuls in a pound of flour?

In what quantity are whole wheat flour and graham flour usually purchased for home use? What is the price per pound of each?

LESSON CXXI

Comparison of Wheat and Other Grains — Muffins

Substituting Other Cereals for Wheat Flour. — A resourceful worker in foods is able to follow a standard recipe and make such substitutions as her available materials permit. Such ability is most desirable. It enables one to work more independently, to produce more varied foods, and to utilize all materials, allowing none to waste.

During the wheat shortage of the World War, many valuable investigations were made regarding the substitution of other grains for wheat flour. It was found that *the substitution should be based upon the relative weights of wheat flour and other flours or meals* rather than upon their relative measures.

By comparing the weight of 1 cupful of wheat pastry flour with the same quantity of its substitutes, the following data have been obtained.

For 1 cupful of wheat flour substitute:

$1\frac{1}{3}$ cupfuls barley flour	$1\frac{1}{3}$ cupfuls rolled oats, ground in food chopper
$\frac{5}{6}$ cupful buckwheat flour	$\frac{1}{3}$ cupful tapioca flour
$1\frac{1}{6}$ cupfuls fine corn-meal	$\frac{7}{8}$ cupful soy-bean flour
1 scant cupful peanut flour	$\frac{3}{4}$ cupful potato flour
$\frac{7}{8}$ cupful rice flour	1 cupful rye flour
$1\frac{1}{2}$ cupfuls rolled oats	

Although *yeast breads* are not so satisfactory if made *entirely* of a grain other than wheat, *quick breads of desirable grain and texture may be made without wheat.* It has been found, however, that a combination of two or more wheat substitutes gives more satisfactory results than a single substitute.

When no wheat is used in quick breads, the following combinations of substitutes are suggested by the *United States Department of Agriculture, States Relation Service.*

Rolled oats (ground) *or* Barley flour *or* Buckwheat flour *or* Peanut flour *or* Soy-bean flour	and	Corn flour *or* Corn-meal *or* Rice flour *or* Potato flour *or* Sweet potato flour

Since the wheat substitutes contain little or none of the kind of protein which when moistened forms a sticky and elastic substance, an increase in the number of eggs in quick breads containing no wheat produces a satisfactory texture. The albumin of eggs aids in holding the materials together.

By scalding certain of the wheat substitutes before adding them to other ingredients, a sticky starch paste is formed. This also aids in binding materials together.

When using a wheat substitute instead of wheat (as suggested in *Quantity of Baking Powder in Quick Breads*, p. 340) it is advisable to increase the quantity of *baking powder*, — $\frac{1}{2}$ *teaspoonful for each cupful of the substitute* used. Thus, if a muffin recipe calls for $3\frac{1}{2}$ teaspoonfuls of baking powder and 2 cupfuls of corn flour are substituted for wheat, the quantity of baking powder should be increased to $4\frac{1}{2}$ teaspoonfuls.

Why Wheat is Popular. — In this country, wheat is doubtless the most used of all grains. Its white or creamy color and mild flavor which blends well with that of many foods account in part for its popularity. From a culinary standpoint, wheat flour is more satisfactory to use than any other kind. It produces breads of pleasing texture, — tender but firm enough to hold their shape. Yeast breads made of wheat flour are larger than those made with other cereals.

Although wheat is generally used, its food value is not superior to that of other grains. It is doubtless because we are " used to " wheat that we have favored it more than other cereals.

Comparing Wheat with Other Grains. — Make a comparative study of the composition of the following:

Wheat Flour and Corn-meal. — From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of wheat flour and of corn-meal. Which contains the more fat? Which contains the more ash?

Corn-meal does not contain as much protein as does wheat. The protein in corn-meal differs from that in wheat; it does not have the elastic property of the protein of wheat. It is this property which makes the latter so satisfactory in bread making. For this reason, it is always best to combine corn-meal with wheat flour or some other cereal in preparing corn breads.

It should be noted that corn-meal contains more fat than wheat flour, and it compares favorably in digestibility with wheat flour. There is a difference in flavor, but no difference in the nutritive value of yellow and of white corn-meal.

Wheat Flour and Oatmeal. — From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of wheat flour and of oatmeal. Which contains the more protein, fat, and ash? Which contains the more carbohydrates?

Oatmeal contains more protein, fat, and ash than any of the cereals commonly used. It is a very tough cereal and requires long cooking in order to make it palatable.

Wheat Flour and Rice. — From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of wheat flour (all analyses, average). Now tabulate the percentage composition of rice (average). Which contains the more carbohydrates? Which, the more protein and ash?

Polished rice contains the least ash and protein of all the common cereals. It is also deficient in fat in comparison with the other cereals.

Unpolished rice, however, contains more than twice as much ash as the polished cereal. It also contains more fat and protein.[1] Hence it compares favorably with the composition of other grains.

Wheat Flour, Barley, Buckwheat, and Rye. — From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of wheat flour, of barley, of buckwheat, and of rye. Note the quantity of fat in barley and in buckwheat, and the small amount of protein in buckwheat and in rye.

CORN MUFFINS

1⅓ cupfuls flour	½ teaspoonful salt
⅔ cupful corn-meal	1 egg
4 teaspoonfuls baking powder	1¼ cupfuls milk
1 to 2 tablespoonfuls sugar	2 tablespoonfuls fat

Mix as plain muffins (see p. 365), and bake in oiled muffin tins 25 to 30 minutes at 400° F.

Rye meal may be substituted for corn-meal in this recipe.

RICE MUFFINS

1½ cupfuls flour	1 egg
3¾ teaspoonfuls baking powder	⅔ cupful milk
2 tablespoonfuls sugar	½ cupful cooked rice
½ teaspoonful salt	2 tablespoonfuls fat

Beat the egg; add the milk and the cooked rice. Add the dry ingredients (through a sifter) to the egg mixture; melt the fat; add it to the flour mixture. Mix quickly and thoroughly, and bake in buttered muffin tins in a hot oven (400° F.) for 25 to 30 minutes.

OATMEAL MUFFINS

Use the recipe for Plain Muffins given on p. 365, as a basic rule. Substitute 1 cupful rolled oats for 1 cupful of

[1] Composition of unpolished rice: protein, 8.02%; fat, 1.96%; carbohydrates, 76.98%; ash, 1.15%.

wheat flour. Scald the milk, pour it over the rolled oats. Let the mixture stand for about ½ hour or until it is cool. Then add the other ingredients and mix as plain muffins. Use 4 teaspoonfuls of baking powder instead of 3½ teaspoonfuls.

QUESTIONS

Explain why corn-meal is not used alone for corn-meal muffins (see *Wheat Flour and Corn-meal*, p. 369).

Compare the quantity of milk used in Rice Muffins with that used in Plain Muffins. Account for the difference.

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of boiled rice. Compare with the composition of the uncooked food. How much nourishment is lost by boiling?

By what method can rice be cooked to retain the most nourishment?

Explain why the per cent of nutrients in a food does not always indicate the quantity of nourishment that the nutrients yield to the body (see *Per Cent of Nutrients; Nutritive Values*, p. 365).

LESSON CXXII

Baking Powder Loaf Breads

Quick Loaf Breads. — The making of yeast bread requires kneading and covers a considerable period of time. A loaf of bread leavened with baking powder or other leavens suitable for quick breads may be made in a short time. The ingredients used for such a loaf, and the method of mixing it are about the same as for muffins. Baking the mixture in a bread pan rather than in muffin pans saves some effort in pouring the batter in the pan and in washing them. For those whose time is limited for food preparation, the making of baking powder loaf breads is recommended.

If it is necessary or desirable to use meals or flours other than wheat, baking powder loaf breads are advisable. Such grains can be used successfully in greater quantity (*i.e.* with the addition of little or no wheat flour) in quick breads than in yeast breads.

A quick bread baked in a loaf should be placed in a slow oven, — about 325° F. Slow heat is applied so that the loaf will rise sufficiently before a crust is formed. Before removing from the oven, the temperature of the oven may be increased. Some secure desirable results by allowing a loaf of quick bread to stand 20 minutes before placing it in the oven. Such a procedure is unnecessary if the loaf is placed in an oven of proper temperature.

WHOLE WHEAT BAKING POWDER BREAD

3 cupfuls whole wheat flour	1½ teaspoonfuls salt
3 tablespoonfuls sugar	1 egg
2¾ teaspoonfuls baking powder	1¾ cupfuls sour milk
⅞ teaspoonful baking soda	3 tablespoonfuls fat

Mix these ingredients in the same way as Plain Muffins (see p. 265). Pour into an oiled bread pan. Bake in a slow oven (325° F.) for 1 hour.

The egg may be omitted. If this is done, increase the baking powder to 3¼ teaspoonfuls.

Peanut Bread may be made by adding 1 cupful chopped peanuts. If commercial salted peanuts are used, decrease the salt to ½ teaspoonful.

PRUNE BAKING POWDER BREAD

1½ cupfuls whole wheat flour	1 cupful prunes (measured before soaking and cooking)
1 cupful pastry flour	
⅜ cupful sugar	1 cupful liquid (prune water and milk)
5¾ teaspoonfuls baking powder	
1 teaspoonful salt 1 egg	2 tablespoonfuls fat

Wash the prunes, soak, and cook them as directed on p. 76. Drain, stone, and cut in pieces or chop them.

Break an egg in the mixing bowl. Beat it and add the chopped prunes. Put the water drained from the prunes in a measuring cup and fill up the latter with milk. Add this liquid to the egg and prune mixture. Then proceed as in making Plain Muffins, see p. 265. Turn into an oiled bread pan. Bake in a slow oven (325° F.) for 1 hour.

Raisins or *dates* may be used instead of prunes. These fruits may be cooked before adding to the other ingredients or they may be used uncooked. If the latter plan is followed, use 1¼ cupfuls milk instead of 1 cupful liquid.

QUESTIONS

Write a recipe for Prune Baking Powder Bread in which no eggs are used.

Write a recipe for Raisin Baking Powder Bread in which uncooked raisins are used, and sour milk is substituted for sweet milk.

Use the recipe for Whole Wheat Baking Powder Bread as a basis, and write a recipe for a loaf of quick bread in which fine white flour is used. Decrease the sour milk to 1½ cupfuls. If the latter change is made, what ingredients will also require changing in quantity?

LESSON CXXIII

Eggs for Quick Breads — Cream Puffs

Dried Eggs. — Eggs are a most valuable food, but they are extremely high in price. In the packing and transportation of eggs, many are broken. To save these cracked eggs, methods of drying them have been devised. If dried or desiccated eggs are cooked or used in cooked foods, they are not injurious. Their food value is high.

It has been found [1] that desiccated eggs can be used successfully in custards, quick breads, cakes, and salad dressings.

[1] See Journal of Home Economics, Vol. XI, p. 108 (March, 1919), "The Use of Desiccated Eggs," by Lois Lhamon.

Use 1 *slightly rounded tablespoonful of dried egg for each egg desired.* To this amount of powder, *add* 3 *tablespoonfuls of water.* Cover the mixture and allow to stand from 30 to 45 minutes, stirring occasionally. A solution is thus obtained, which resembles eggs in which the whites and yolks have been beaten together.

Desiccated eggs should not be confused with the so-called egg-substitute powders. The latter contain little and sometimes no dried egg. These usually are composed of starch, coloring material, with a little nitrogenous material in the form of gelatine, casein, or albumin. Their food value cannot be compared with that of eggs. For the amount of nutriment contained in egg-substitute powders, their price is high.

The Preparation of Eggs for Delicate Quick Breads. — In all the quick bread mixtures given thus far, the whites and yolks of eggs were beaten together. It was shown in Experiments 41 and 43 (p. 160) that more air could be inclosed in an egg mixture when the white and yolk were beaten separately. It is well, therefore, to beat each part of an egg separately when a delicate bread is desired.

The reason that meringues, unless cooked, fall after a time, is because some of the inclosed air has escaped. From this it is apparent why eggs used in quick breads should not be beaten until ready for use.

It is possible, also, by much stirring and careless mixing, to lose some of the air inclosed in a beaten egg white. When the egg is to be separated, the method of cutting and folding, as used in Foamy Omelet (see p. 160), should be used for mixing the egg whites with the other ingredients of a quick bread.

Cream Puff Batter. — The flour of cream puff mixture is usually cooked before baking so that a paste is formed. When the mixture containing the flour paste is dropped on a flat surface, it does not spread to a great extent and holds its shape. It is possible to mix Cream Puffs in the same manner as Popovers (see p. 333). If this method is followed and uncooked flour is added to the batter, it is necessary to bake the cream puff mixture in muffin tins or gem pans.

The method of leavening Cream Puffs is similar to that used in leavening Popovers, *i.e.* by means of steam and air inclosed in beaten eggs.

CREAM PUFFS

½ cupful water	½ cupful flour
3 tablespoonfuls vegetable oil or butter	¼ teaspoonful salt
	2 eggs

Mix the water and fat and heat the mixture until the water boils. Add all of the flour and salt and mix thoroughly. Stir and cook until the ingredients are well blended and the paste does not stick to the sides of the pan. (Care should be taken not to cook the mixture too long. If the fat separates from the other ingredients, the puffs will not be successful.) While the mixture is hot, add the eggs, unbeaten, one at a time. Beat until thoroughly mixed. Drop by tablespoonfuls on an oiled baking-sheet, and bake at 450° F., for 20 minutes, then at 325° F., for 25 minutes. When cool slit one side open and fill with Cream or Chocolate Filling or Whipped Cream.

Cream Puffs may also be filled with creamed chicken or veal, or a salad mixture.

CREAM FILLING

¼ cupful flour	1 tablespoonful butter
1 tablespoonful cornstarch	1 or 2 eggs
¾ cupful sugar	¼ teaspoonful salt
2 cupfuls scalded milk	1 teaspoonful vanilla

Mix the flour, cornstarch, and sugar. Slowly add the hot milk. Pour the mixture into a double boiler; stir, and cook

20 minutes. Remove from heat. Beat the egg, add the egg and butter to the flour and milk mixture. Return to the fire and cook over water until the egg is coagulated; then add the salt. Cool, and add flavoring.

$\frac{1}{4}$ pint *whipped cream* folded into the cooked and cooled custard produces a finer flavor and texture.

Chocolate Filling may be made by following the recipe for Cream Filling, increasing the sugar to 1 cupful and adding a paste made by cooking 1 square (or ounce) of chocolate with $\frac{1}{4}$ cupful of water as directed in Chocolate Corn-starch Pudding (see p. 100).

QUESTIONS

Note the quantity of flour and water used in cream puff mixture. What kind of batter do these quantities of flour and moisture usually make? How do you account for the consistency of the cream puff batter when it is ready to bake?

From the difference in the methods of preparing Cream Puffs and Popovers before baking, explain the difference in the stiffness of the mixtures.

By what gas is the mixture lightened? By what means is this gas introduced into the mixture?

Why is it necessary to bake the mixture for so long a time?

What is the result of baking this mixture for too short a time?

In Cream Filling, what is the purpose of mixing the flour and sugar before cooking (see Experiment 24, p. 99)?

Give two reasons for cooking this mixture in the double boiler, rather than directly over the flame.

How long a time does it take to thicken the flour mixture? Why is it necessary to cook it for 20 minutes?

What is the use of eggs in the filling? Why are they not cooked as long as the flour mixture?

Determine the number of Cream Puffs this recipe will make.

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of the edible portions of whole eggs (see Figure 75, p. 311), of egg yolk, and of egg white. Compare the last two. Which contains the more fat? Which contains the more protein? Which contains the more water? Which contains the more nutriment?

Tabulate the percentage composition of milk (see Figure 64, p. 284).

RELATED WORK

LESSON CXXIV

Food Requirement

Daily Energy Requirement. — One hears much concerning working efficiency, *i.e.* the ability to do the maximum amount of work of the highest type with a minimum waste of effort. There is no doubt that the kind and quantity of food that an individual consumes has much to do with his working efficiency, and that it is consequently a matter worthy of serious consideration. Enough gasoline is used in an automobile so that there is produced sufficient power to move the car at the desired speed. So sufficient food should be used by the individual that enough energy be supplied to his body for its greatest usefulness.

Since foods furnish the body with energy, *the energy which the body spends in doing its work is a measure of the fuel food needed.* If the body requires a certain amount of energy for its needs, this energy, measured in Calories, can be supplied by a definite quantity of combustible food. Hence, daily energy requirements can be measured in Calories.

Scientists have done much experimenting and investigating concerning the quantity of food that individuals require. They have concluded that many factors may be taken into consideration in determining daily food requirements or *dietary standards.* Some of these factors are: (1) weight; (2) occupation; (3) age.

(1) *Relation of Weight, Size, and Shape to Daily Energy Requirement.* — In general the quantity of food required increases with the size of an individual but not at the same rate as the body weight increases. Two persons may be equal in weight, yet very different in height and shape. A tall, slender person requires more food than a short, fleshy

person of the same weight. For this reason, size and shape rather than weight are found more accurate in computing the daily food requirement. However, for practical purposes, energy requirement is generally based upon body weight.

(2) *Relation of Occupation to Daily Energy Requirement.* — From the previous consideration of energy, it is obvious that muscular exercise, even though very slight, requires some expenditure of energy. It has been found that, even during sleep and rest, energy is required to carry on the functions of the body (such as the beating of the heart, etc.). Since the energy for both the voluntary and involuntary activities of the body is furnished by the fuel foods, it is clear that one's occupation is an important factor in determining the kind and quantity of food an individual should use.

The man who is doing hard physical work needs more food than the man who sits quietly at his employment.

The following table, showing the energy required for different conditions of activity, has been formulated by scientists:[1]

Man sleeping requires	65 Calories per hour
Man sitting at rest requires	100 Calories per hour
Man at light muscular exercise requires . .	170 Calories per hour
Man at active muscular exercise requires .	290 Calories per hour
Man at severe muscular exercise requires .	450 Calories per hour
Man at very severe muscular exercise requires	600 Calories per hour

From these data, it is possible to compute the dietaries of people of different occupations. For example, the energy requirement for a bookkeeper (male) leading an inactive muscular life is:

[1] Atwater and Benedict, United States Department of Agriculture, Yearbook 1904, p. 215.

8 hours sleep (65 Calories per hour)	520 Calories
9 hours work at desk (100 Calories per hour)	900 Calories
4 hours sitting at rest and reading (100 Calories per hour)	400 Calories
3 hours walking (170 Calories per hour)	510 Calories
	2330 Calories

The energy requirement for a man of severe muscular activity, such as excavating, is:

8 hours sleep (65 Calories per hour)	520 Calories
8 hours excavating (450 Calories per hour)	3600 Calories
1 hour walking (170 Calories per hour)	170 Calories
7 hours sitting at rest (100 Calories per hour)	700 Calories
	4990 Calories

Another authority[1] gives these data pertaining to men engaged in muscular work:

Shoemaker requires	2001–2400 Calories per day
Weaver requires	2401–2700 Calories per day
Carpenter or mason requires	2701–3200 Calories per day
Farm laborer requires	3201–4100 Calories per day
Excavator requires	4101–5000 Calories per day
Lumberman requires	5000 or more Calories per day

The following data regarding the energy requirements of the average woman in some of her common occupations have been formulated[2]:

At rest	1600–1800 Calories per day
Sedentary occupations	2000–2200 Calories per day
Milliners, Teachers, Bookkeepers, Seamstresses, Stenographers, Machine operatives	
Occupations involving standing, walking, or manual labor	2200–2500 Calories per day
Cooks in family groups, Chamber maids, General housekeepers, Waitresses	
Occupations developing muscular strength	2500–3000 Calories per day
Laundresses, Cooks for large groups	

[1] "Textbook of Physiology," p. 141, Tigerstedt.

[2] See "Feeding the Family," p. 76, by Mary Swartz Rose, Ph.D.

(3) *Relation of Age to Daily Energy Requirement.* — Young children, *i.e.* those under eight or nine years of age, do not require as much food as adults. The food requirement of a child and of an adult is not proportional to weight, however. In proportion to his weight a child requires more food than an adult. The growing child needs food, not only to give energy to the body and rebuild tissue, but to build new tissue. An aged person needs less food to build new tissue. Furthermore, since an old person's strength is somewhat lessened, he needs less food to carry on the activities of the body. Hence, the aged person requires less food than the adult of middle life. The following table [1] gives the differences in energy requirement of children from one to seventeen years inclusive. It is thought that after the age of seventeen, food requirement will depend quite as much upon occupation as upon age. Hence, the foregoing tables can be used to estimate energy requirement for all ages above seventeen:

Children of 1–2 years inclusive . . .	1000–1200 Calories per day
Children of 2–5 years inclusive . . .	1200–1500 Calories per day
Children of 6–9 years inclusive . . .	1400–2000 Calories per day
Girls of 10–13 years inclusive . . .	1800–2400 Calories per day
Boys of 10–13 years inclusive . . .	2300–3000 Calories per day
Girls of 14–17 years inclusive . . .	2200–2600 Calories per day
Boys of 14–17 years inclusive . . .	2800–4000 Calories per day

The fact that the energy requirement of the boy from 10 to 17 years is greater than that of the girl of equal age is due probably to the greater restlessness or muscular activity of the boy.

Daily Protein Requirement. — If a person's energy requirement were 2500 Calories, sufficient energy might be supplied by using butter or beef steak for a day's ration. Yet this

[1] From "Chemistry of Food and Nutrition," Second Edition, by Henry C. Sherman, Ph.D., p. 197.

would be extremely unpalatable and would not meet the needs of the body. The body should be nourished by *all* the combustible foodstuffs, — carbohydrates, fat, and protein. Now the question arises: How many of the required Calories shall be supplied by each of these foodstuffs?

Too much or too little protein is often harmful and produces serious results. As mentioned previously, too much protein may cause intestinal disturbances, and an overtaxing of the excretory organs. On the other hand, the use of too little protein may produce imperfect nourishment. Concerning the quantity of protein used in diet, there has been much difference of opinion. Atwater, an American authority, thought that there should be a generous supply, *i.e.* a surplus of protein, to supply the demands of body-building. Chittenden, another American authority, believes in just enough protein to meet the demands of the body. However, the use of sufficient protein food to produce from *ten to fifteen per cent of the total Calories* has been found both practical and satisfactory.

Daily Carbohydrate and Fat Requirement. — Although protein may furnish the body with energy, it should not serve as the principal source of fuel. Its more essential function is to help build the body. If carbohydrates and fat are present with protein, the former supply energy and allow the protein to perform its more important function of body-building. There should always be enough carbohydrates and fat to furnish energy to the body, so that the protein can be used chiefly for body-building. In the growing period of youth or after a wasting disease, it might seem that "flesh" could be "put on" by increasing the quantity of body-building food. But such is not the case. *The most effective work in building the body can be accomplished by using a normal amount of food rich in protein and a generous supply of foods rich in ash, carbohydrates, fat, and vitamines.* With such a combination, the protein can be used to best advantage for body-building.

For practical purposes, the following general statement concerning the carbohydrates and fat requirement is believed to be adequate: If the total Calories and the number of Calories yielded by protein meet the requirement of a dietary standard and the food composing the diet is varied in composition, the carbohydrates and fat will exist in satisfactory proportion.

Daily Ash Requirement. — Since ash is not a combustible foodstuff, it cannot be included in the foodstuffs whose energy requirement can be measured. Although ash exists in small quantity in food, the use of certain ash constituents is considered as necessary as the use of protein. A diet may meet the total energy, the protein, the carbohydrate, and the fat requirements, yet may be lacking in certain essential mineral materials. It is especially necessary to include food containing phosphorus, iron, and calcium in one's diet (see pp. 320 to 322).

The Appetite and Food Requirement. — The appetite is the most common measure of daily food requirement. If one relies upon his appetite as an index of the quantity of food he should consume, and if his health and weight remain normal, the appetite may serve as a guide for daily food requirement. But one may be a little over weight or under weight, and yet have normal body functions.

There can be no doubt, however, that the whims of the appetite often lead to unwise selection of food. A study of food composition is absolutely essential in overcoming this fault. Lack of energy or loss of flesh may be due to improper feeding. If the needs of the body and the kind and quantity of food that will supply these needs are understood by the home-keeper, she may do much in maintaining the health, happiness, and usefulness of the members of the family.

Weight as an Index to Proper Nourishment. — It has been found that the diet of an individual has a most decided effect upon his weight. Dr. Thomas D. Wood has prepared

HEIGHT AND WEIGHT TABLE FOR GIRLS

Height Inches	5 Yrs	6 Yrs	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
39	34	35	36											
40	36	37	38											
41	38	39	40											
42	40	41	42	43										
43	42	42	43	44										
44	44	45	45	46										
45	46	47	47	48	49									
46	48	48	49	50	51									
47	....	49	50	51	52	53								
48	....	51	52	53	54	55	56							
49	....	53	54	55	56	57	58							
50	....	....	56	57	58	59	60	61						
51	....	....	59	60	61	62	63	64						
52	....	....	62	63	64	65	66	67						
53	....	....	....	66	67	68	68	69	70					
54	....	....	....	68	69	70	71	72	73					
55	....	....	....	....	72	73	74	75	76	77				
56	....	....	....	....	76	77	78	79	80	81				
57	....	....	....	....	....	81	82	83	84	85	86			
58	....	....	....	....	....	85	86	87	88	89	90	91		
59	....	....	....	....	....	89	90	91	93	94	95	96	98	
60	....	....	....	....	....	....	94	95	97	99	100	102	104	106
61	....	....	....	....	....	....	99	101	102	104	106	108	109	111
62	....	....	....	....	....	....	104	106	107	109	111	113	114	115
63	....	....	....	....	....	....	109	111	112	113	115	117	118	119
64	....	....	....	....	....	....	....	115	117	118	119	120	121	122
65	....	....	....	....	....	....	....	117	119	120	122	123	124	125
66	....	....	....	....	....	....	....	119	121	122	124	126	127	128
67	....	....	....	....	....	....	....	....	124	126	127	128	129	130
68	....	....	....	....	....	....	....	....	126	128	130	132	133	134
69	....	....	....	....	....	....	....	....	129	131	133	135	136	137
70	....	....	....	....	....	....	....	....	....	134	136	138	139	140
71	....	....	....	....	....	....	....	....	....	138	140	142	143	144
72	....	....	....	....	....	....	....	....	....	....	145	147	148	149

ABOUT WHAT A GIRL SHOULD GAIN EACH MONTH

Age		Age	
5 to 8	6 oz.	14 to 16	8 oz.
8 to 11	8 oz.	16 to 18	4 oz.
11 to 14	12 oz.		

Weights and measures should be taken without shoes and in only the usual indoor clothes.

CHILD HEALTH ORGANIZATION
156 Fifth Avenue, New York

Courtesy of *Child Health Organization*. Prepared by *Dr. Thomas D. Wood.*

tables showing the normal height and weight of girls and boys of various ages. These tables are most valuable in determining whether or not a girl or boy is of the proper weight for his height. If the weight of a girl or boy is less than it should be, he is likely to be malnourished.

HEIGHT AND WEIGHT TABLE FOR BOYS

Height Inches	5 Yrs	6 Yrs	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	18 Yrs
39	35	36	37											
40	37	38	39											
41	39	40	41											
42	41	42	43	44										
43	43	44	45	46										
44	45	46	46	47										
45	47	47	48	48	49									
46	48	49	50	50	51									
47	....	51	52	52	53	54								
48	....	53	54	55	55	56	57							
49	....	55	56	57	58	58	59							
50	....	....	58	5	60	60	61	62						
51	....	....	60	61	62	63	64	65						
52	....	....	62	63	64	65	67	68						
53	....	....	....	66	67	68	69	70	71					
54	....	....	....	69	70	71	72	73	74					
55	....	....	....	....	73	74	75	76	77	78				
56	....	....	....	....	77	78	79	80	81	82				
57	....	....	....	....	....	81	82	83	84	85	86			
58	....	....	....	....	....	84	85	86	87	88	90	91		
59	....	....	....	....	....	87	88	89	90	92	94	96	97	
60	....	....	....	....	....	91	92	93	94	97	99	101	102	
61	....	....	....	....	....	....	95	97	99	102	104	106	108	110
62	....	....	....	....	....	....	100	102	104	106	109	111	113	116
63	....	....	....	....	....	....	105	107	109	111	114	115	117	119
64	....	....	....	....	....	....	....	113	115	117	118	119	120	122
65	....	....	....	....	....	....	....	....	120	122	123	124	125	126
66	....	....	....	....	....	....	....	....	125	126	127	128	129	130
67	....	....	....	....	....	....	....	....	130	131	132	133	134	135
68	....	....	....	....	....	....	....	....	134	135	136	137	138	139
69	....	....	....	....	....	....	....	....	138	139	140	141	142	143
70	....	....	....	....	....	....	....	....	....	142	144	145	146	147
71	....	....	....	....	....	....	....	....	....	147	149	150	151	152
72	....	....	....	....	....	....	....	....	....	152	154	155	156	157
73	....	....	....	....	....	....	....	....	....	157	159	160	161	162
74	....	....	....	....	....	....	....	....	....	162	164	165	166	167
75	....	....	....	....	....	....	....	....	....	....	169	170	171	172
76	....	....	....	....	....	....	....	....	....	....	174	175	176	177

ABOUT WHAT A BOY SHOULD GAIN EACH MONTH

Age		Age	
5 to 8	6 oz.	12 to 16	16 oz.
8 to 12	8 oz.	16 to 18	8 oz.

Courtesy of *Child Health Organization*. Prepared by *Dr. Thomas D. Wood.*

Dr. Wood's tables also indicate the proper rate of increase in weight. The rate of increase in weight is thought to be quite as important as is the correct proportion between weight and height. The use of scales in the home and school is to be recommended. They furnish a means of determining whether the proper amount is being eaten.

QUESTIONS

Compute (from the table on p. 378) the energy requirement of at least two members of your family. Compute your own energy requirement from this table.

Determine your height and weight. How does your weight compare with the normal weight given in the table for one of your height? If you are under weight, discuss with your teacher the kind and quantity of food needed to increase your weight. At the end of a month, again determine your weight. How does the gain compare with that given in the table for one of your age?

LESSON CXXV

Planning, Cooking, and Serving a Dinner

Plan a dinner.[1] Use seasonable foods and a meat-substitute. Follow the suggestions given in Lesson CV (p. 318).

Plan the menu so that the cost of the materials used does not exceed 25 cents per person. Analyze the menu and see that it meets the requirements stated in Lesson CV.

Cook and serve the dinner. Follow the Russian or Compromise style of serving (see p. 122). Serve the dinner with a maid, provided the pupils find it useful to know how to serve with a maid either in their own homes or in the homes of others.[2]

[1] See footnote, p. 327.

[2] See *Suggestions for Teaching* (p. 3, Appendix), regarding service with and without a maid.

LESSON CXXVI

Review — Meal Cooking

MENU

Potato Soup
Lettuce Salad with French Dressing
Muffins

See Lesson XIV, p. 68, regarding suggestions for the preparation of the lesson.

LESSON CXXVII

Home Projects [1]

Suggestions for Home Work. — Prepare muffins, baking powder biscuits, or baking powder loaf breads at least twice a week.

Suggested Aims: (1) To learn to work quickly. Note the time required to mix these quick breads. Strive to lessen the number of minutes each time you prepare them.

(2) To use available materials. Use the food-materials you have on hand, — such as sour or sweet milk, left-over cooked cereals, and different kinds of flours or meals.

[1] See Lesson IX, p. 51.

DIVISION TWELVE

QUICK BREADS: SOFT DOUGHS

LESSON CXXVIII

METHOD OF MIXING FAT IN QUICK BREADS — DROP BISCUIT

Mixing Fat. — What method is used in mixing the fat in all batter quick breads (see previous lessons on *Batters*)?

In making quick breads, it is desirable to mix all ingredients thoroughly. Fat is mixed in a quick bread most easily and thoroughly by melting it and stirring it into the other ingredients, provided only that the quick bread mixture is thin, *i.e.* a batter.

When the quick bread is a stiff mixture, *i.e.* a dough, this method of mixing the fat is not considered satisfactory, although it has been found that biscuits of good quality can be made by adding melted fat, provided the dough is beaten thoroughly. Fat is usually added to doughs by working it, in solid form, into the dry ingredients, either with a knife or with the fingers. (In which method of mixing — with the knife or with the fingers — can the mixture be kept cooler? Which is the cleaner method?) If the fingers are used for mixing the fat, it is well to work it into the flour with the tips of the fingers rather than to rub the ingredients between the palms of the hands.

Soft Doughs. — Doughs are most easily mixed by using a knife instead of a spoon. A soft dough contains approximately *three parts of flour to one part of moisture.* Baking Powder Biscuit (p. 391) is a typical soft dough mixture.

DROP BISCUITS

2 cupfuls flour	½ teaspoonful salt
4 teaspoonfuls baking powder	2 tablespoonfuls fat

Milk or water, about ¾ cupful

Mix the dry ingredients; then work the fat into the mixture with the tips of the fingers, or cut it in thoroughly with a knife. With a knife mix the liquid with the dry ingredients. The mixture is of proper consistency when it may be dropped from the spoon without spreading. Drop by spoonfuls on an oiled pan, or into oiled muffin tins. Bake in a hot oven (475° F.) from 12 to 15 minutes.

FRUIT PUDDING

Place sliced fruit — fresh, canned, or dried — in an oiled baking-dish. Cover the fruit with a biscuit mixture, made by using the ingredients in the same proportion as for Drop Biscuits. Two or three times as much fat as the given quantity may be used. Bake until the fruit is tender and the batter is firm and brown, usually from 15 to 30 minutes. Serve with cream or fruit sauce. Plain cream may be used, or the cream may be whipped, or sweetened and flavored with a little nutmeg or vanilla.

WHIPPED CREAM SAUCE

1 cupful whipped cream	⅓ cupful powdered sugar
1 egg white	½ teaspoonful vanilla

Chill the cream; add the unbeaten egg; then beat with an egg beater (for method of whipping cream, see p. 169). Add the sugar and vanilla.

QUESTIONS

Explain why the fat in Drop Biscuit is not added in the same manner as in pour batters.

If the fat is to be mixed with the dry ingredients, why rub the ingredients together between the fingers rather than between the palms of the hands?

Compare as to taste and appearance the biscuits made with lard or vegetable fat with those made with butter.

Why should not a tin pan be used for the fruit pudding?

Mention at least four kinds of fruit that could be used for the pudding and tell how the use of some kinds of fruit would modify the time of baking.

Why does the quantity of liquid given in Drop Biscuits vary (see *Pour Batter*, p. 333 and *Gluten*, p. 408)?

Why is it necessary to surround the cream with ice water while whipping it (see *Whipping Cream*, p. 169)?

LESSON CXXIX

Quantity of Fat in Quick Breads — Short Cake

"**Shortening.**" — The tenderness of a quick bread is an important consideration. It is dependent upon the quantity of fat in the bread. Oil and water do not mix (see Experiment 35, p. 139). Hence when much fat is used in a quick bread, particles of dough or batter, which contain both fat and moisture, do not adhere firmly. Quick bread containing much fat becomes tender, that is, it crumbles readily.

In preparing modified biscuit mixtures, — short cakes, fruit dumplings, etc., — in which the quantity of fat is increased, make very careful comparisons between the "rich" or "short" breads and those containing the standard quantity of fat. In making observations, note the following:

(*a*) ease or difficulty in removing from the pan without breaking,

(*b*) tenderness or toughness,
(*c*) difference in flavor.

FRUIT SHORT CAKE

Make a biscuit mixture, containing two or three times the quantity of fat used in biscuit mixture. Place one half of the mixture in an oiled cake pan, then spread it with a scant quantity of melted butter or substitute. Add the remainder of the mixture and bake at 450° F., for 20 minutes. Remove from the pan, and place on a cake cooler for a few minutes. Split the cake open and fill with crushed and sweetened fruits. Place uncrushed fruits on the top, and serve with plain cream or Whipped Cream or Fruit Sauce; or cover the cake with a meringue, garnish with whole fruit, and serve with a Soft Custard Sauce.

¼ cupful of sugar may be added to the dry ingredients of Short Cake.

QUESTIONS

What general statement can you make with regard to the effect of increasing the fat in quick breads?

Knowing the change that takes place in a quick bread, when the quantity of fat is increased, state the effect of adding too much fat.

What is the purpose of using *melted* butter or substitute in the Short Cake mixture?

Mention some fruits, or fruit combinations, that would be palatable in a Short Cake.

How many persons can be served with a Short Cake made with 2 cupfuls of flour?

LESSON CXXX

"Cut" Biscuit

Use of the Rolling Pin. — When dough is to be rolled and cut into biscuits, it needs to be a little stiffer than for Drop Biscuits. It should, however, be a soft dough. Biscuit dough should not be pressed down with a rolling motion, but should be deftly and gently "patted" out with several successive "touches" with the rolling pin.

In using the rolling pin for stiff doughs, when more pressure should be exerted, the pin should be lifted up at the end of each stroke.

BAKING POWDER BISCUITS

2 cupfuls flour	½ teaspoonful salt
4 teaspoonfuls baking powder	2 tablespoonfuls fat

Milk or water, about ¾ cupful

Mix as in drop biscuits, using less milk, so that the dough is just stiff enough to roll out. Roll gently to ½ inch thickness on a slightly floured board, and cut into small biscuits. If any dry flour clings to the top of the biscuits, moisten it with a little milk or water. Place on a slightly oiled pan, and bake in a hot oven (475° F.) from 12 to 15 minutes. Serve hot. They may be placed on a folded napkin or doily.

APPLE DUMPLINGS

Make Baking Powder Biscuit dough. Roll until ¼ inch thick and cut into pieces. Place an apple (cored and pared) in the center of each piece. Fold the dough over the fruit and bake (375° F.) or steam for ½ hour, or until the apples are soft. The dumplings may be browned in the oven after steaming.

Rich biscuit dough or pastry (see p. 447) may be used for Apple Dumplings. Other fruits may be used instead of apples.

FRUIT ROLLS

Make a biscuit mixture, using 4 tablespoonfuls of fat instead of 2 tablespoonfuls, as given in the recipe for Baking

Powder Biscuits. Gently roll to $\frac{1}{4}$ inch thickness, and spread the following ingredients over it:

1 tablespoonful butter or substitute	$\frac{1}{2}$ teaspoonful cinnamon
2 tablespoonfuls sugar	Fruit

For the fruit use:

$\frac{1}{2}$ cupful dried currants, or
$\frac{1}{3}$ cupful raisins and 2 tablespoonfuls citron, or
2 cupfuls chopped apples

Roll as jelly roll, then cut into pieces $\frac{3}{4}$ inch thick and place (cut side down) on buttered tins. Bake in a hot oven (450° F.) 15 to 30 minutes. If apples are used, serve the roll with cream and sugar as a dessert. If the dried fruits are used, serve the roll in place of a hot bread or cake.

QUESTIONS

Compare recipes for "drop" and "cut" biscuits. How do they differ?

Why should biscuits be "patted" out rather than rolled out with the rolling pin?

If dry flour clings to the top of the biscuits after cutting, what is the result after baking? How can this be remedied?

How can the biscuit cutter and rolling pin be prevented from sticking to the dough?

Why are biscuits sometimes served on a napkin or doily?

Write a recipe for Baking Powder Biscuits, using 3 cupfuls of flour as the basis.

How many apples of medium size are required for Apple Dumplings, when 2 cupfuls of flour are used?

Why do Apple Dumplings require a longer time for baking than Baking Powder Biscuits?

How should citron be cut for use in cooking?

If apples are to be used for the fruit of Fruit Rolls, give in order the measuring, the preparation, and the mixing of the materials.

RELATED WORK

LESSON CXXXI

Measurement of the Fuel Value of Food Applied to Daily Food Requirement

Practical Method of Diet Calculation. — The 100-Calorie portions can be used in a very practical way for computing the fuel value of one's daily diet. In Lesson CXVI, p. 351, the weights of 100-Calorie portions of flour, butter, sugar, etc., were determined, then these portions were weighed and measured. In much the same way, tables have been prepared containing the weight and measure of 100-Calorie portions. If such a table (see p. 396) is read and the quantity of the various ordinary foods that will produce 100 Calories of heat is kept in mind, the computation of the meal becomes very simple.

If a person knows his energy requirement, he can select such quantities of food for the day as will conform with the ideal standard. The quantity of food to be used at each meal is a matter of personal choice. The important point is to have the food of the entire day conform to the standard. However, in computing the energy value of the foods of each meal, some find it convenient to divide the day's ration. The following is a convenient division: One third for breakfast, one fourth for luncheon, and five twelfths for dinner.

But the division may vary with individual needs. Ascertaining one's energy requirement and deciding upon a certain division for the three meals, one can very easily select such quantities of foods for each meal as will conform with the ideal standard. If the energy requirement of a girl of fourteen years is 2200 Calories (see p. 380), her breakfast may yield approximately 750 Calories, her luncheon 550 Calories, and her dinner 900 Calories. A luncheon consisting of an omelet made with one egg (50), one medium slice of homemade bread (100), orange marmalade (100), butter for bread (100), large banana (100), and a small glass of milk (100) would yield sufficient nourishment according to the requirement above.

If it is desired to compute the Calories produced by the protein of a meal, data can be obtained from the table also (see *Calories Derived from Protein,* p. 396).

The calculation of the protein content of the luncheon above is:

Number of Calories derived from protein of egg	18.2
Number of Calories derived from protein of bread	13.8
Number of Calories derived from protein of marmalade	0.7
Number of Calories derived from protein of butter	0.5
Number of Calories derived from protein of banana	5.3
Number of Calories derived from protein of milk	19.1
Number of Calories derived from protein of entire meal	57.6

If one tenth of the total energy requirement is taken as the desired protein requirement, the above luncheon approaches the ideal.

The Form C given on p. 395 will be found convenient to use in calculating the fuel value of menus from 100-Calorie portions.

QUESTIONS

Calculate your own breakfast, luncheon, and dinner energy requirement, and those of at least two members of your family.

From the table of 100-Calorie portions of p. 396 estimate the fuel value of all your meals served either at your home or at school for several days. Compare the result with the ideal energy requirement obtained above. If the results vary greatly, strive to select the proper kind and quantity of foods so that the total Calories and Calories derived from protein approach the ideal.

FORM C: CALCULATION OF FUEL VALUE OF 100-CALORIE PORTIONS

Meal:.. Number to Serve:..

Food	Quantity	Number of 100-Calorie Portions	Total Calories	Calories Produced by Protein in 100-Calorie Portion	Total Calories Produced by Protein	Cost of 100-Calorie Portion	Total Cost
Total							
Total for One Person							

Percent of Total Calories produced
by Calories derived from Protein..

Signature:..
Date:..

Table of 100-Calorie Portions[1]

Edible Portions	Approximate Measure of 100-Calorie Portion	Weight in Ounces of 100-Calorie Portion	Calories Derived from Protein
Almonds	15 average	0.5	12.6
Apples	2 medium	5.6	2.5
Apricots, fresh	2 large	6.1	7.7
Asparagus, cooked	2 servings	7.5	17.9
Bacon, smoked (uncooked)	1 thin slice, small	0.6	6.7
Bananas	1 large	3.6	5.3
Beans, baked, canned	1 small serving (½ cupful)	2.8	21.5
string, canned	5 servings	17.2	21.5
lima, canned	1 large saucedish	4.6	20.8
Beef, corned		1.2	21.2
dried, salted, and smoked	4 large slices	2.0	67.2
*loaf	Slice 4 in.×6 in.×½ in.	1.4	40.0
porterhouse steak	1 serving	1.3	32.4
ribs, lean	1 average serving	1.9	42.3
ribs, fat		0.9	15.6
round, free from visible fat	1 generous serving	3.1	80.7
rump, lean		1.7	41.0
rump, fat		0.9	17.5
*stew with vegetables	⅔ cupful	3.0	16.0
sirloin steak	1 average serving	1.4	31.0
Beets, cooked	3 servings	8.9	23.2
*Biscuits, baking powder	2 small	1.3	11.0
*Blanc Mange	¼ cupful	1.9	8.0
Brazil nuts	3 average size	0.5	10.2
Bread, graham	1 thick slice	1.3	13.5
toasted	2 medium slices (baker's)	1.2	15.2

[1] The approximate measure of 100-Calorie portions is based in part upon "Table of 100 Food Units," compiled by Dr. Irving Fisher. The weight in ounces of 100-Calorie portions and Calories derived from protein are based upon data found on p. 410 of "Chemistry of Food and Nutrition," by Henry C. Sherman, Ph. D. Items marked "*" are from "Feeding the Family," by Mary Swartz Rose, Table III, p. 355.

TABLE OF 100-CALORIE PORTIONS — *Continued*

Edible Portions	Approximate Measure of 100-Calorie Portion	Weight in Ounces of 100-Calorie Portion	Calories Derived from Protein
Bread — *Continued*			
white homemade .	1 medium slice	1.3	13.8
average	1 thick slice	1.3	14.0
whole wheat . . .	1 thick slice	1.4	15.9
Buckwheat flour . .	¼ cupful	1.0	7.4
Butter	1 tablespoonful (ordinary pat)	0.5	0.5
Buttermilk	1¼ cupfuls (1½ glasses)	9.9	33.6
Cabbage	2 servings	11.2	20.3
* Cake, chocolate . .	Piece 2½in. × 2½ in. × ⅞ in.	0.9	8.0
* Cake, one egg . .	Piece 1¾ in. × 1¾in. × 1¾in.	1.0	8.0
Calf's-foot jelly . .		4.1	19.8
Carrots, fresh . . .	2 medium	7.8	9.7
Cauliflower [1] . . .		11.6	23.6
Celery		19.1	23.8
Celery soup, canned .	2 servings	6.6	15.7
Cheese, American pale[1]	1½ cubic inches	0.8	26.5
American red [1] . .	1½ cubic inches	0.8	26.0
Cheddar [1]	1½ cubic inches	0.8	24.4
Cottage	4 cubic inches (⅓ cupful)	3.2	76.1
Neufchâtel . . .	1½ cubic inches (¼ cupful) (½ small package)	1.1	23.2
Roquefort [1] . . .		1.0	25.3
Swiss [1]	1½ cubic inches	0.8	25.4
Chicken, broilers . .	1 large serving	3.3	79.1
Chocolate	" generous half " square	0.6	8.3
* Chocolate (beverage half milk and half water)	½ cupful (scant)	4.1	10.0
Cocoa	2½ tablespoonfuls	0.7	17.3
* Cocoa (beverage, — half milk and half water) . . .	⅗ cupful	5.5	14.0
Cod, salt	2½ tablespoonfuls	3.4	97.5
* Cookies	2, 2¼ in. diameter	0.9	6.0
Corn, green [1] . . .	1 side dish	3.6	11.4
Corn-meal	2 tablespoonfuls	1.0	10.3

[1] As purchased.

TABLE OF 100-CALORIE PORTIONS — *Continued*

EDIBLE PORTIONS	APPROXIMATE MEASURE OF 100-CALORIE PORTION	WEIGHT IN OUNCES OF 100-CALORIE PORTION	CALORIES DERIVED FROM PROTEIN
Crackers, graham	3 crackers	0.9	9.6
soda	3 crackers	0.9	9.4
water	3 crackers	0.9	10.3
Cranberries [1]	1 cupful (cooked)	7.5	3.4
Cream	¼ cupful	1.8	5.0
Cucumbers	2 large	20.3	18.4
* Custard, cup	⅓ cupful	3.3	17.0
Dates, dried	4 medium	1.0	2.4
Doughnuts	½ doughnut	0.8	6.2
Eggs, uncooked	1½ medium or 2 small	2.4	36.4
Farina		1.0	12.3
Figs, dried	1 large	1.1	5.5
Flour, rye	¼ cupful	1.0	7.9
wheat, entire	¼ cupful	1.0	15.5
wheat, graham	¼ cupful	1.0	14.9
wheat, average high and medium	¼ cupful	1.0	12.8
Gelatine	4 tablespoonfuls	1.0	98.7
* Gingerbread	Piece 1 in.×2 in.×2 in.	1.2	8.0
Grapes	1 large bunch	3.7	5.4
Haddock		4.9	96.3
Halibut steaks	1 average serving	2.9	61.8
Ham, fresh, lean		1.5	44.0
fresh, medium	1 average serving	1.1	19.0
smoked, lean		1.3	30.1
Herring, whole		2.5	54.6
Hominy, uncooked	¼ cupful	1.0	9.3
* Ice cream, vanilla	¼ cupful	2.0	6.0
Lamb, chops, broiled	1 small chop	1.0	24.3
leg, roast	1 average serving	1.8	41.0
Lard, refined	1 tablespoonful (scant)	0.4	(—)
Lemons	3 medium	8.0	9.0
Lettuce	50 large leaves	20.4	25.2
Liver, veal, uncooked	2 small servings	2.9	61.6
* Macaroni and cheese	½ cupful	2.1	17.0
Macaroni, uncooked	¼ cupful (4 sticks)	1.0	15.0
Macaroons	2	0.8	6.2

[1] As purchased.

TABLE OF 100-CALORIE PORTIONS — *Continued*

EDIBLE PORTIONS	APPROXIMATE MEASURE OF 100-CALORIE PORTION	WEIGHT IN OUNCES OF 100-CALORIE PORTION	CALORIES DERIVED FROM PROTEIN
Mackerel, uncooked	1 large serving	2.5	53.9
salt		1.2	29.5
Marmalade, orange	1 tablespoonful	1.0	0.7
Milk, condensed, sweetened	$1\frac{1}{16}$ cupfuls	1.1	10.9
skimmed	$1\frac{1}{4}$ cupfuls (scant)	9.6	37.1
whole	$\frac{5}{8}$ cupful (generous half glass)	5.1	19.1
Molasses, cane	$\frac{1}{8}$ cupful	1.2	3.4
* Muffins, corn-meal	$\frac{3}{4}$ muffin	1.2	13.0
* Muffins, wheat	$\frac{4}{5}$ muffin	1.2	12.0
Muskmelons	$\frac{1}{2}$ average serving	8.9	6.0
Mutton, leg	1 average serving	1.8	41.2
Oatmeal, uncooked	$\frac{1}{8}$ cupful	0.9	16.1
Olives, green	7 to 10	1.2	1.5
Onions, fresh	2 medium	7.3	13.2
Oranges	1 very large	6.9	6.2
Oysters, canned	5 oysters	4.9	48.6
Parsnips	1 large	5.4	9.9
Peaches, canned	1 large serving	7.5	6.0
fresh	4 medium	8.5	6.8
Peanuts	10 to 12 (double kernels)	0.6	18.6
Peas, canned	2 servings	6.3	25.9
Peas, dried, uncooked	2 tablespoonfuls	1.0	27.6
green	1 generous serving	3.5	28.0
Pies, apple	$\frac{1}{5}$ piece	1.3	4.6
custard	$\frac{1}{3}$ piece	2.0	9.4
lemon	$\frac{1}{3}$ piece	1.4	5.6
mince	$\frac{1}{4}$ piece	1.2	8.1
squash	$\frac{1}{3}$ piece	2.0	9.9
Pineapples, fresh	5 slices	8.2	3.7
canned	1 small serving	2.3	1.0
Pork, chops, medium	1 very small serving	1.1	19.9
fat, salt [1]		0.5	1.0
* Potatoes, creamed	$\frac{2}{5}$ cupful	2.7	9.0
Potatoes, white, uncooked	1 medium	4.2	10.6

[1] As purchased.

TABLE OF 100-CALORIE PORTIONS — *Continued*

EDIBLE PORTIONS	APPROXIMATE MEASURE OF 100-CALORIE PORTION	WEIGHT IN OUNCES OF 100-CALORIE PORTION	CALORIES DERIVED FROM PROTEIN
Potatoes, sweet, uncooked	½ medium	2.9	5.8
Prunes, dried	3 large	1.2	2.8
Raisins	⅕ cupful (packed solid)	1.0	3.0
Rhubarb, uncooked	3½ cupfuls (scant)	15.3	10.4
* Rice pudding	¼ cupful	2.2	12.0
Rice, uncooked	2 tablespoonfuls	1.0	9.3
Salmon, whole	1 small serving	1.7	43.1
Sauce, white	¼ cupful	2.4	8.0
* Salmon, loaf	¼ cupful	2.1	37.0
Shad, whole	1 average serving	2.2	45.9
Shredded wheat	1 biscuit	1.0	11.3
* Soup, corn	½ cupful	3.9	12.0
potato	½ cupful (scant)	4.2	15.0
cream of tomato	⅜ cupful	3.2	11.0
Spinach, fresh [1]	3 ordinary servings (after cooking)	14.7	35.0
Succotash, canned	1 average serving	3.6	14.7
Sugar	3 lumps, 5 teaspoonfuls granulated; 6½ teaspoonfuls powdered sugar	0.9	(—)
Tapioca, apple	¼ cupful	3.6	0.7
Tomatoes, fresh	4 average servings	15.5	15.8
canned	1¾ cupfuls	15.6	21.3
Turkey	1 serving	1.2	28.7
Turnips	2 large servings (2 turnips)	9.0	13.3
Veal, cutlet		2.3	53.6
fore quarter		2.3	52.8
hind quarter		2.3	53.0
Walnuts, California	4 whole nuts	0.5	10.3
Wheat, cracked		1.0	12.4
White fish		2.4	61.4
Zwieback	1 thick slice	0.8	9.4

[1] As purchased.

LESSON CXXXII

Planning, Cooking, and Serving a Dinner

Plan a dinner.[1] Use seasonable foods. Follow the suggestions given in Lesson CV (p. 318). Plan the menu so that the cost of the materials does not exceed 30 cents per person. From the Table of 100-Calorie Portions (p. 396) estimate the total Calories and the Calories derived from protein produced by the foods of your menu. How do the total Calories compare with the dinner energy requirement of an average man or woman? Are the Calories derived from protein from 10 to 15 per cent of the total Calories? If necessary, change your menu so that its total Calories meet the dinner energy requirements of an average man or woman and its Calories derived from protein are from 10 to 15 per cent of the total Calories. The pupil should note that the Calorific value of meals is usually correct if the suggestions for menu-making given in Lesson CV are followed.

Cook and serve the dinner. Follow the Russian or Compromise Style of serving (see p. 122). Serve the dinner with a maid.[2]

LESSON CXXXIII

Review — Meal Cooking

MENU

Rolled Beef Steak
Stuffed Baked Potato
Drop Biscuits

See Lesson XIV, p. 68, for suggestions regarding the preparation of the lesson.

[1] See Foot-note, p. 327. [2] See Foot-note, p. 385.

LESSON CXXXIV

HOME PROJECTS [1]

Suggestions for Home Work. — Plan and cook meals.

From the Table of 100-Calorie Portions (p. 396) estimate the fuel value of the meals you prepare.

Suggested Aims: To compare the fuel value of the meals with the energy requirements secured in answering the *Questions* on p. 394. To use these comparisons as a basis on which to plan meals more nearly approaching the desired energy requirements.

[1] See Lesson IX, p. 51.

DIVISION THIRTEEN

YEAST BREADS: STIFF DOUGHS

LESSON CXXXV

YEAST — LOAF BREAD

Experiment 77: Conditions for Growth of the Yeast Plant.— (*a*) Mix 1 tablespoonful of flour, 1 tablespoonful of sugar, ¾ cake compressed yeast, and 5 tablespoonfuls of cold water. Put 1 tablespoonful of the mixture in a test tube and mark the tube "*a*." Fill the tube nearly full of lukewarm water and stand in a warm place for 15 minutes. Examine, noting especially the appearance at the top of the test tube. What kind of substance (gas, liquid, or solid) has been formed by the growth of the yeast plants?

(*b*) Put 1 teaspoonful of the yeast mixture in a test tube, and fill nearly full of boiling water. Label it "*b*" and after 15 minutes examine. Is there any change in the contents of the tube? What has happened to the yeast plants?

(*c*) Put 1 teaspoonful of the yeast mixture in a test tube, fill nearly full of cold water, and label it "*c*." Surround it with cracked ice or, if the weather is cold, place it out of doors. After 15 minutes examine. Is there any change in the contents of the tube? Why do not the yeast plants grow?

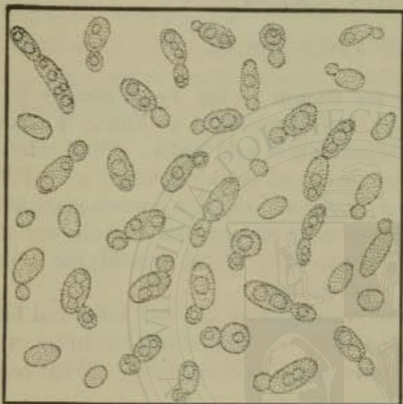
(*d*) Surround the tube marked "*c*" with lukewarm water and stand in a warm place. After 15 minutes examine. Are the yeast plants growing? Does freezing kill yeast plants?

(*e*) Mix ⅛ cake yeast with a little lukewarm water. Stand in a warm place and after 15 minutes examine. Will yeast grow in water alone?

(*f*) Mix ⅛ cake yeast, 1 tablespoonful of sugar, and a little lukewarm water. Set aside in a warm place so that the yeast plants may grow. Then examine under the microscope. Are there any budding yeast cells? Make a drawing of the plants as they appear under the microscope.

Draw at least two practical conclusions from these experiments as to the use and care of yeast for bread making.

Properties of Yeast. — Yeast consists of a mass of microscopic plants (see Figure 86). When placed under proper conditions these plants grow rapidly, and in so doing they separate the sugar that exists in flour into carbon dioxide and alcohol. The carbon dioxide lightens dough. The alcohol passes off as vapor in baking.



From *Farmers' Bulletin 389.*

FIGURE 86. — GROWING YEAST PLANTS.

Plants need moisture, warmth, light, and the food that is furnished by the air and soil for their growth. Yeast plants require all of these except light. They are not green plants, hence they need no light. Moisture is obtained from the water, milk, or other liquids used in bread dough. Yeast thrives at a temperature of 90° F. It is killed by a temperature above 130° F. Hence the yeast is mixed with lukewarm water. The other liquids that are added to it are of the same temperature. Also, the dough is placed in a warm place while it is rising, or while the yeast plants are growing. The food required for the rapid growth of the yeast is obtained from the protein and carbohydrates in the flour.

Compressed yeast cakes which are wrapped in tinfoil and received fresh at the market every day or two are the most satisfactory to use. This yeast must be fresh for successful bread making. It is fresh when it is of a light color, is free from dark streaks, and is crumbly in texture.

Stiff Dough. — *Approximately four parts of flour to one of moisture are used for stiff doughs.* When sufficient flour has been added to stiff dough, it should not cling to the sides of the mixing bowl. This is an indication to the pupil of the proper stiffness of the dough. The test applies, however, only when there is no coating of flour over the dough. One should remember that the softest dough will not "stick," if covered generously with flour.

General Suggestions for Bread Making. — Use wheat bread flour, or a combination of wheat bread flour with whole wheat, or graham flour, or with flour or meal made from other grains, in making bread. Flour should be kept in a dry place. It is well to warm flour for bread before using.

If milk is used, scald or boil it to prevent it from souring. Water should be boiled and then cooled (see *Why Foods Spoil*, p. 474).

With 1 pint of liquid ½ to 1 cake of yeast should be used. When it is desired to mix and bake bread in a few hours, a greater quantity of yeast may be used. If the yeast is fresh, most satisfactory results are secured when this is done. The use of much yeast, however, adds to the cost of bread. The less quantity of yeast (½ cake) is used when the dough is allowed to rise overnight. Mix 1 yeast cake in 1 cupful of lukewarm water before adding the rest of the liquid.

It is desirable to use sufficient yeast and to subject it to desirable conditions so that the dough will rise quickly. If the rising process occupies much time, certain kinds of bacteria which may be present in the yeast or other materials may act upon the alcohol present in the risen dough and convert it into acid. This produces sour dough and consequently bread of sour taste and odor.

Although it is customary to allow bread to rise twice, tasty bread may be secured by one rising. Bread raised only once, however, is usually of uneven grain, because the carbon dioxide bubbles formed during rising are uneven in size or are unevenly distributed. By kneading bread, the larger bubbles are broken or distributed more evenly through the dough. Since considerable gas is pressed out by kneading, it is necessary to allow the dough to rise a second time. It is well to make the dough into small loaves, and place them in small pans, so that the bread will be baked through.

Loaves of bread should bake at least 1 hour at a temperature varying from 375° F. to 400° F. During the first 20 minutes they should rise but slightly and just begin to brown; during the second 20 minutes they should continue to brown; during the last 20 minutes they should shrink from the sides of the pan, while still continuing to brown.

To soften the crust, rub it with a bit of butter or substitute a few minutes before taking from the oven and again after removing from the oven. After baking, place the loaves of bread on a bread cooler, or arrange them in such a way that the air may reach them on all sides. When cool, place in a covered tin box.

BREAD (2 loaves)

2 cupfuls hot water *or* milk and water	½ tablespoonful fat
2 teaspoonfuls salt	½ to 1 cake compressed yeast
2 teaspoonfuls sugar	½ cupful lukewarm water

Bread flour (7 to 8 cupfuls)

Boil the water or milk and water. Pour it into a bowl and add the salt, sugar, and fat. Stir until the salt and sugar are dissolved, and the fat is melted. Mix the yeast with lukewarm water. When the first mixture is cooled to lukewarm temperature, add the yeast mixture to it. Then add flour enough to make it of the proper consistency (see *Stiff Dough*), using a knife for mixing. Turn out on a floured board, and knead until soft and elastic. Return the dough to the bowl, moisten, cover, and let rise until doubled in bulk. Then divide it into loaves, or shape into biscuits. Cover and allow the loaves or biscuit to rise in the pan in which they are to be baked until they are doubled in bulk. Bake the biscuits 30 minutes in a hot oven and the bread about 60 minutes in a moderate oven (see *Oven Thermometers and Temperatures*, p. 330).

QUESTIONS

Why should the flour for bread be warmed before using?

What should be the temperature of all materials mixed with yeast? Why?

What should be the difference in the temperature of the oven for loaf bread and for biscuits? Explain.

Why should bread be stored in a covered tin box?

At what temperatures should biscuits and loaf bread bake? Why are these foods baked at different temperatures?

For how long a time should biscuits and bread bake? Explain the difference in the length of time of baking each.

LESSON CXXXVI

Wheat Flour — Bread Sponge

Experiment 78: Protein in Flour. — Make a stiff dough, using 2 tablespoonfuls of bread flour and about $\frac{1}{2}$ tablespoonful of water. Knead well, and allow to stand for 20 minutes. Then tie the dough in cheese-cloth, place it in a bowl of water, and knead for a few minutes.

Pour a little of the water in a test tube; drain the remainder of the water from the dough. Add more water to the bowl. Again knead the dough under the clean water.

Examine the material in the cloth. What is its color? Feel and pull it. Put a little on a plate to dry, and bake some in the oven. Examine after drying and baking. How has it changed in size by heating?

Test the water in the test tube for starch.

Gluten. — The material left in the cloth consists largely of protein. If flour is mixed with water, *gluten* is formed from the two kinds of protein that are to be found in all wheat flours. Gluten is yellowish gray in color, is extremely elastic and sticky, and, if moistened and heated, expands to many times its original bulk. These qualities of gluten are most desirable for good yeast bread; hence, the more protein that flour contains, the better it is for bread making. As has been stated, some flours contain more protein than others. The protein of wheat as well as of other grains is incomplete, hence grains need to be supplemented with other kinds of protein food.

Wheat Flour. — The quantity of protein in flour is not only dependent upon the portion of the wheat kernel used in making the flour (see *Difference in Wheat Flours*, p. 363), but also upon the kind of wheat from which the flour is made. Spring wheat, the seeds of which are sown in the springtime, usually contains more protein than winter wheat, the seeds of which are sown in the fall. The flour made from spring wheat is called *hard wheat flour* or *bread flour*. This flour is creamy in color, rather gritty in feeling, and when pressed in the hand does not retain the impression of the fingers. Flour made from winter wheat is called *soft wheat flour* or *pastry flour*. This is white, very fine and velvety in feeling, and easily retains the impression of the fingers.

On account of the greater quantity of protein in bread flour, this flour absorbs more moisture than pastry flour. Less bread flour than pastry flour, therefore, is required for the bread mixture. If bread flour is substituted for pastry flour, its quantity should be decreased, — 2 tablespoonfuls for each cupful.

Dry Yeast Sponge. — It is generally agreed that compressed yeast is more satisfactory for bread making than dry yeast.

By the use of the former, the method is shorter, and the "rising" can take place during the daytime and be checked at the proper time. The use of dry yeast, however, is necessary under some conditions. For this kind of yeast cake, the yeast is made into a stiff dough by mixing it with starch or meal, and is then dried. In the dry state, yeast plants do not grow, but remain inactive until they are subjected to conditions favorable for growth. In order that dry yeast may begin to grow, it is necessary to make a *sponge* of the materials used in bread making. A sponge is a batter containing half as much flour as is required for the stiff dough. A thin mixture rises more quickly than does a stiff dough; hence the advantage of "starting" dry yeast in a sponge.

The growth of yeast is somewhat retarded by salt and spices. Sugar in small quantity aids rapid growth; much sugar delays the rising of bread. Much fat and many eggs also make the process slower. In the preparation of buns, when much fat and sugar and many eggs are to be used, it is advisable to make a sponge. These materials are not to be added, however, until the sponge is stiffened. The yeast thus gets a good "start" before the eggs, etc., are added.

BREAD (made with dry yeast) (2 loaves)

2 cupfuls water	2 teaspoonfuls sugar
½ cake dry yeast	1 tablespoonful fat
2 teaspoonfuls salt	6 cupfuls (or more) bread flour

Soak the yeast in the water (lukewarm) until softened. Then add the salt, sugar, and fat. Stir until the salt and sugar are dissolved, and the fat is melted. Add one half the given quantity of flour. Beat until the mixture is smooth; cover. Let rise until very porous and foamy. Add enough flour to make a stiff dough; knead; and allow to rise until doubled in bulk. Proceed as for bread made with compressed yeast.

Score Card for Bread[1] — Determining its Quality

Flavor	35
Lightness	15
Grain and texture	20
Crust (color, depth, texture)	10
Crumb (color, moisture)	10
Shape and size	10
Total	100

QUESTIONS

Under what conditions would dry yeast be used in bread making?

For what reason is bread dough kneaded?

What is the test for sufficient kneading of bread dough?

In what part of the country is spring wheat grown? Winter wheat?

How are the flours distinguished that are made from these different kinds of wheat?

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of winter and of spring wheat flour.

Which contains the more protein; which, the more carbohydrates? Compare the quantity of ash in each.

Knowing the method of leavening, the time required for raising, and the properties of gluten, explain why spring wheat flour is better adapted to yeast breads than to quick breads.

What is the price per sack of pastry and of bread flour?

What is the price per cake of compressed yeast? What is the price per package of dry yeast? How many cakes in a package?

LESSON CXXXVII

Modifications of Plain White Bread

Breads Other than Wheat. — As mentioned previously, wheat is the most popular grain in this country, largely because we are most used to it, not because it is a better food than other cereals. The use of different starchy materials

[1] "Selection and Preparation of Food," by Bevier and Van Meter, p. 82.

and grains, especially the whole cereals, is advised to give variation not only in flavor, but in nutritive content. Yeast breads containing cereals other than wheat are more satisfactory in texture and in size of loaf when they are made by combining some wheat with the other grains.

The housekeeper of olden days considered the potato most essential for bread making. It is possible to make good bread by using $\frac{1}{3}$ as much mashed potato as wheat flour. Potato bread is moist; it keeps better than bread made entirely with wheat. It has been observed that bread containing potatoes or potato water rises quickly. It is possible that the growth of the yeast is stimulated by potato. Although bread containing potatoes is light, it is not as delicate or " fluffy " as plain wheat bread.

Since potatoes contain much moisture, the quantity of liquid used in making potato bread should be lessened. Because bread dough containing potatoes softens as it rises, sufficient flour should be added to make it very stiff or more flour added while kneading.

Much experimenting with bread during the World War showed that bread containing cereals other than wheat is more satisfactory when potatoes are used in making it. It was found that less of wheat and more of the other grains could be used when potatoes were added to the dough.

Bread made of grains other than wheat requires a greater quantity of yeast than wheat bread. The following explanation may account for this fact: Some recent scientific investigations point out the fact that the activity of yeast is increased when vinegar or other weak acid material is added to bread dough. Since the proteins of cereals other than wheat absorb more of the free acid of the dough than do the proteins of wheat, the acidity of the dough is lessened. Hence more yeast is required to leaven dough containing grains other than wheat.

GRAHAM BREAD

Use one half white bread flour and one half graham flour in the recipe given for Bread (see p. 406) in order to make Graham Bread. One fourth cupful of molasses may be substituted for the sugar. Mix and bake as white bread.

Some consider that it is much more satisfactory to make a sponge when using graham flour. If this is done, first make a sponge using only one half the given quantity of flour. Let the mixture rise, then add the remainder of the flour, and proceed as in making white wheat bread.

WHOLE WHEAT BREAD

Follow the recipe for Bread (see p. 406), substituting whole wheat for the fine wheat bread flour, but make a soft, not stiff dough. Bake in a moderate oven (375° F.) for 1 hour.

Raisin Bread may be made by adding 2 cupfuls of seeded raisins to whole wheat bread mixture and increasing the sugar to ¼ cupful or substituting ½ cupful molasses for the sugar. Use the greater quantity of yeast. Add the raisins to the mixture before adding the flour.

POTATO BREAD (2 loaves)

- 2 cupfuls dry mashed potatoes
- 1 cupful water in which potatoes were cooked
- 1 tablespoonful salt
- ½ cupful lukewarm water
- 2 tablespoonfuls sugar
- 1 tablespoonful fat
- ½ to 1 cake compressed yeast
- 5½ to 6 cupfuls wheat bread flour

Pare 6 medium-sized potatoes. Cut into pieces and cook in boiling water until tender. Drain the water from the potatoes, but save the potato water to use as moisture for the dough, and for mixing with the yeast. Mash the potatoes; add the potato water, salt, sugar, and fat. Then proceed as directed for Bread on p. 406.

OATMEAL-POTATO BREAD (2 loaves)

$1\frac{1}{2}$ cupfuls potato water	1 tablespoonful fat
2 cupfuls rolled oats	2 cupfuls dry mashed potatoes
1 tablespoonful salt	1 cake compressed yeast
2 teaspoonfuls sugar	1 tablespoonful lukewarm water

Wheat bread flour, about 6 cupfuls

Heat the liquid to boiling point. Pour it over the rolled oats. Add the salt, sugar, and fat. Stir and let stand until the mixture is lukewarm. Add the potatoes, then proceed as for plain bread. Let the dough rise in the pans until it is from $2\frac{1}{4}$ to $2\frac{1}{2}$ times its original bulk. Bake at 375° F. 1 hour.

QUESTIONS

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of white, of graham, and of whole wheat bread.

Under what conditions should a sponge be made when compressed yeast is used?

What kind of bread is most satisfactory in high altitudes, *i.e.* where the climate is dry? Explain.

Why is potato water a more valuable liquid for bread making than water?

What is the purpose of adding boiling water to rolled oats in making Oatmeal-Potato Bread (see *Substituting Other Cereals for Wheat Flour*, p. 367)?

Compare the quantity of yeast used in Oatmeal-Potato Bread with that used in plain wheat bread. Account for the difference.

LESSON CXXXVIII

Rolls and Buns

PLAIN ROLLS OR BISCUITS

For rolls or biscuits use the recipe for Bread (p. 406), adding twice the quantity of fat, and using milk for part of the liquid. Or they may be made by kneading more fat into any bread dough. Knead well after the first rising; then cut into pieces half the size of an egg, and shape into balls. Place the balls some distance apart in a pan or place the balls so that one touches another. The latter plan of placing in the pan produces biscuits having a small amount of crust. Allow the biscuits to rise to double their bulk; then bake in a hot oven.

PARKER HOUSE ROLLS

2 cupfuls hot milk and water	1 teaspoonful salt
3 tablespoonfuls fat	1 yeast cake
2 tablespoonfuls sugar	$\frac{1}{4}$ cupful lukewarm water

Bread flour

Make a sponge of the ingredients, using 3 cupfuls of flour. Beat thoroughly, cover, and let rise until light. Then add enough flour to knead. Knead, cover, and allow to rise until doubled in bulk. Knead again slightly, and roll out on a floured board until $\frac{1}{3}$ of an inch in thickness. Cut into rounds with a biscuit cutter; put a bit of butter or substitute near the edge of the biscuit; fold; and press the edges together. Place in an oiled pan; cover. Let rise until double in bulk, and bake at 425° F. from 20 to 30 minutes.

The crust may be *glazed* with a mixture of milk and sugar a few minutes before removing the biscuits from the oven. Use 1 part sugar to 2 parts milk. Diluted egg white also may be used for glazing.

A corn-starch paste is sometimes used for *glazing*. It is made as follows: Mix 2 teaspoonfuls of corn-starch with the same quantity of cold water. Add $\frac{3}{4}$ cupful of boiling water; stir and cook for 5 minutes. Brush this over the top of the rolls, sprinkle with sugar. Return the rolls to the oven and continue baking until the crust is browned.

POTATO YEAST ROLLS

Use the recipe for Parker House Rolls as a basic rule. In preparing the sponge, use 2 cupfuls of dry mashed potatoes instead of flour. Decrease the liquid to 1 cupful. Increase the quantity of salt to 1 tablespoonful. When the sponge is light, add sufficient wheat flour to make the dough of the proper consistency. Proceed as for plain wheat rolls.

Rye flour may be used instead of wheat in preparing these rolls.

CINNAMON BUNS

Use one half of the recipe for Parker House Rolls. After the dough has risen, roll until ¼ inch thick, and spread with the following:

½ cupful butter or butter and other fat softened	2 tablespoonfuls cinnamon
1 cupful currants or raisins	1 cupful brown sugar

Roll the dough as for Jelly Roll or for Fruit Rolls (see p. 391) and cut into slices 1 inch thick. Place in well-oiled pans or muffin tins, with a cut surface resting on the pan. When very light, bake in a moderate oven (375° F.) 30 minutes. The buns may be basted with molasses or sugar, or with a milk and sugar mixture (see *Parker House Rolls*). Add 1 teaspoonful of the basting material to each bun 15 minutes before removing from the oven.

BISCUITS WITH PRUNE OR RAISIN FILLING

1 cupful milk	3 tablespoonfuls fat
1 cupful water	1 to 3 eggs
2 tablespoonfuls sugar	2 cakes compressed yeast
1 teaspoonful salt	¼ cupful lukewarm water

Bread flour (about 7 cupfuls)

Heat the milk and water. Turn into a bowl and add the sugar, salt, and fat. Let the mixture stand until it is lukewarm in temperature. Mix the yeast with the lukewarm water and add it to the lukewarm milk mixture. Break the egg; beat the white and yolk separately. Add the egg to the other ingredients.

Through a sifter, add enough flour to knead. Knead and roll out on a floured board until about 1 inch in thickness. Cut into rounds with a biscuit cutter. Make a depression in the center of each biscuit, fill with prunes or raisins prepared as directed below.

Place the biscuits on greased pans, let them rise (in a warm place) until doubled in bulk; bake at 375° F. 25 to 30 minutes.

PRUNE OR RAISIN FILLING

1 pound dried prunes *or*	$\frac{1}{8}$ teaspoonful cloves
$1\frac{1}{2}$ cupfuls seeded raisins	2 tablespoonfuls lemon juice
1 teaspoonful cinnamon	$\frac{1}{4}$ teaspoonful salt

Sugar

Soak the fruit in enough water to cover overnight or for several hours. Cook as directed on p. 76, until the fruit is tender and the water is almost evaporated. If prunes are used, remove the stones. Add the spices, lemon juice, and salt. Also add sugar " to taste."

QUESTIONS

Why should a sponge be made when eggs are to be added to the yeast mixture?

What would be the disadvantage in adding them to a dough, after the dough had stiffened?

What must be done to produce biscuits having much crust rather than little crust?

What care should be taken in regulating the temperature of the oven when baking Cinnamon Buns, especially if they are to be basted during baking?

How many times are Biscuits with Prune or Raisin Filling allowed to rise? How does yeast bread made with one rising differ from that made with several risings?

Why is it necessary to cook the fruit used for filling for biscuits until the water is almost evaporated? What would be the effect on the biscuits of much moisture in the filling?

RELATED WORK

LESSON CXXXIX

Food for Girls and Boys

The Young Girl. — Adolescence is a period of great activity and growth. Much physical development characterizes the years of youth.

During the time of rapid growth, it is very easy to acquire craving not only for sweets, but for condiments and highly seasoned and spiced foods and for foods of decided and contrasting flavor. As previously explained on p. 264, such foods used excessively are harmful. It is especially necessary that a girl growing into womanhood use foods which furnish building and energy-giving nutrients in sufficient quantity as well as materials to promote growth.

Going without breakfast may be the cause of headaches, poorly prepared lessons, and in some cases irritability or bad dispositions. When the morning meal is omitted, an undue quantity of food is apt to be eaten at noon. In many schools, work is resumed immediately or shortly after luncheon. The digestion of a large quantity of hearty food interferes with mental effort.

The Hungry Boy belongs to the period of adolescence. It is perfectly natural for the growing boy to be hungry. Indeed during the time from twelve to seventeen years, more food is consumed by the average youth than by an adult. If three meals a day are to satisfy the hungry boy, a nourishing diet must be eaten. Concentrated, but easily digested foods, such as eggs, cereals, meat, starchy and nitrogenous vegetables for building and energy as well as foods which supply mineral matter such as fruits and succulent vegetables, are needed.

The use of milk and cocoa rather than tea and coffee should be encouraged. It is especially necessary that milk with its growth-promoting materials and valuable proteins be included in the diet of a growing youth. If coffee must be used, let it be cereal coffee.

For the boy who would "make the team" and excel in athletics the matter of a proper food selection is most important. The athlete must give serious consideration to his diet.

Food Plans for Girls and Boys. — According to the table given on p. 380, the diet of a girl from fourteen to seventeen should supply Calories averaging 2400, while that of a boy of the same age should supply Calories averaging 3400.[1]

The following plans for a day's diet for the girl and boy of fourteen to seventeen years are offered as suggestions for wholesome food combinations:

Foods		Approximate Calories
Breakfast.	Fruits, fresh or cooked	75–100
	Cereal with Whole Milk and Sugar	200–250
	Toast and Butter (2 to 3 slices)	300–450
	Cocoa or Whole Milk	120–150
Luncheon.	Cream Soup	150–175
	Meat Substitute	200–300
	Bread and Butter (1 to 2 slices)	150–300
	Rice or Tapioca Pudding or Blanc Mange	150–200
	Cocoa or Whole Milk	120–150
Dinner.	Egg-dish or Meat	200–300
	Starchy Vegetable or Cereal	100–125
	Succulent Vegetable or Salad	50–150
	Bread and Butter (1 to 2 slices)	150–300
	Baked Custard or Ice Cream with Chocolate Sauce	250–300
	Cereal Coffee (with Sugar and Top Milk) or Whole Milk	125–150
		2340–3400

[1] The reason why the energy requirements of a boy exceeds that of a girl of the adolescent period is stated on p. 380.

The School Luncheon. — Girls and boys of high school age invariably lunch at school, or a luncheon is brought from home and eaten at school. If a pupil buys his luncheon at school, hot, wholesome, nourishing foods such as cream-soup vegetables, eggs, cereal puddings, cocoa, and milk should be purchased. It is unfortunate if pastry and sweets are chosen to the exclusion of the foods just mentioned.

In case the plainer foods are selected, it is a mistake for the pupil to narrow his purchase to a very few foods such as meat, potatoes, and pastry. Too often pupils get in the habit of choosing foods which furnish too little variety in composition. Learning to like many different foods is a characteristic one should strive to develop. When one abolishes food prejudices (see p. 61) and "eats everything" that is wholesome, the possibility of securing a well-balanced meal to meet the needs of the body is increased.

Luncheon Menus. — The quantity and kind of food that should be eaten at luncheon depends largely upon the kind and quantity of foods eaten at breakfast and dinner or supper. Some eat more breakfast than luncheon while others follow the reverse plan. It has been found, however, that a luncheon yielding from 750 to 1000 Calories furnishes adequate nutriment for the average youth, provided of course the foods are well balanced in composition. Suggestive luncheon menus for school girls and boys follow. (The luncheon which is carried from home is discussed in Lesson CXLIX.)

Food	Calories Derived from Protein	Total Calories
1 serving macaroni and cheese (1 cupful) .	34.0	200.00
1 slice bread and butter	14.2	150.00
1 portion gingerbread (2 ounces)	14.0	200.00
1 medium baked apple with whole milk .	6.8	128.00
1 serving cocoa ($\frac{3}{4}$ cupful)	16.1	118.40
	85.1	796.40

Food	Calories Derived from Protein	Total Calories
1 serving vegetable soup (1 cupful) . . .	21.28	148.22
1 cheese and peanut sandwich	43.47	270.00
1 large orange	6.20	100.00
1 portion cake (2 ounces)	14.00	200.00
1 glass milk ($\frac{7}{8}$ cupful)	26.60	140.00
	111.55	858.22
1 serving cream of tomato soup (1 cupful) .	25.07	178.4
3 soda crackers	9.4	100.0
1 ham sandwich	51.1	316.4
1 portion ice cream ($\frac{1}{8}$ quart)	7.66	199.2
1 large banana	5.3	100.0
1 glass milk ($\frac{7}{8}$ cupful)	26.6	140.0
	125.13	1034.0

QUESTIONS

Plan a week's series of school luncheons containing foods which may be obtained at home or at school or at any other place where you eat your luncheon. Calculate the total Calorific value of the menus. Also determine the per cent of Calories derived from protein.

LESSON CXL

Planning a Day's Diet — Cooking and Serving a Meal

Plan[1] a day's diet containing the kinds of foods suitable for you and other members of your class and furnishing sufficient Calories to meet the energy-requirement of girls of your age. (Follow the suggestions given in Lesson CV and CXXXIX.) Determine the per cent of the total Calories produced by Calories derived from protein. Compute the cost of the meal.

Cook and serve one of the meals of the day's diet. Follow the English or family style of serving, — either with or without a maid.

[1] See Foot-note, p. 327.

LESSON CXLI

Review: Meal Cooking

MENU

Bread (or Raised Biscuits)
Cranberry Jelly (or Fruit Sauce)

See Lesson XIV, p. 68, for suggestions regarding the preparation of the lesson.

LESSON CXLII

Home Projects [1]

Suggestions for Home Work. — Bake yeast bread or raised biscuits at your home at least once a week.

Suggested Aims: (1) To improve the quality of the bread. Score your products each time you prepare them (see p. 410). By careful observation and by consultation with your teacher, determine the cause of any undesirable quality your breads may have and then strive at the next baking to correct your mistakes.

(2) To compare homemade and baker's bread. Determine the weight and cost of a loaf of homemade and baker's bread. Compute the cost per pound of each. Compare the flavor and satisfying qualities of each. Consult other members of your family regarding these two qualities. Name the advantages and disadvantages of baking bread at home.

[1] See Lesson IX, p. 51.

DIVISION FOURTEEN

CAKE

LESSON CXLIII

Cake without Fat — Sponge Cake

Comparison of Sponge Cake and Popovers. — See the recipe for Popovers, p. 333. Compare it with the recipe for Sponge Cake I.

SPONGE CAKE NO. I

4 egg yolks	Grated rind of ½ lemon
1 cupful sugar	4 egg whites
1 teaspoonful lemon juice	⅛ teaspoonful salt

1 cupful flour

What two ingredients are similar in these recipes? What ingredients does Sponge Cake contain which do not exist in Popovers? What ingredients in Popovers are omitted in Sponge Cake? Note the number of eggs in each. What is the wetting material in Popovers? In Sponge Cake? By what means are Popovers lightened? Sponge Cake? How do you account for the difference in the number of eggs?

Note. — A typical Sponge Cake contains no baking powder or moisture except that contained in the eggs and flavoring material. To make a cheaper cake, the following modification may be made: Instead of 4 eggs, 2 eggs with ¼ cupful of water and 1 teaspoonful of baking powder may be used.

Method of Mixing Sponge Cake. — Beat the yolks of the eggs until thick and lemon-colored. Add the sugar and continue beating; then add the flavoring and any other liquid that the recipe may call for. Beat the mixture well.

Add the salt to the egg whites and beat until the whites are stiff. Sift the flour (and baking powder if used) several times. Add part of the dry ingredients through the sifter to the yolk mixture, then add some of the egg whites. Repeat until all the dry ingredients and the egg whites have been added. Mix by cutting and folding the ingredients. Turn at once into an unoiled pan. Bake in a moderate oven (325° F.) for 50 or 60 minutes.

Baking Sponge Cakes. — *The baking of a cake, as well as the manner of mixing the ingredients* and the quality of the ingredients themselves, determines the success of the cake. A practical test for the temperature of the oven is the placing of a bit of flour or white paper in the oven. If at the end of 5 minutes the paper or flour is slightly browned, the oven is of proper temperature for sponge cakes or cakes without fat. The time required to bake a cake should be divided into quarters. During the first quarter the cake should begin to rise; during the second quarter it should continue to rise and begin to brown; during the third quarter it should continue to brown, and the fourth quarter it should finish baking.

If the mixing and the baking have been successful, failure may result after removing the cake from the oven. It should not be placed in a cold place or in a draft. Invert the cake pan on a wire rack and allow the cake to remain until cool. Remove the cake from the pan, and store in a covered tin box.

SPONGE CAKE NO. II

2 or 3 egg yolks	2 cupfuls flour
1½ cupfuls sugar	½ teaspoonful salt
1 tablespoonful lemon juice	2 teaspoonfuls baking powder
¾ cupful water	2 or 3 egg whites

Mix and bake according to the directions given above. It is advisable to oil the pan for this cake.

WASHINGTON PIE

Sponge Cake with Cream Filling is termed Washington Pie. Follow the recipe for Cream Filling given on p. 375 and put it between the layers of Sponge Cake, or as a filling between split sheets of a loaf or thick sheet of Sponge Cake.

QUESTIONS

What is the purpose of cutting and folding the egg whites and the dry ingredients into a sponge cake mixture?

Why is it necessary to add moisture and baking powder to Sponge Cake No. II?

What is the effect of too cool an oven on Sponge Cake?

LESSON CXLIV

Cake Containing Fat — One-egg Cake

Classes of Cakes. — Cakes are commonly divided into two classes: (*a*) Cakes without fat and (*b*) Cakes containing fat. Sponge Cake (p. 422) is an example of the first class and the One-egg Cake given below is an example of the second class. The method of mixing cakes containing fat differs from the method of mixing cakes without fat. The temperature of the oven and the length of time required for baking also differ for the two classes of cakes.

Comparison of One-egg Cake and Muffins. — See the recipe for Plain Muffins, p. 365. Compare it with the following recipe.

ONE-EGG CAKE[1]

2 cupfuls flour	1 egg
3½ teaspoonfuls baking powder	1 cupful milk or water
½ teaspoonful salt	1 teaspoonful flavoring
¾ to 1 cupful sugar	2 to 4 tablespoonfuls fat

[1] Note to the Teacher. — If a richer cake is desired, follow the Plain Cake recipe given on p. 429.

What ingredient does cake contain that is not present in muffins? What two ingredients exist in greater quantity in cake than in muffins?

The Ingredients of a Cake Containing Fat. — Materials of the best quality should be used for cakes. Pastry flour and the finest granulated sugar are necessary ingredients.

In determining the kind of fat to use in a cake, one should consider all of the ingredients in a recipe, and then decide which one will give the most pronounced flavor to the combined materials. If a cake contains so much fat that the fat will be one of the predominating flavoring ingredients, table butter should be used alone or combined with some bland fat. When but little fat is used in Plain Cake, there is little difference in the flavor of cake made with butter or substitutes. Oleomargarine, tried-out chicken fat, suet, lard, or vegetable fat may be used for spice cakes or other highly flavored cakes. Cake is one of the foods whose ingredients require the greatest accuracy and care in measuring. When a cake contains much fat, the latter can usually be more easily and accurately weighed than measured.

Method of Mixing Cake Containing Fat. — Since cakes contain much more fat and sugar than muffins, a different method of mixing the fat with the other ingredients of the cake has been used quite generally. The fat and sugar have usually been blended by creaming them.

However, many experiments in the mixing and baking of cakes have been made. These show that a cake of good quality may be made by following the method of mixing fat in a muffin mixture, *i.e.* melting the fat and adding it to other ingredients. The following is the method of mixing cake when melted fat is used:

Beat the eggs, add the sugar, liquid, and flavoring. Melt the fat and add it to the other ingredients. Mix the dry ingredients, *i.e.* the flour, baking powder, and salt. Add these through a sifter to the egg and sugar mixture. Beat from 1 to 2 minutes.

In cake mixing, the yolks and the whites of the eggs are often separated. When this is done, the yolks and sugar are blended, the moisture, flavoring, melted fat, and dry ingredients are added, the mixture beaten, and finally the beaten whites are folded in.

In combining cake ingredients, great care must be taken to mix all ingredients *thoroughly*. Cakes, except those containing very little moisture and much fat, such as Jumbles or Pound Cake, can be made satisfactorily by adding melted fat. It has been estimated that half as much time is required for mixing a cake in which melted fat is used as one in which the fat is creamed. It has been found [1] that the amount of mixing and the preparation of ingredients in a cake are much more important factors than the manner of combining the ingredients. Too little beating makes a cake of coarse, crumbly mixture. Too much beating makes it compact in texture with " tunnels " through it.

Preparing the Pans for Cakes Containing Fat. — The pans for cakes that contain fat should be well oiled. It is well to line the pans with paper and to oil the paper thoroughly, or to oil the pans well and to sprinkle a little flour over them before adding the cake batter.

Baking Layer and Loaf Cakes. — If a bit of flour or white paper is delicately browned after being placed for 2 minutes in the oven, the oven is of proper temperature for layer cakes containing fat. For a loaf cake the oven should be cooler, since a longer time for baking is required. It is especially important that a crust does not form over the top of a cake before the cake has risen, or before it has been in the oven one fourth of the time required (see *Baking Sponge Cakes*, p. 423). To avoid this, the temperature of

[1] See Journal Home Economics, Vol. X, pp. 542–7, December, 1918.

the oven should be quite low when a thick loaf cake is first placed in it. Some housekeepers find it most satisfactory to cover the top of a pan containing loaf cake with paper until the cake has risen. In general, layer cakes require 20 to 35 minutes for baking and loaf cakes from 40 minutes to $1\frac{1}{2}$ hours. Shortly after taking from the oven, cake containing fat may be removed from the pan, and placed on a wire cake cooler or towel until cold. In a heat-regulated oven, bake layer cakes at 375° F., and loaf cakes at 350° F.

The Quality of Cake. — Desirable cake is tender and light, but of fine grain. The quantity of eggs, sugar, fat, and moisture affects these qualities. Too much sugar makes a cake of coarse grain and of waxy or tough texture. On the other hand, a cake containing too little sugar is not as fine grained as one having "just enough."

A cake in which there is too much fat is crisp or crumbly, — *i.e.* it will not hold its shape. Too little fat may make it tough in texture. Generally the more fat a cake contains the smaller the quantity of moisture needed. Note that the One-egg Cake recipe contains 1 cupful of liquid, but when the fat is increased to $\frac{1}{2}$ cupful, the moisture is decreased to $\frac{2}{3}$ cupful (see Plain Cake recipe, p. 429).

Many eggs without a proportionate quantity of fat and sugar produce a tough cake. The toughness occasioned by eggs, may be offset, of course, by the tenderness produced by fat. It is a most interesting study to compare cake recipes. Some are well proportioned, others could be greatly improved by variations in the quantity of ingredients.

The flavor of a cake is largely affected by the proportion of ingredients in a cake. For the sake of economy, however, certain ingredients, especially fat and eggs, must be decreased even though texture, grain, and flavor are sacrificed. The matter of wholesomeness must also be taken into consideration. Many persons can eat with comfort plain cakes, *i.e.*

those containing little fat and a moderate quantity of sugar, while rich cakes distress them.

SCORE CARD FOR CAKE, — DETERMINING ITS QUALITY

Flavor	40
Lightness	20
Grain and texture	15
Baking (crust and color)	15
Appearance (shape and icing)	10
Total	100

QUESTIONS

How should cake batter be spread in the pan to prevent it from rising higher in the center than at the edges?

What is the purpose of placing the warm cake on a cake cooler or on a cloth? Mention some substitute other than a cloth for a wire cake cooler. Why not place the warm cake *inverted* on the cake cooler?

Explain why a hot cake should not be placed in a cool place or in a draft.

Why store a cake in a tightly covered tin box?

Give two reasons for the cracking of the crust of a cake.

What is the effect of using too much fat in a cake? Too much sugar? Too much moisture?

If the quantity of fat is increased, what ingredient in a cake recipe should be decreased?

If the number of eggs in a cake is reduced, what ingredient should be increased?

LESSON CXLV

Cake Containing Fat — Plain Cake and its Modifications (A)

The "Conventional" method of mixing cake is as follows: Cream the fat; then gradually add the sugar. Cream the mixture. Add egg yolks that have been beaten until light. Add the flavoring. Then add some of the milk and part of the dry ingredients. Repeat until all the milk and dry ingredients have been added. Beat the mixture thoroughly. Cut and fold in the whites of the eggs quickly; then turn into oiled pans. Bake layer cakes at 375° F., and loaf cakes at 350° F.

PLAIN CAKE

2 cupfuls flour	1 cupful sugar
2 teaspoonfuls baking powder	$\frac{2}{3}$ cupful liquid
$\frac{1}{2}$ teaspoonful salt	1 teaspoonful flavoring
2 eggs	$\frac{1}{4}$ to $\frac{1}{2}$ cupful fat

Mix according to the directions above or according to *Method of Mixing Cake Containing Fat* (p. 425).

Compare this recipe with that for One-egg Cake (p. 424). Note that the eggs and fat are increased, while the baking powder and moisture are decreased. Can you account for these variations?

WHITE CAKE

Follow the Plain Cake recipe, using 4 egg whites instead of 2 eggs and the greater quantity of fat. Vanilla or almond flavoring are pleasing in White Cake. If almond extract is used, add only $\frac{1}{2}$ teaspoonful.

White Cake is mixed according to the general directions (see p. 425), except, of course, that the egg yolks are omitted; the egg whites are beaten until stiff and folded into the other ingredients.

A cheaper but tasty white cake may be made by following the recipe for One-egg Cake (see p. 424) and using 2 egg whites instead of 1 whole egg.

FRESH COCONUT CAKE

Break open a fresh coconut, save all the milk and use it as part of the liquid for a White Cake. Add milk to the milk of coconut to make the $\frac{2}{3}$ cupful of liquid in the plain cake recipe. Prepare a White Cake in two layers.

Break the coconut into pieces, pare these and put them through a food chopper or grate them. Prepare Boiled Frosting. When the frosting is ready to spread on the cake, add about $\frac{3}{4}$ of the chopped coconut. Spread the mixture on the cake layers and sprinkle the remainder of the coconut over the frosting on the top layer of the cake.

A fresh coconut cake will keep moist for a week.

WATER FROSTING

1 cupful confectioner's sugar
1 tablespoonful hot water, milk, or cream
Salt
1 tablespoonful lemon juice

Stir the hot water into the sugar and add the salt and lemon juice. If too stiff, add a little more boiling water.

3 tablespoonfuls of *cocoa* or 1 ounce of *chocolate* may be mixed with 3 tablespoonfuls of water, cooked for a few minutes, and used in place of the moisture and lemon juice. $\frac{1}{2}$ teaspoonful of vanilla should be added when these materials are used. When cocoa is used the addition of 1 tablespoonful of butter improves the flavor.

Mocha frosting may be made by mixing the cocoa or chocolate with strong coffee instead of water.

EGG FROSTING

1 egg white
1 tablespoonful lemon juice
1 cupful confectioner's sugar
Salt

Put the unbeaten egg white into a bowl; add the lemon juice, then the salt and sugar. Mix thoroughly. Spread on warm cake.

The lemon juice may be omitted, and *chocolate* (or cocoa) and vanilla added, as in Water Frosting.

GOLD FROSTING

2 egg yolks
Confectioner's sugar
1 tablespoonful lemon juice or vanilla
Salt

Add the flavoring and salt to the unbeaten yolks. Add enough confectioner's sugar to the mixture to make it thick enough to spread. Use on White Cake when it is warm.

BOILED FROSTING

$\frac{3}{4}$ to 1 cupful sugar	$\frac{1}{3}$ cupful water
1 teaspoonful vinegar	1 egg white
1 teaspoonful flavoring	Salt

Mix the sugar, water, and vinegar in a saucepan. Cook *gently* until the sirup (when dropped from a spoon) "spins a thread" 3 inches long. Remove from the fire, and gradually pour the sirup over the egg white to which a pinch of salt has been added and which has been beaten stiff. Continue to beat the mixture; when it begins to stiffen, add the flavoring, and spread over cooled cake.

The less quantity of sugar produces a more delicate and less dense frosting than the greater quantity.

CHOCOLATE-MARSHMALLOW FROSTING

1 cupful sugar	12 marshmallows
$\frac{1}{4}$ cupful boiling water	2 ounces chocolate
$\frac{1}{8}$ teaspoonful salt	3 tablespoonfuls water

$\frac{1}{2}$ teaspoonful vanilla

In a saucepan stir the sugar, boiling water, and salt. Then place over a low flame and heat until the sugar is dissolved.

Cut the marshmallows in halves, add to the sugar mixture, and beat until the marshmallows have melted. Cut the chocolate in pieces and mix with 3 tablespoonfuls water. Stir and cook over a low flame until a thick, smooth paste is formed. Add to the sugar mixture. Beat until the frosting is of proper consistency to spread, then stir in the vanilla.

QUESTIONS

Give the reason for the greater quantity of fat in cake when egg yolks are omitted.

If the conventional method of mixing cake is followed, what can be done in cold weather to hasten the creaming of fat? What is the result of insufficient creaming?

Why is the cake mixture beaten thoroughly before the whites of eggs are added?

What is the purpose of cutting and folding in the whites of eggs in the cake mixture?

What kind of fat should be used for white cake? Why?

Why use hot water rather than cold water for Water Frosting (see Experiment 11, p. 70)?

When egg whites alone are used in cake, give at least three uses for the yolks of the eggs.

Why is Egg Frosting used on warm cake, rather than on cold?

What is the use of vinegar in Boiled Frosting (see *Christmas Candy*, p. 526)?

Why should the white of egg be beaten while the hot sirup is being poured over it?

LESSON CXLVI

Cake Containing Fat — Plain Cake and its Modifications (B)

CHOCOLATE CAKE

2 cupfuls flour	$\frac{1}{4}$ teaspoonful baking soda
3 teaspoonfuls baking powder	2 eggs
$\frac{1}{2}$ to 1 teaspoonful salt	$1\frac{1}{2}$ cupfuls sugar
2 ounces chocolate *or*	$\frac{1}{2}$ cupful milk
$\frac{1}{3}$ cupful cocoa	1 teaspoonful vanilla
$\frac{1}{2}$ cupful water	$\frac{1}{3}$ cupful fat

Cook the chocolate or cocoa in the water until a smooth paste is formed, stirring constantly while cooking. Cool, and add the baking soda.

Beat the egg yolks and whites separately. Mix as plain cake, adding the chocolate mixture after the egg yolks have been mixed with the sugar. Use the less quantity of salt if butter is used for the fat.

Bake in layers at 375° F., placing Chocolate Filling between the layers and Boiled Frosting on the top layer.

Sour milk may be substituted for the sweet milk. When this is done, increase the baking soda to ½ teaspoonful and decrease the baking powder to 2 teaspoonfuls.

Baking soda is used with chocolate to neutralize a small quantity of acid (tartaric) contained in it. Its use with chocolate will also darken the cake.

CHOCOLATE FILLING

½ cupful sugar	3 tablespoonfuls water
⅓ cupful flour	¼ teaspoonful salt
1 cupful milk	1 egg yolk
1 ounce chocolate	1 teaspoonful vanilla

Mix all ingredients except the egg yolk and flavoring in the same manner as Chocolate Corn-starch Pudding (see p. 100). When sufficiently cooked, add the egg yolk as directed for Butterscotch Tapioca (see p. 182). Continue cooking until the egg is coagulated. Remove from the fire, cool, add vanilla.

3 tablespoonfuls of cocoa may be substituted for the chocolate. When this substitution is made, mix the cocoa with the flour and sugar and omit the water.

The egg yolk may be omitted. When this is done add ½ tablespoonful of corn-starch to the flour and sugar mixture.

Compare the recipes for chocolate and plain cake. How do you account for the difference in the quantities of sugar (see *Chocolate Corn-starch Pudding,* p. 100)?

Does the water used for making the chocolate paste change in quantity during the cooking? Explain. What ingredient do both chocolate and cocoa contain which aids in thickening the cake? From this can you account for the greater quantity of moisture used in Chocolate Cake?

Would it be advisable to use a greater quantity of fat ($\frac{1}{2}$ cupful) for Chocolate Cake? Why?

NUT CAKE

Follow the recipe for Plain Cake, use the smaller quantity of fat, and add 1 cupful of chopped nuts. A convenient way of chopping nuts is to put them through the food chopper, using the coarse knife.

CAKE CONTAINING FRUIT

Follow the recipe for Plain Cake, but add 1 cupful of raisins or currants. Clean the fruit, then dry, and sprinkle it with flour. Raisins may be chopped, or cut in two pieces (see *To Prepare Raisins for Cooking*, p. 77). Citron may also be added. It should be cut in thin slices or put through the food chopper.

When light brown sugar is used instead of white sugar, dates make a pleasing addition. These should be cleaned, stoned, cut into pieces, and added as are the raisins or currants.

Spices give pleasing flavor when dried fruits are used. 1 teaspoonful each of cinnamon and nutmeg and $\frac{1}{8}$ teaspoonful of cloves make desirable flavoring.

QUESTIONS

Mention the kinds of fat that could be used for spice cakes and for Chocolate Cake. Give the reason for the selection made.

From *U. S. Department of Agriculture*, Bulletin 28, tabulate the percentage composition of some common nuts. Of chocolate and cocoa.

Explain why the minimum quantity of fat should be used for Nut Cake.

Why are the dried fruits floured?

Why are nuts not floured?

Compare cakes made with the least and the greatest quantity of fat. Which is the more tender? Which has the better taste?

Calculate the cost per pound of Sponge Cake (see p. 422). Calculate the cost per pound of cake containing fat (see *Plain Cake*, p. 429).

LESSON CXLVII

Cake Containing Fat — Cookies

Classes of Cookies. — Cooky mixture may be thin like a drop batter and dropped by spoonfuls on to a pan or it may be about as stiff as a soft dough and rolled and then cut into rounds or other shapes. Hence cookies may be classified as:

(1) Drop Cookies.

(2) Cut or Rolled Cookies.

Texture of Cookies. — Drop cookies may or may not contain fat. Cut or rolled cookies usually contain fat. Since a dough is prepared in making the latter kind of cookies, fat is needed to make the mixture sufficiently tender. A dough containing little or no fat usually produces a tough cut cooky. A skilled cooky maker, however, can secure a soft cut cooky containing little fat by making a very soft dough.

If crisp, cut cookies are desired, the dough should be rolled thin. To secure soft cookies roll the dough to at least $\frac{1}{4}$ inch thickness. If cookies containing fat are stored in a tightly covered box, they become softer after several days.

Compare the recipe for Sugar Cookies with that for Plain Cake (see p. 429). Account for the difference in the quantity of milk. Explain why the quantity of milk is decreased rather than the quantity of flour increased.

SUGAR COOKIES

2 cupfuls flour	1 cupful sugar
2 teaspoonfuls baking powder	$\frac{1}{2}$ cupful fat
$\frac{1}{2}$ teaspoonful salt	Milk or water (about $\frac{3}{8}$ cupful)
1 egg	1 teaspoonful flavoring or spice

Mix as for Plain Cake (do not separate the eggs), adding just sufficient milk to make the dough stiff enough to be rolled out. Put the dough in a cool place to chill. Roll out in small portions; then sprinkle with sugar. Cut and bake at 375° F. 10 minutes or until browned.

SOUR MILK OR CREAM COOKIES

Follow the recipe for Sugar Cookies, using ½ cupful of thick sour milk or cream in the place of sweet milk and adding ¼ teaspoonful of baking soda. If sour cream is used, only ⅓ cupful (instead of ½ cupful) of fat is needed. Nutmeg — ½ teaspoonful — is a pleasing flavoring material for these cookies.

For *Ginger Cookies*, vary the recipe for Sour Cream Cookies as follows:

Use ½ cupful sugar and ½ cupful molasses instead of 1 cupful of sugar.

Increase the baking soda to ½ teaspoonful.

For flavoring use 1 teaspoonful ginger and 1 teaspoonful allspice.

Since the molasses furnishes some moisture, it is usually necessary to add more flour or decrease the sour milk or cream.

COOKIES WITH RAISIN FILLING

Prepare Sour Cream Cooky dough. Roll the dough into a thin sheet and cut it into rounds. Spread half of the rounds with a thin layer of Raisin Filling (see below). Then cover each round with another piece of dough. Press the edges together. Place on an oiled baking sheet and bake in a moderate oven.

RAISIN FILLING

½ cupful corn sirup
1 cupful seeded raisins
¼ teaspoonful salt

Cook these ingredients until the mixture is thick enough to use as cake filling.

One fourth cupful of chopped nuts may be added. One egg may also be added to the mixture just before removing from the fire.

PEANUT BUTTER COOKIES

2½ cupfuls flour	1 egg
3 teaspoonfuls baking powder	1 cupful sugar
½ teaspoonful baking soda	¾ cupful peanut butter
½ teaspoonful salt	1 cupful sour milk

Mix and bake as Sugar Cookies. It is especially necessary to make the dough for these cookies very soft. It requires skilful handling.

CORN-MEAL COOKIES

½ cupful melted fat	½ teaspoonful baking soda
½ cupful molasses	2 teaspoonfuls baking powder
½ cupful corn sirup	2 cupfuls corn-meal
1 egg	1 cupful wheat flour
6 tablespoonfuls sour milk	½ teaspoonful salt

Combine the melted fat, molasses, sirup, beaten egg, and milk. Sift the dry ingredients and combine with the liquid. Drop from a teaspoon on to a greased pan and bake in a moderate oven (375° F.) for 15 minutes. This makes 55 to 60 cookies about 2 inches in diameter.

(Adapted from *United States Food Administration Bulletin.*)

QUESTIONS

How does the method of preparing cooky mixture differ from that of preparing cake mixture?

Why should cooky dough be chilled before rolling out?

What can be done to the cooky cutter to prevent it from sticking?

Why is less fat required for Sour Cream than for Sour Milk Cookies (see Figure 64, p. 284)?

From the *United States Department of Agriculture*, Bulletin No. 28, find the per cent of fat in peanut butter. What is the per cent of fat in butter (see Figure 63, p. 277)? If butter were substituted for peanut butter in Peanut Butter Cookies, how much would be needed to furnish the same quantity of fat?

LESSON CXLVIII

Cakes without Eggs

Omitting Eggs in Cake. — It was previously stated that 2 teaspoonfuls of baking powder are required to leaven 1 cupful of flour when no eggs are used. The statement was also made that the quantity of baking powder is reduced when eggs are used. Hence cakes made with eggs require less than the proportionate quantity of leavening given above.

When eggs are omitted in a cake, it is necessary to use 2 teaspoonfuls of baking powder (or its equivalent) for each cupful of flour.

The flavor of cakes is usually improved when eggs are used. In eggless cakes, it is advisable to use spices or other materials of pronounced flavor.

Since eggs are highly nutritious, their omission in cake decreases considerably the food value of the cake. Leavens and flavoring materials (except chocolate) used in eggless cakes have practically no food value.

APPLE SAUCE CAKE

2 cupfuls flour	¼ teaspoonful salt
⅛ teaspoonful cloves	1 cupful sugar
1½ teaspoonfuls cinnamon	1 cupful apple sauce (unsweetened)
1 teaspoonful nutmeg	⅓ cupful fat
1 teaspoonful baking soda	1 cupful raisins, cut in halves

Mix the sugar and apple sauce; add the fat. Mix the dry ingredients. Through a sifter, add them to the apple sauce mixture. Flour the raisins and stir them into the batter. Turn into a greased loaf-cake pan or into two layer-cake pans. Bake in a moderate oven (375° F.). If the cake is baked in layers, put Raisin Filling (see p. 436) between them, but omit the raisins in the cake batter.

CHOCOLATE CAKE

2 cupfuls flour	$\frac{1}{4}$ cupful fat
2 teaspoonfuls baking powder	$\frac{1}{2}$ teaspoonful baking soda
1 teaspoonful salt	1 cupful sugar
$\frac{1}{3}$ cupful cocoa	$\frac{3}{4}$ cupful sour milk
$\frac{1}{3}$ cupful water	1 teaspoonful vanilla

Mix the cocoa and water. Stir and cook until a thick smooth paste is formed. Add the fat. If solid fat is used stir until it is melted. Set aside to cool.

Add the baking soda and mix well. Then add the sugar and sour milk. Through a sifter, add the dry ingredients. Then add the vanilla. Beat well. Bake in two layers (375° F.) or in one sheet (350° F.). Use frosting or Chocolate Filling made without eggs (see p. 433) between the layers and frosting on the top layer.

If it is desired to save sugar, a thin layer of Chocolate Filling may be used between the layers and on the top layer.

SPICE CAKE

1 cupful brown sugar	1 teaspoonful nutmeg
$\frac{1}{4}$ cupful molasses	2 teaspoonfuls cinnamon
1 cupful seeded raisins	$\frac{1}{8}$ teaspoonful cloves
$\frac{3}{4}$ cupful water	$2\frac{1}{2}$ cupfuls flour
$\frac{1}{2}$ cupful fat	$\frac{1}{4}$ teaspoonful baking soda
$\frac{1}{2}$ teaspoonful salt	$3\frac{1}{2}$ teaspoonfuls baking powder

In a saucepan mix all the ingredients except flour and leavening materials. Stir and cook the mixture at boiling temperature for 3 minutes. Set aside to cool.

Through a sifter, add the leavening materials and flour. Beat well. Turn into an oiled loaf-cake pan and bake in a moderate oven (350° F.) from 45 to 60 minutes.

Chopped nuts — ½ cupful — may be added to this cake. This addition, however, increases the cost. For economy the raisins may be omitted.

NOTE. — Various changes occur when certain of the ingredients of this cake are cooked, viz.,

(*a*) The sugar is dissolved
(*b*) The raisins are softened
(*c*) The fat is melted
(*d*) The spices are improved in flavor.

QUESTIONS

What materials in Apple Sauce Cake leaven it?

What ingredient usually present in cake recipes is omitted in this cake? What takes the place of this ingredient?

In Chocolate Cake, how much baking soda is required to neutralize the acid of the sour milk? For what purpose is the additional quantity used?

What is the purpose of cooking the cocoa and water (see *Cocoa and Chocolate*, p. 166)?

Determine the difference in the cost of Chocolate Cake with and without eggs (see p. 432).

What ingredient in Spice Cake contains a small quantity of acid? Explain why baking soda is an ingredient of this ingredient.

Why should the cooked mixture of Spice Cake be cool before the remaining ingredients are added?

RELATED WORK

LESSON CXLIX

THE LUNCHEON BOX

The luncheon box most commonly used is of pasteboard or tin. Both these materials have advantages and disadvantages. Bread and cake are prevented from drying out when placed in a tightly covered tin box. On the other hand, food odors are retained and one pronounced odor may permeate all of the foods. But since dry bread is unpalatable, the tin box is considered more satisfactory. It should be kept clean and free from odors, should be emptied of its contents every day, washed (scalded often), and allowed to remain open all night. The collapsible box is the most convenient.

For most lunches, a teaspoon, jelly glass, and in some cases a drinking cup are all the "dishes" needed. The jelly glass may serve for many purposes. Cup custard may be steamed or baked in it, or it makes an admirable mold for an individual steam pudding. Small fruits and fruit sauces may also be carried in jelly glasses.

Menu Making for the Luncheon Box. — A luncheon box may be made a source of pleasure to the school child or everyday worker. To bring this about, the foods must be varied on successive days. It is not necessary that each luncheon consist of various foods. Indeed, many kinds of food or foods in great quantity are not desirable for a child who sits quietly at study much of the day or for a person of sedentary occupation. It is both possible and necessary, however, — if the luncheon box is not to become monotonous, — to have different foods for each day of the week. As in any meal, all of the foodstuffs should be represented in the food of a luncheon box.

Foods for the Luncheon Box. — (1) *Sandwiches.* — Bread is the basis of almost all box luncheons. Since sandwiches furnish the most convenient way of carrying foods that are to be eaten with bread, they invariably form a part of every luncheon. Because they are used so frequently they should be varied. Different kinds of bread, such as graham, Boston brown, and nut bread, may be used. Variety may be had by serving bread sometimes in the form of muffins or rolls. The slices of bread may be cut thin or thick to suit the appetite of the eater. It is often desirable to leave the crusts on the bread. Butter should be creamed before spreading it on the bread. If the sandwiches are to be cut extremely thin, spread the bread before cutting it into slices. If sandwiches are prepared some time before they are served, they can be kept moist by wrapping in a dry towel, covered with a towel wrung out of hot water.

The fillings for sandwiches offer many variations. They may be divided into two classes, seasoned and sweet. *Seasoned fillings* may include meat, eggs, cheese, vegetables. If meat is used, it may be cut in slices, or chopped and mixed with a sauce. If sliced meat is used, it is well to tear it into pieces. (This applies also to lettuce.) If it is desired to lessen the quantity of meat in a diet, the meat should be chopped, for it has been found that only half as much meat is required when it is chopped and mixed with a dressing. Either Salad Dressing or White Sauce may be combined with meat. A French Dressing made of vegetable oil, lemon juice, and seasonings is better, so far as ease of digestion is concerned, than Cream or " Boiled " Salad Dressing. If oil is not palatable, learn to like it. Any of the seasoned fillings may be mixed with Salad Dressing. Sliced tomatoes spread with Mayonnaise or Cream Salad Dressing, chopped peanuts mixed with salad dressing, sardines or cold chicken with lemon juice and paprika make tasty sandwich fillings.

Sweet fillings for sandwiches include: preserved or dried fruits, bananas, nuts. Sandwiches made with a sweet filling are most popular among children. Some of them make good substitutes for cake, and are much more easily digested. The dried fruits such as dates, figs, and prunes, cooked and combined with bread and butter, make excellent foods.

The growing child is apt to become anemic. Since prunes contain iron, they should be frequently used in children's diet. Cooked prunes — seeded and flavored with lemon juice — make palatable sandwiches, especially when brown bread is used or a few chopped nuts are added. Breads containing sugar or molasses are most pleasing when used with a sweet filling. Banana sandwiches are much improved by the addition of lemon juice or Salad Dressing. Nuts are often combined with both sweet and seasoned materials; their use gives opportunity for variety. Chopped raisins and nuts may be moistened with grape juice and used as sandwich filling. Chopped dates, apples, and nuts mixed with salad dressing make a pleasing filling. Crushed maple or brown sugar mixed with cream or butter and used with whole wheat bread is a favorite sandwich among children.

(2) *Relishes.* — Celery, olives, and radishes serve as relishes for the luncheon box. Celery and olives (especially those stuffed with pimentos or nuts) are pleasing as a sandwich filling. Most relishes, however, are more suitable for the luncheon box of a mature person than for that of a child.

(3) *Desserts.* — Cake is a common constituent of the luncheon box. Not all cakes, however, are suitable for luncheons. For children, only the plainer cakes, *i.e.* those containing little fat, should be used. Plain cake and cookies, sponge cake, lady fingers, and gingerbread (if not too highly spiced) are also desirable for the school luncheon. Cookies or cakes baked in muffin pans are more suitable for packing than cut pieces of cake.

Most fresh fruits can be easily packed in the luncheon box. As has been mentioned, grapes, the small fruits such as strawberries and raspberries, sliced pineapple, or fruit sauces may be carried in jelly glasses.

Cup custards and simple puddings may be used as desserts. If a child is permitted to have sweets, a little candy may be placed in the luncheon box; it is better for a child to have candy at the end of a luncheon than after school (see *Use of Candy in Diet*, p. 523).

Packing the Luncheon. — Neatness is an essential in an inviting luncheon box. All foods should be wrapped separately in paraffin paper, and placed neatly in the box. Since some foods crush readily, it is not always possible to place the foods to be eaten first on top, but it is desirable to arrange the foods so that not all of them will have to be removed before beginning to eat the luncheon. The paper napkin should always be placed on top. It is perhaps unnecessary to say that foods should not come in direct contact with newspapers or any printed matter.

QUESTION

Plan menus for five school luncheons, making them as varied as possible. If you carry your luncheon to school, follow these menus in preparing your luncheon box.

LESSON CL

Planning and Preparing Box Luncheons

Plan [1] box luncheons. Make sandwiches and other foods for the luncheon box. Fill one or more luncheon boxes according to plans.

LESSON CLI

Review — Meal Cooking

MENU

Cake (for Cottage Pudding)
Vanilla Sauce
Cocoa

[1] See Foot-note, p. 327.

See Lesson XIV, p. 68, for suggestions regarding the preparation of the lesson.

LESSON CLII

Home Projects [1]

Suggestions for Home Work. — Bake cake or cookies at least once a week. If eggs are high in price, bake cake without eggs or bake One-egg Cake.

Suggested Aims: (1) To improve the quality of cake. As suggested in a previous Home Project, score your product, determine the cause of any undesirable quality, and then avoid your error at the next baking (see p. 428).

(2) To compare homemade and baker's cake. Determine the weight and cost of homemade and baker's cake. Compare like kinds of cake, *i.e.* plain, chocolate, etc. Compute the cost per pound of each. If possible compare the flavor, grain, and texture of each. What are the advantages of homemade over baker's cake?

[1] See Lesson IX, p. 51.

DIVISION FIFTEEN

PASTRY

LESSON CLIII

Pie with Under Crust

Pastry. — Good pastry is: (*a*) light, (*b*) flaky or friable, and (*c*) tender. The *lightness* of pastry is largely dependent upon the temperature of the ingredients. All the materials should be cold, so that the expansion in baking may be as great as possible. In order to keep the ingredients cold and the fats solid, a knife (instead of the fingers) should be used in mixing. It is well to chill pastry by placing it on the ice before rolling out. The lightness of pastry is dependent somewhat upon quick and deft manipulations. A little baking powder also increases the lightness of pastry.

Flaky pastry results when the ingredients are mixed so as to form layers. To accomplish this, solid fat is used and it is not cut fine into the dry ingredients, but is left in pieces. Thus, when rolled, there are layers of flour and fat. Pastry is sometimes made by cutting part of the fat into the flour mixture, then moistening and rolling it out; adding the remainder of the fat in small bits, folding and rolling out again.

Friable pastry usually results when oil is used instead of solid fat. The following fats may be used alone or in combination: butter, oleomargarine, lard, vegetable oil or fat, lard substitutes.

To make pastry *tender* and not tough, the least possible moisture should be used. The quantity of fat used also determines its tenderness. The more fat used, the less the amount of water required. Less moisture is required when oil rather than solid fat is used. For this reason, many persons can produce more tender pastry by using a cooking oil. The fact that the moisture is decreased when oil is used may also account for the decreased quantity of oil given in the recipe for pastry. Less oil than solid fat will produce the same degree of tenderness, provided less water is used.

Pie with the Under Crust. — Pastry is somewhat difficult of digestion; but a crust that is brittle and easily crumbled is more readily digested than one that is moist and pasty. Pie crust should crumble as finely as a cracker. To prevent moist and pasty pie crust, it is advisable to bake "one crust" pie. If an under crust only is used, it should be baked before adding the filling. The filling should be cooked and sweetened before adding it to the crust.

PLAIN PASTRY (2 crusts)

1½ cupfuls flour	¼ to ½ cupful fat *or*
1 teaspoonful baking powder	⅙ to ⅓ cupful oil
½ teaspoonful salt	Ice water

Mix the dry ingredients, cut in the fat slightly; then add just enough water to hold the ingredients together. Chill; then roll out (one crust at a time).

Pastry should be baked in a hot oven. A pastry shell containing no filling should be baked at 400° F., for 15 to 20 minutes.

Bake a one crust pie on the outside of a pie pan; it should be pricked with a fork before baking.

The pastry trimmings should be utilized. They may be made into tarts or cheese straws.

LEMON PIE

3 tablespoonfuls flour	2 egg yolks
3 tablespoonfuls corn-starch	Juice and grated rind of 1 lemon
1 cupful sugar	1 tablespoonful butter
2 cupfuls boiling water	¼ teaspoonful salt

MERINGUE

2 egg whites	2 tablespoonfuls powdered sugar

Mix the sugar, flour, and corn-starch, add the boiling water. Stir and cook on the back of the range, or over an asbestos mat, for 15 minutes. Add the egg yolks and cook at simmering temperature, until the eggs thicken. Add the remaining ingredients. Cool and place in a baked crust. Cover with a meringue (see p. 180). Bake until the meringue is a light brown, *i.e.* at 300° F., 10 to 15 minutes.

Note that the lemon is added to the mixture after cooking. Cooking a starchy material with a small amount of acid, dextrinizes the starch. Since dextrin has less thickening power than starch, the starch mixture would become thinner if cooked for some time with lemon.

SCORE CARD FOR PIE,— DETERMINING ITS QUALITY

Flavor	30
Tenderness	20
Lightness	10
Flakiness	10
Appearance (color and thickness)	10
Filling (flavor and consistency)	20
Total	100

QUESTIONS

Why should not the fingers be used to mix the fat with the dry ingredients in pastry making?

Why is it easier to roll out pastry, if it has been chilled after mixing?

Why should a lower crust, when used alone, be baked before adding the filling?

What is the purpose of pricking the lower crust with a fork before baking?

Compare the filling for Lemon Pie with that for Cream Puffs (see p. 375). How do they differ in moisture, method of preparation, and length of time in cooking? Give the reason for these differences.

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of butter (see Figure 63, p. 277), oleomargarine, lard, lard substitute, and vegetable oil. What is the price per pound of each?

Which furnishes more fat, — a pound of butter or a pound of lard? If lard, lard substitute, or vegetable oil were substituted for butter in a cake or other quick bread, should the same quantity be used? Explain.

LESSON CLIV

Pies with Upper Crust

Digestion of Pastry. — As previously mentioned (see *Frying and Digestion*, p. 140), when fats are heated to a high temperature, they decompose. The products of this decomposition are less readily digested than is fat before it is decomposed. Hence in fried foods, the fat is made somewhat indigestible. Thus it is much better to spread uncooked fat over hot potatoes than to combine the two foods by frying the potatoes.

Fat is the most slowly digested of all foodstuffs. Hence a combination of fat and carbohydrates is more slowly digested than carbohydrate. For this reason, foods consisting of fat and flour such as pastry may remain in the digestive tract for a long time and cause disturbances. Distressing effects are less likely to result, however, when a person's work is out of doors. Since fatty foods remain in the stomach longer than others, they may serve to allay the feeling of hunger which is caused by the contracting of an empty stomach.

Pie with the Upper Crust. — In the previous lesson (see *Pie with Under Crust*, p. 447), it was mentioned that "pasty" pie crust was not readily digested. For this reason, fresh fruit pie may be made with an upper crust only. Such pie should be baked in a pan of granite, glass, or similar material. The fruit is placed in the pie pan, then a half-inch strip of pastry is placed over the rim of the pie pan; the strip is moistened and the crust placed over the top. The strip of pastry and the upper crust are pressed together, then the edges of the latter are trimmed. The upper crust should be cut in several places for the escape of steam.

RHUBARB PIE

2 cupfuls rhubarb, cut in small pieces
1 egg — 1 cupful sugar
4 tablespoonfuls flour — Salt
Lemon rind

Mix the sugar, salt, lemon rind, and flour; beat the egg. Add the rhubarb and flour mixture to the egg. Turn into an earthenware dish or a granite pan, and cover with pastry as directed above. Bake until the rhubarb is tender and the crust is brown, *i.e.* at 425° F., 35 to 45 minutes.

Rhubarb contains such a large percentage of moisture that it is well to use but one crust.

QUESTIONS

Explain why it is that baked potatoes and butter are more readily digested than fried potatoes.

What is the advantage of using only a top crust for fresh fruit pie?

What is the purpose of egg and flour in Rhubarb Pie? Why is it desirable to use these ingredients with rhubarb?

Why should the flour in Rhubarb Pie be mixed with sugar?

How much water is there in apples and rhubarb (see *U. S. Department of Agriculture*, Bulletin No. 28 and Figure 70, p. 298)?

LESSON CLV

Two-Crust Pies

Two Crusts. — If both upper and lower crusts are used in making a pie, the lower crust should be placed inside the pan. The filling should be added, the edge of the crust moistened, and the upper crust placed over the pie and pressed around the edges. Then the edges should be trimmed. As was mentioned before, upper crusts should always be cut in several places for the escape of steam.

Sometimes a half-inch strip of pastry is placed around the edge of the under crust before placing the upper crust. This is thought to aid in preventing the escape of the moisture of the filling.

APPLE PIE

Cut 4 or 5 apples into slices, and for each apple use 2 tablespoonfuls (or more) of sugar. If the apples are not juicy, add from $\frac{1}{2}$ to 1 tablespoonful of water for each apple. Flavor with 1 teaspoonful each of lemon juice and rind, $\frac{1}{4}$ teaspoonful cinnamon or nutmeg, and $\frac{1}{8}$ teaspoonful salt. Line the inside of a pie pan with pastry, pour in the apple mixture. Add bits of butter, and cover with pastry as directed above. Bake until the apples are soft and the crust is brown, *i.e.* at 425° F., 35 to 45 minutes.

Apple sauce may be used as a filling for a baked crust. Such a pie is sometimes covered with meringue or strips of pastry.

FRUIT PIE WITH TWO CRUSTS

2 cupfuls fruit — $\frac{1}{2}$ to 1 cupful sugar
3 tablespoonfuls flour

If the fruit is fresh, wash and drain it well. Mix the sugar and flour. Line the inside of a pie pan with pastry, add half of the sugar and flour mixture. Add the fruit, and then the remainder of the sugar and flour. Cover with a top crust according to the directions above.

QUESTIONS

Explain why pie with only one crust, if properly made, is more desirable than that with two crusts (see *Pie with Under Crust*, p. 447).

Why should fresh fruit, for fruit pie with two crusts, be well drained after washing?

Give three ways of preventing the juice from boiling over, in a pie with two crusts.

Compare pastry that is made with lard, lard substitutes, vegetable oils and butter, as to taste, appearance, flakiness or friability, and tenderness.

RELATED WORK

LESSON CLVI

Infant Feeding

Perfect Food for Infants. — Nature in her wisdom provides ideal food for the infant, — mother's milk. No perfect substitute has been found for it. It is most unfortunate when a child is denied this food.

It has been found [1] that babies fed with mother's milk are much less likely to contract disease and much more apt to grow to maturity. A mother's milk is adapted to the needs of her child. It agrees with the infant and nourishes it well. A practical advantage of a healthy mother's milk is that it is sterile and of the proper temperature.

Modified Milk. — In case it is necessary to give the infant artificial diet, the greatest care should be taken to provide clean, easily digested food. Cow's milk is the basis of the food generally chosen. The way babies digest cow's milk shows the necessity of changing or *modifying* it to meet the needs of an infant. Cow's milk is modified sometimes by diluting it to make it digest easier and adding other ingredients to it. In order to increase the fuel value of diluted milk, carbohydrate food of some soluble, easily digested kind is added. Sometimes gruel or cereal water is used as one of the constituents of modified milk.

[1] See "Feeding the Family," by Mary Swartz Rose, Ph.D., p. 98.

Formulas for modified milk vary with the individual infant. A physician should be consulted regarding the formula for food for a baby.

(*a*) *Utensils* for measuring and preparing the ingredients of modified milk should be kept very clean. Before using, all glass and metal utensils used for measuring and holding the milk should be covered with cold water, then the water should be heated and allowed to boil for twenty minutes. Just before using rubber nipples, place them in boiling water for a few minutes. After using, they should be rinsed in cold water and then carefully washed inside and out with soap and water. When not in use, nipples should be kept in a clean covered jar or jelly glass. (The jar and cover should be sterilized daily.) After using the milk bottles (have as many bottles as there are feedings a day), rinse them in cold water, and then fill them with water and add a pinch of baking soda. Before filling the bottle with milk, wash with soap and water — using a bottle brush — and then sterilize in boiling water for twenty minutes (as directed above). Bacteria cannot pass through cotton, hence it is used for stoppering the filled milk bottles. It should be clean, however. Paper caps are also used.

(*b*) *Ingredients.* — (1) *Milk.* — The selection of milk for an infant is an important consideration. *Clean milk* is most essential. Milk is considered clean when it comes from dairy farms where clean milkers work under sanitary conditions, approved by a medical milk commission (see *Care of Milk*, p. 172). Such milk contains few bacteria and is called *certified milk*. This is by far the safest milk for infant diet, but it is expensive. It usually costs almost twice as much as ordinary milk. Milk is *pasteurized* commercially by heating it to 150° F., keeping it at that temperature for about thirty minutes, and then quickly cooling it. While pasteurizing kills most of the disease-producing germs, it does not destroy all the spores (see *Micro-organisms in the Spore Form*, p. 502). The taste of milk is not affected by pasteurizing. Milk is *sterilized* — all germ life destroyed — by heating at 212° F. from one to one and one half hours.

Since the value of milk as an infant food depends upon its cleanliness, it is difficult to state just how old milk may be before it is unsafe for infant feeding. It is safest to use only *fresh* milk. Bacteria in milk may develop so rapidly that it is unfit to use a few hours after it has been drawn from the cow. Unless milk is certified, it should not be used in summer after it is twenty-four hours old, and in winter, after it is forty-eight hours old. *Bottled* milk should be used for infants. According to most plans for modifying milk, *whole milk* is used.

(2) *Sugar.* — Several kinds of sugar are used in modified milk. These are:

Milk sugar or lactose.
Malt sugar combined with dextrin or dextrimaltose.
Granulated sugar or cane sugar.

The advice of a physician should be consulted regarding the kind of sugar best suited to the needs of the particular infant. The first two kinds of sugar can be obtained at a drug store. Granulated sugar is too sweet for general use.

(3) *Water or Cereal Water.* — If plain water is to be used with milk, it should be boiled before adding to the other ingredients.

In some cases, gruel or cereal water is added. Usually rolled oats or barley flour is the grain used. To prepare either of these use:

4 tablespoonfuls rolled oats *or*
3 tablespoonfuls barley flour
1 quart cold water

Mix and boil gently until the mixture is reduced to a pint. Then strain through a fine wire strainer or muslin.

(c) *Method of Mixing.* — Measure the sugar. This ingredient is usually measured in ounces, tablespoonfuls, or teaspoonfuls. ($1\frac{1}{2}$ dipperfuls (Figure 87) of milk sugar weigh 1 ounce.) In the graduated measure (Figure 87), measure the water or cereal water for diluting the milk and dissolve the sugar in it. Stir the mixture until the sugar is completely dissolved. Then pour it into the mixing pitcher. Measure the milk (and other ingredients if required) and pour into pitcher. Mix thoroughly. While stirring, turn the proper quantity of food into as many sterilized bottles as are required for a day's feeding. Stopper with cotton or cap. If the milk used is certified, place in a clean refrigerator until used for feeding. If the milk is not certified, it may be pasteurized.

FIGURE 87. — GRADUATED MEASURE AND DIPPER FOR MEASURING THE INGREDIENTS OF MODIFIED MILK.

Pasteurizing Milk at Home. — Place the bottles of milk in a wire basket. Then place the basket in a kettle. Pour water in the kettle so that the water is a little higher outside of the bottles than the surface of the milk inside. Heat the water and let it boil for 5 minutes. (Do not begin to count the time until the water reaches the boiling point.) At once cool the milk by allowing a stream of cold water to displace the hot water. Do not allow the cold water to run directly on the hot bottles. When the milk is cooled, place the bottles immediately in a clean refrigerator.

Preparation of Milk before Feeding. — At feeding time, milk should be heated to about 98° F. Place the bottle in a pan of warm water. Test the milk for proper temperature. Use the method described in Junket "Custard," p. 189, for testing the temperature of the milk. Shake the bottle before feeding.

Other Foods Given to Infants. — In addition to modified milk, boiled water should be given to infants. A few other foods — egg yolk or vegetable juices and orange juice — may often be given during the first year. The egg yolk should be soft-cooked. This food supplies iron and increases the Calorific value of the diet. Orange juice (strained through muslin) may be usually given at five or six months of age. It is especially necessary to give orange juice to infants whose milk is pasteurized or sterilized. Its use prevents constipation and scurvy.

Energy Requirement of an Infant. — The energy requirement of an infant is greater than one would suppose. Growth and development are going on at a rapid rate. Like the adult, a baby asleep needs energy to carry on the involuntary activities of its body. When awake such muscular activities as crying, kicking, and throwing of arms require energy. An infant's energy requirement is usually based upon its body weight. According to generally accepted standards[1] an infant's average energy requirement is:

1st to 3d months	50 Calories per pound per day
4th to 6th months	45 Calories per pound per day
7th to 9th months	40 Calories per pound per day
10th to 12th months	35 Calories per pound per day

Quantity of Food. — When a baby must be given artificial food entirely or as a supplement to natural food, it is safest and most satisfactory to follow the advice of a physician.

[1] See "Feeding the Family," by Mary Swartz Rose, Ph.D., p. 103.

It is said, however, that an infant requires an average of $1\frac{1}{2}$ ounces of milk per day for every pound of body weight. After the eighth month, this quantity of milk is usually decreased first to $1\frac{1}{3}$ and then to $1\frac{1}{4}$ ounces for every pound of body weight per day.

The amount of artificial food found satisfactory for the infant during the first few months of its life is usually not sufficient to yield as many Calories as given in the table on p. 456. But while the baby is adjusting itself to artificial feeding, it is especially necessary that the stomach be not overtaxed. As the infant develops, the quantity of food can be increased and the deficiency made up later.

QUESTIONS

Define certified, pasteurized, sterilized, modified, and top milk.

Give reasons for sterilizing utensils used for measuring and holding milk.

In preparing modified milk why is milk diluted? Why is sugar added?

What is the price per quart of certified milk?

LESSON CLVII

Modifying Milk

Modify cow's milk according to a formula secured from a physician or baby's dispensary. Pasteurize milk.

LESSON CLVIII

Review — Meal Cooking

MENU

Baked Sweet Potatoes or Scalloped Potatoes
Apple Dumpling (made with pastry or biscuit dough)

See Lesson XIV (p. 68), for suggestions regarding the preparation of the lesson.

LESSON CLIX

Home Projects[1]

Suggestions for Home Work. — If pies are served in your home, bake at least one pie a week. In case pies are not used, bake cake in which different quantities of fat are used.

Suggested Aims: (1) To compare One- and Two-crust Pies. Prepare each kind. Determine the difference in cost, time of preparation, and quality of the crust of each. Which kinds of pies do you consider more successful in regard to quality? Which is cheaper? Which kind meets the approval of other members of your home?

(2) To compare Cake Containing Little and Much Fat. Follow the recipe for One-egg or Plain Cake. Vary the quantity of fat from $\frac{1}{8}$ to $\frac{1}{2}$ cupful. Make comparisons regarding cost, texture, grain, and flavor. Which amount do you consider most successful from the standpoint of texture, grain, and flavor?

[1] See Lesson IX, p. 51.

DIVISION SIXTEEN

FROZEN DESSERTS

LESSON CLX

Method of Freezing — Water Ice

Experiment 79: Mixtures for Freezing. — Prepare 2 cupfuls of cracked ice. Place 1 cupful of the cracked ice in each of two bowls. To one bowl of ice add $\frac{1}{3}$ cupful of rock salt, and mix thoroughly. Insert thermometers into both bowls and note temperature. What effect does the salt have upon the temperature of the ice?

Allow the ice mixture to stand a few minutes, then observe the difference in the condition of the ice in the two bowls. Besides lowering the temperature, what does the salt do to the ice?

Freezing with Ice and Salt. — When a solid substance is changed to a liquid, heat is absorbed from surrounding materials. When solid ice liquefies, heat is absorbed from surrounding materials. Salt makes ice liquefy at a lower temperature, thus absorbing more heat from its surroundings. Since foods must be cooled, *i.e.* heat drawn from them, in order to freeze them, a mixture of ice and salt rather than ice is used in freezing.

If ice and salt surround a tin can containing substances to be frozen, from what is the heat absorbed when the ice is changed to liquid form? Explain why it is that a mixture of ice and salt, rather than ice alone, is used to freeze a dessert.

Conductors of Heat. — In Experiment 2, p. 16, and on p. 90, *The Principle of Fireless Cookery*, it is shown that some materials are better conductors of heat than others.

Which is a better conductor of heat, wood or metal? Explain why it is that most freezers consist of an inner can of metal and an outer bucket of wood. A few freezers have an outside metal bucket. Such freezing devices have been found more satisfactory when heavy paper is tied around the outer metal bucket.

Cooling by Evaporation. — If a few drops of alcohol, ether, or gasoline are poured in the palm of the hand and allowed to evaporate, the hand feels cold. During evaporation, the liquid takes heat from the hand. When any liquid evaporates, heat is absorbed from surrounding materials. Water may be cooled by placing it in a porous jar and hanging it in a breeze.

When there is no ice, this principle of cooling by the rapid evaporation of a liquid may be applied to the cooling of butter and other foods. Wrap butter in an oiled paper and place it in a flower crock or any porous jar. Place the crock in a draft; put a bowl of water beside it. Wrap a wet cloth about the crock and place one end of it in the bowl of water. The continuous evaporation of the moisture keeps the food cool.

Preparing and Packing the Freezer. — Scald the can, the cover, and the dasher of the freezer; cool it before the mixture that is to be frozen is placed in it. Adjust the can carefully in the bucket; put in the dasher; pour in the mixture, cover; adjust the crank. Crush the ice for freezing by placing it in a strong bag and pounding it with a wooden mallet. Mix the ice with rock salt in the proportion given below. Then pour the ice and salt mixture around the can of the freezer. The ice and salt mixture should be higher around the can than the level of the mixture inside.

For *freezing* ice creams and most ices use *three* parts of cracked ice to *one* of rock salt. If ice of coarse grain is desired, use a greater quantity of salt. The less salt in proportion to ice used, the finer the grain; the process of freezing, however, takes place very slowly when little salt is used.

For mixtures which are frozen by merely packing in ice and salt but are not stirred, such as mousse or parfait, use *two* parts of cracked ice to *one* of rock salt.

For packing frozen mixtures after freezing, use *four* parts of cracked ice to *one* of rock salt.

Freezing. — If a dessert of fine texture is desired, turn the crank slowly and steadily until the mixture is rather stiff, then turn more rapidly. In making water ices, it is considered advisable by some to turn the crank steadily for 5 minutes, then allow to stand 5 minutes, turn again 5 minutes, and continue until freezing is completed. Do not draw off the salt water while freezing the mixture, unless the salt water stands so high that there is danger of its getting into the can.

When the mixture is frozen, remove the ice and salt around the top of the can; wipe the cover and top; uncover; and remove the dasher. Then stir the frozen mixture thoroughly; place thin paper or paraffin paper over the can; cover; place a cork in the hole of the cover. Drain off all the water which has collected in freezing; repack the freezer with ice and salt mixture in the proportion given above; cover with carpet, blanket, or newspapers; and allow to stand in a cold place several hours.

FRUIT ICE

4 cupfuls water	3 lemons
$2\frac{3}{4}$ cupfuls sugar	3 bananas
3 oranges	$\frac{1}{4}$ teaspoonful salt

Make a sirup of the sugar and water, and then cool it. Extract the juice from the lemons and oranges; crush the peeled and scraped bananas with a wooden potato masher.

Mix the fruits and salt immediately with the sirup. Freeze *at once*. When frozen, remove the dasher and repack as directed above.

A less expensive but more mildly flavored ice may be prepared by using 3 pints of water (instead of 4 cupfuls). When the greater quantity of water is used, $3\frac{1}{4}$ cupfuls (instead of $2\frac{3}{4}$ cupfuls) of sugar should be used.

These recipes for Fruit Ice are modifications of the popular recipe termed "Five Threes."

QUESTIONS

Explain why it is necessary to scald the can, cover, and dasher of an ice cream freezer (see *Care of Milk*, p. 172).

What harm sometimes results when an ice cream freezer has been carelessly prepared?

Why should not the salt water be drawn from the freezer during freezing (see Experiment 79, p. 459)?

What is the purpose of placing paper over the can when packing the frozen mixture?

What is the purpose of covering the packed freezer with carpet, blanket, or newspapers (see *The Principle of Fireless Cookery*, p. 90)?

Why is it well to tie heavy paper around an *outside metal* bucket of a freezer?

Why should "Fruit Ice" mixture be frozen *at once* after preparing the fruit?

Heat aids chemical action. Can you explain why acid mixtures are not acted upon by the metal and consequently discolored when *frozen* in a tin or iron can?

LESSON CLXI

Frozen Creams

Frozen desserts consist of:

1. **Cream Mixtures**:

(*a*) *Plain Ice Cream.* — Cream, sugar, and flavoring. This is sometimes called Philadelphia Ice Cream.

(*b*) *French Ice Cream.* — Custard, cream, and flavoring. On the continent, this frozen mixture is called Neapolitan Ice Cream. In this country, three kinds of frozen mixtures served together make up what is termed Neapolitan Ice Cream.

(*c*) *Mousse.* — Whipped cream, folded into various sweetened and flavored mixtures, placed in a mold, and packed in ice and salt, but not beaten.

2. **Water Mixtures**:

(*a*) *Water Ice.* — Fruit juice, water, and sugar.

(*b*) *Sherbet.* — Water ice with the addition of dissolved gelatine or beaten whites of eggs.

(*c*) *Frappé.* — Water ice of coarse texture.

(*d*) *Granite.* — Water ice to which fruit is added after freezing.

3. **Frozen Puddings**:

Various sweet mixtures.

Method of Mixing Frozen Foods. — The sugar of a frozen dessert should always be dissolved. To accomplish this a sirup should be made of the sugar and water (see Experiment 11, p. 70). For mixtures that contain no eggs, but in which cream or milk is used, the cream or milk may be scalded, and the sugar dissolved in the hot liquid. If eggs are used to thicken ice cream, they should be combined with the sugar and cream and cooked as for a soft custard (see p. 179).

In sherbets, whites of eggs are often used. They are usually beaten stiff, and added uncooked to the mixture. If fruit juice is to be used with milk or cream, the latter should be chilled before adding the fruit. Fruits that are to be frozen with the other ingredients should be crushed thoroughly. Small fruits, or large fruits cut in pieces, are sometimes added to a dessert after it is frozen, thereby preventing the fruit from freezing and becoming hard. All frozen mixtures should stand several hours before serving, in order to ripen.

PLAIN ICE CREAM

1 quart cream	$\frac{3}{4}$ cupful sugar	1 tablespoonful vanilla

Prepare as directed in *Method of Mixing Frozen Foods.*

CHOCOLATE ICE CREAM

1 quart cream	1 cupful sugar	2 ounces chocolate
$\frac{1}{3}$ cupful boiling water	Salt	1 teaspoonful vanilla

Scald the cream; add the sugar to it. Prepare the chocolate in the usual way, by cooking it in the boiling water until a smooth paste is formed (see *Chocolate*, p. 168). Add the chocolate mixture to the hot cream. Cool, add salt and vanilla, and freeze.

FRENCH ICE CREAM

1 quart cream	Salt
1 pint milk	1 cupful sugar
3 egg yolks	1 tablespoonful vanilla

Prepare as directed in *Method of Mixing Frozen Foods* (see p. 463).

FRUIT ICE CREAM

2 cupfuls fruit juice, *or*	1 quart cream
3 cupfuls crushed fruit	2 cupfuls sugar

Prepare and freeze according to the *Method of Mixing Frozen Foods* (see p. 463).

For Frozen Fruit or Water Ice, use water instead of cream.

The flavor of most fruits is improved by adding 2 tablespoonfuls of lemon juice to the water mixture.

QUESTIONS

For Fruit Ice Cream, why is it necessary to chill the cream before adding the fruit juice or crushed fruit (see Experiment 61, p. 283)?

Why is it necessary to crush the fruit for frozen fruit mixture?

How much sugar would be required to sweeten one and one half quarts of custard, according to the recipe for Soft Custard (p. 179)? Compare this with the quantity of sugar used for French Ice Cream. How do extremely cold beverages affect the sense of taste? From this, account for the difference in the quantity of sugar used in frozen and in cold desserts. Also compare the quantity of sugar and vanilla used in Chocolate Ice Cream and Chocolate Beverage (p. 168). Account for the difference.

Approximately how much ice is required to freeze and pack one quart of Ice Cream? What is the cost of ice per hundred pounds?

How many persons does one quart of ice cream serve?

RELATED WORK

LESSON CLXII

Diet for Young Children

Selection of Food for Children (2 to 12 years). — Although solid food is included in the diet of a child after the first year, the baby is by no means ready for the food of adults. Childhood differs essentially from maturity in that it is a period of growth. In proportion to weight a child is much more active than an adult. A child has not the reserve power of a grown-up person. His organs of digestion and assimilation are delicate. Because the activities and needs of the child differ greatly from those of the adult, diet suitable for the adult is not adapted to the child. A consideration of foods for young children follows:

(1) *Milk*. — Since milk is the food provided for young animals, it should be used generously all through childhood. The nutritive value of milk is high in proportion to the

effort required to digest and assimilate it. The average child with good digestion should take from one and one half pints to one quart daily until the tenth year. In this amount is included not only the milk that is used as a beverage, but the milk served with cereals and vegetables and that used in soups, custards, blanc mange, rice and bread puddings, and other easily digested desserts.

(2) *Cereals and Breads.* — Well-cooked cereals are among the essential foods of childhood. "Ready-to-serve" breakfast cereals are undesirable as staples for young children. Cereals should be *cooked* from *one* to *three hours.* For very young children (under eighteen months) all cereals must be strained. For older children, unstrained cereals may be used, provided they are thoroughly cooked. Frequent use of the whole grains, as rolled oats and wheat, is recommended. These cereals contain more protein and ash than the finer cereals and hence may be better body-builders, but they also contain much bran. Usually the latter does not prove irritating if thoroughly cooked. But if these coarse cereals do cause irritation they should either be strained or the cereals containing less bran, as cream of wheat, farina, and arrowroot, should be used. Cereals should be served with milk or cream, but with no sugar or sirup or not more than one teaspoonful to a serving.

Carefully made toast (see p. 103), "zwieback," and stale bread may be given to young children. On account of the difficulty in digesting fresh breads, they are excluded from children's diet.

(3) *Eggs* are especially good foods for children, provided they are fresh and properly cooked. They should be cooked in some way which leaves them soft such as soft-cooking or poaching. Only soft-cooked egg yolks should be given to children under three years. One whole egg per day may be included in the diet of older children.

(4) *Broth and Meat.* — There is some difference of opinion regarding the use of meat in children's diet. Some authorities advise beef broth and the more easily digested meats for young children. Others say that if a generous amount of eggs and milk is included in children's diet, it is well not to give them meat before eight years. In the diets for children from two to eight years, given on p. 469, neither broth nor meat is included. It is possible to obtain sufficient protein from milk and eggs. Doubtless, as with adults, most young children would be benefited by much less meat than is generally given them or by none at all. If meat is given to young children, it should be scraped (see Experiment 50, p. 192) and pan-broiled (see *Pan-Broiling*, p. 199), as it is somewhat difficult to masticate.

(5) *Fresh Vegetables* should be included in children's diet. For very young children select mild vegetables such as spinach, asparagus tips, string beans, and peas. Cook until very soft and press through a sieve or mash. Later, such cooked vegetables as potatoes (baked or mashed), beets, carrots, cauliflower, and squash may be added. No uncooked vegetables should be given to young children.

(6) *Fruits and Sugar.* — Fruits are especially valuable for children. Care should be taken, however, in selecting fruits. It is said that until a child is five years old only cooked fruits and the juice of fresh fruits should be given. For very young children the juice of orange or the pulp of cooked prunes should be given daily, because they contain valuable nutrients and possess laxative properties. For older children the cooked food fruits (see *Kinds of Fruits*, p. 65) such as dates, figs, and raisins (without seeds), and bananas (baked) are desirable. Apples, peaches, and apricots, baked or made into sauces, are also suggested.

Fruits should be cooked with little or no sugar. Sweets in the form of sweet fruits rather than sugar and candy should be given to children under six years. After six years, very little candy or sweet chocolate may be given at the end of a meal, not between meals. It is a mistake to give children candy just because they want it (see *The Use of Candy in Diet*, p. 523.)

(7) *Desserts.* — Fruits selected and prepared as given in the previous section, very plain cakes — sponge cake and those containing little fat — and easily digested desserts made of eggs, milk, cereals, etc., are the only desserts suitable for young children.

(8) *Water and Other Beverages.* — " Pure " water in generous quantities is needed for children. Water and milk are the only beverages (if milk can be considered a beverage) that should be given to children under six years. After that age, cocoa made with much milk may be given, but not tea, coffee, or any carbonated drinks.

The Importance of Proper Diet for Children cannot be over-emphasized. It is a child's right to be " hardy." Good food in proper quantity given at the right time is essential for the sure and steady growth of the body. The child's future health, usefulness, and happiness depend much upon the nourishment he receives. If insufficient food, or food lacking in foodstuffs for growth, is given to children, a wasting away of brain cells and muscle may take place and stunted growth will result. The additional care in preparing special menus for children is an effort well worth making; its compensation is inestimable. If from babyhood a child is given his own special diet, it is possible to satisfy him at the table with food that differs from that of the rest of the family. Habits of eating plain food should be established in childhood. Mrs. Richards says: " Habit rather than instinct guides civilized man in the choice of food." Likes or dislikes for food should not be discussed in the presence of children. Such discussions may establish distaste for a food of decided nutritive value.

Regularity in feeding children is most important. There should be no lunches between meals. It is important also that a child be taught to *masticate* food thoroughly.

Energy Requirements of Children of Different Ages. — It is difficult to write definitely regarding the quantity of food that should be given to children. As with adults, some children require more than others. The personal factor enters largely into this question. In Lesson CXXIV the energy requirements of children of different ages are given (see *Relation of Age to Daily Energy Requirement,* p. 380). As stated there, these tables indicate the energy requirement of children of normal size, development, and activity. Note that in the menus given below the Calories derived from protein are approximately one seventh of the total Calories (see *Daily Protein Requirement,* p. 380).

The following menus[1] for children from two to twelve years were prepared for average children of moderate activity in a family of limited income.

MEALS FOR ONE DAY

Child 2–4 Years Old

Breakfast: 7:30 A.M.	Oatmeal Mush	0.8 ounce dry cereal
	Milk	$1\frac{1}{2}$ cupfuls
	Stale Bread	1 slice
	Orange Juice	4 tablespoonfuls
Lunch: 11 A.M.	Milk	1 cupful
	Stale Bread	1 slice
	Butter	1 teaspoonful

[1] Prepared by Mary Swartz Rose, Ph.D., Assistant Professor of Nutrition, School of Household Arts, Teachers College, Columbia University (see Teachers College Bulletin, "The Feeding of Young Children," pp. 6–9).

Dinner: 1 P.M.	Baked Potato	1
	Boiled Onion (Mashed)	1
	Bread and Butter	1 slice
	Milk to Drink	1 cupful
	Baked Apple	1
Supper: 5:30 P.M.	Boiled Rice	1 cupful
	Milk	$\frac{3}{4}$ cupful
	Bread and Butter	1 slice

Fuel Value, 1313 Calories; Calories derived from protein, 191.2.

Substitutes or Additions:

For Rolled Oats or Rice: Other cereals, such as rolled wheat, wheaten grits, farina, hominy, and corn-meal.

For Orange Juice and Baked Apple: Prune pulp or apple sauce.

For Onions: Spinach, strained peas, stewed celery, carrots, or cauliflower tips.

An egg may be added every day, and should be included at least two or three times a week.

These changes will alter the cost somewhat.

Child 4–8 Years Old

Breakfast:	Oatmeal	$1\frac{1}{2}$ ounces dry cereal
	Top Milk	4 ounces
	Stewed Prunes	4 or 5
	Toast	1 slice
	Milk to Drink	6 ounces
Dinner:	Pea Soup	1 cupful
	Croutons	1 slice bread
	Boiled Onions	2 small
	Baked Potato	1 large
	Molasses Cookies	2
Supper:	Cream Toast	2 slices bread
	Rice Pudding with Milk and Sugar	1 cupful
	Milk to Drink	5 ounces

Fuel Value, 1892 Calories; Calories derived from protein, 261.6.

Substitutes or Additions:

For Rolled Oats: Other cereals, as suggested on previous page.

For Onions and Peas: Strained dried beans; other vegetables carefully cooked; fresh lettuce.

For Prunes: Fresh ripe apples, baked bananas, other mild fruits well cooked.

For Rice Pudding: Junkets, custards, blanc manges, bread puddings, and other very simple desserts.

For Cookies: Gingerbread, sponge cake, or very plain cookies.

Child 8–12 Years Old

Breakfast:	Oatmeal Mush	1½ ounces dry cereal
	Top Milk	6 ounces
	Stewed Prunes	6 or 7
	Toast	2 slices
	Milk to Drink	6 ounces
Luncheon:	Pea Soup	1 cupful
	Boiled Onions	2 small
	Baked Potato	1 large
	Bread and Butter	2 slices bread
	Molasses Cookies	3 cookies
Dinner:	Baked Haddock	small serving (2 ounces)
	Creamed Hashed Potato	¾ cupful
	Spinach	½ cupful
	Bread and Butter	2 slices
	Rice Pudding — Milk and Sugar	1 cupful

Fuel Value, 2420 Calories; Calories derived from protein, 345.6.

Substitutes or Additions:

For Rolled Oats: Other cereals thoroughly cooked.

For Haddock: Rare beefsteak, roast beef, or mutton chops; other fish, especially white varieties.

For Prunes: Any mild ripe fruit uncooked or cooked.

For Onions: String beans, stewed celery, beets, squash.

Peas or Spinach: Turnips or cauliflower.

Suggestive Dietary for Child who will not Drink Milk, Age 5 Years

(1 quart milk concealed in the menu.)

Breakfast:

7 A.M.	Oatmeal	¼ cup cereal cooked in 1 cupful milk
	Creamy Egg on Toast	1 egg yolk with ½ slice bread and ¼ cupful milk
	Cocoa	1 teaspoonful cocoa and ¾ cupful milk

10 A.M.	"Zwieback" and Cream	1 piece "zwieback" and 1 tablespoonful cream
1:30 P.M.	Spinach Soup	4 ounces
	Baked Potato with Cream	1 potato and 2 tablespoonfuls cream
	Bread and Butter	1 slice
	Caramel Junket	$1\frac{1}{2}$ cupfuls
5:30 P.M.	Rice and Prunes	2 tablespoonfuls rice cooked in $\frac{1}{2}$ cupful milk, and 5 prunes
	"Zwieback"	1 slice

Total Calories, 1431; Calories from protein, 207.6.

QUESTIONS

Give at least three reasons why young children should have different food from adults.

Why are not ready-to-serve cereals suitable staple foods for young children?

What are the advantages of using whole grains for children's food?

Why not serve sugar with breakfast cereals for children?

Why is not meat a desirable food for most young children?

Why are fresh vegetables and fruits such necessary foods for children?

LESSON CLXIII

Planning and Preparing Menus for Children

Plan[1] a day's feeding for a child of five years, meeting the total energy and the protein requirements. Prepare these foods.

LESSON CLXIV

Review — Meal Cooking

MENU

Creamed Vegetable
Apricot Dainty
Coffee

[1] See Foot-note, p. 327.

See Lesson XIV (p. 68), for suggestions regarding the preparation of the lesson.

LESSON CLXV

Home Projects [1]

Suggestions for Home Work. — Plan a week's diet for a small sister, brother, or other child in whom you are interested. (Follow suggestions given in Lesson CLXII.) Calculate the total Calorific value and Calories derived from protein. Does your menu consist of foods which furnish the proper Calorific value and Calories derived from protein?

Supposed Aims: (1) If your menus do not conform to the requirements, to change them so as to meet the requirements of the young child.

(2) If possible, to arrange to have your menus prepared and fed to the child, assisting as much as possible in the preparation of the food and in the feeding of the child.

[1] See Lesson IX, p. 51.

DIVISION SEVENTEEN

FOOD PRESERVATION

LESSON CLXVI

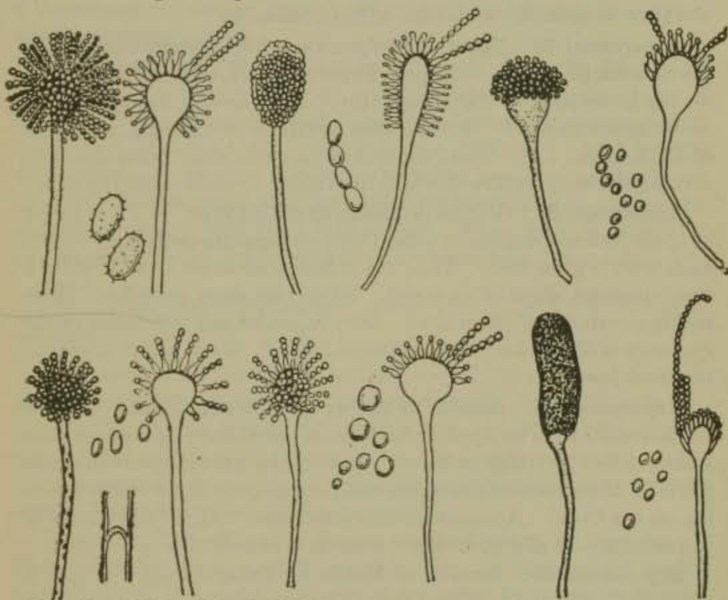
The Principles of Preserving Food

Why Foods Spoil. — Most foods spoil or change readily, — fruits decay, milk sours, butter becomes rancid, and meat putrefies. Knowledge concerning the spoiling of foods makes it possible for the housekeeper to preserve foods from one season to another; it gives her the assurance that her preserved fruit will " keep."

The decay of foods is due largely to the existence of minute vegetable organisms or microörganisms. These microörganisms are molds, yeasts, and bacteria. The molds (see Figure 88) are visible to the naked eye, the yeasts (see Figure 86, p. 404) and bacteria (see Figure 89) are microscopic in size. These plants exist everywhere, and in everything (except those things in which the organisms have been destroyed and prevented from reëntering), — in the air, in and on foods, and all over our bodies. Like all plants, these organisms require warmth, moisture, and food for their most rapid growth. Oxygen is necessary for the growth of some of these plants.

Many foods constitute nourishment for these organisms. It is because these plants exist in foods and live upon them that changes in foods result. The mold on bread and fruit, the odor from decaying meat and eggs, the liquefaction of decayed eggs, and the gas from fermenting canned fruit are caused by microörganisms existing and growing in these foods. The following experiments show the growth of molds on food and other materials:

Experiment 80: Effect of Air, Light, and Drying upon the Growth of Molds. — Place a piece of bread on a saucer. Allow it to remain uncovered, in a light place, at room temperature, for several days. Examine. What is the condition (moist or dry) of the bread? Have molds grown upon the bread?



From *Household Bacteriology*, by Buchanan.

FIGURE 88. — SOME SPECIES OF MOLDS.

Experiment 81: Effect of Moisture and Light upon the Growth of Molds. — Sprinkle a thick piece of bread with water, place it on a saucer, and cover with a jelly glass or any glass dish. Leave in a light place at room temperature for several days. Examine. Is the bread moist or dry? Have molds grown upon the bread?

From the results of Experiments 80 and 81 what would you say has caused the molds to grow? What conclusion can you draw from this concerning the growth of molds upon foods in damp and dry places and in damp and dry weather? How should bread be stored in dry weather? In damp weather? Give the reason for storing Dried Bread Crumbs as directed on p. 176.

Experiment 82: Effect of Moisture and Darkness upon the Growth of Molds. — Repeat Experiment 81, except the method of covering. Cover with an earthen dish so that the light is excluded. Let it remain at room temperature for the same length of time as given in Experiment 81. Have molds grown? How does the growth compare in quantity with that of Experiment 81?

Experiment 83: Effect of Moisture and Low Temperatures upon the Growth of Molds. — Repeat Experiment 81, but place the bread on the lower shelf of the refrigerator. After several days, examine. Have molds grown? How do they compare in quantity with that of Experiment 81? What conclusion can you draw from this concerning the temperature at which food liable to mold should be kept?

Experiment 84: Growth of Molds upon Cut Fruit. — Place pieces of apple, banana, lemon, or other fruits on separate saucers and cover each with a glass dish. Place some lemon or other fruit juice in a test tube and allow it to stand. After two days examine. Have molds grown on all the fruits? Do you notice any difference in the quantity of the molds on the different fruits? Have molds grown on the fruit juice?

Experiment 85: Growth of Molds upon Whole Fruits. — Place whole fruits, such as apples and lemons, on saucers and cover with glass. After two days examine. Have molds grown upon the whole fruits? If so, how do the molds compare in quantity to those growing on cut fruit? Account for this difference. Apply the results of Experiments 84 and 85 to the "keeping" of fresh fruits.

Experiment 86: Growth of Molds on Other Foods. — Place a piece of cheese and a piece of meat on separate saucers and cover each with a glass dish. After two days examine. Have molds grown upon these foods? Account for the growth of molds upon these foods when no moisture was added to them. Devise a method for keeping cheese free from mold. Give the reasons for your method.

Experiment 87: Growth of Mold upon Wood. — Soak a bit of wood in water for at least 15 minutes. Cover it with an earthen dish and let it stand at room temperature for several days. Examine. Have molds grown upon the wood? What has caused the molds to grow upon the wood? From this give directions for the care of the wooden part of the dasher of an ice cream freezer. Draw conclusions concerning the care of pastry and bread boards and butter paddles after scrubbing. Draw conclusions concerning the scrubbing, drying, and airing of wooden floors.

Experiment 88: Growth of Molds upon Cloth. — Sprinkle a bit of cloth with water. Cover with an earthen dish. Let stand a few days at room temperature. Examine. Have molds (mildew) grown upon the cloth? What caused the molds to grow? From this draw a conclusion concerning the care of washed clothes, wet dish-cloths, towels, and wash-cloths.

Experiment 89: Contamination of Fresh Food by Means of Moldy Food. — Dip a piece of bread in water and place it on a saucer. With a knitting needle, place bits of mold at several points on the surface of the bread. Cover with a glass dish. After several days examine. At what points on the bread have the molds started to grow? What conclusion can you draw from this concerning the placing of moldy food with fresh food? When fruit is falling to the ground, tell how an orchard should be cared for. Explain.

The following experiments show the growth of bacteria on food:

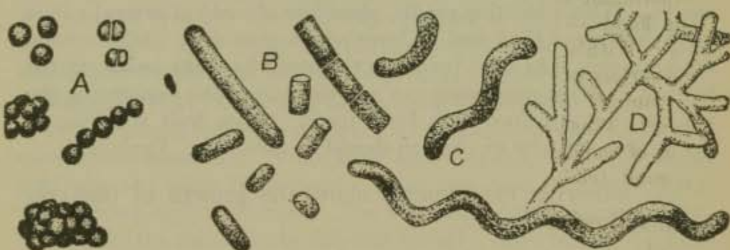
Experiment 90: Growth of Bacteria. — Into test tubes put one of the following foods: (1) bit of uncooked meat; (2) small quantity of egg; (3) piece of bread; (4) crushed peas or beans; (5) sugar or sirup. Add a little water to each tube. Set aside in a warm place. After several days, examine. What change in appearance do you note? What has caused the foods to spoil?

Experiment 91: Effect of Boiling on the Growth of Bacteria. — Place a little chopped meat in two test tubes. Add lukewarm water to each. Boil the contents of one of the tubes for several minutes. Set both aside. After 24 hours, examine. What difference is there in the condition of the meat in each tube? Explain this difference. From the result of this Experiment draw conclusions regarding the boiling of food to prevent spoiling.

Experiment 92: Effect of Preservatives on the Growth of Bacteria. — Beat slightly an egg white. Add to it $\frac{1}{2}$ cupful of water. Pour a little of the diluted egg white into four test tubes. To three of the test tubes add one of the following: (1) salt; (2) sugar; (3) vinegar. Put *all* of the tubes in a warm place. After several days, examine. What is the condition of the egg white in each tube? Explain. Draw inferences regarding the use of "safe" preservatives to prevent foods from spoiling.

The Principles of Preserving Food. — Food may be preserved by opposing the growth of microörganisms or by destroying them. Low temperatures, certain preservatives, and drying destroy microörganisms or retard their growth.

Drying is effective in preserving such foods as fruits, certain vegetables, fish, and meats. The drying of fruit



From *Household Bacteriology*, by Buchanan.

FIGURE 89. — THE FOUR TYPES OF BACTERIA.
A, cocci; B, bacilli; C, spirilla; D, branched filamentous organism.

and vegetables may be done in the home. This process of food preservation is often advisable when there is an excessive supply of fruit or vegetables in the orchard or garden.

Substances known as *preservatives* are used in food preservation. Some of these are harmless, as sugar, salt, vinegar, and spices. Others are harmful, as formaldehyde, boric, salicylic, benzoic, and sulphurous acids, with their related compounds. Saltpeter and smoke are also preservatives. There is some doubt concerning the harmlessness of these latter preserving agents. Foods preserved with harmful materials should never be used. Good food materials can be preserved without the use of harmful preservatives.

The destruction of microörganisms by *heat* is the basic principle of preserving much food, especially fruit and vegetables. In order to preserve fruits it is necessary to *process* them, *i.e.* to apply heat in such a way as to insure preservation and secure the maximum of good quality. To do this, the fruit must be cooked well, packed in cans which have been boiled, and sealed to exclude the air from them. It is necessary, also, to sterilize all utensils which come in contact with the foods in the processes of cooking and sealing.

If canned fruits do not keep, microörganisms on the fruit, can, or utensils used in canning, have not been destroyed or their growth has not been retarded, or the can has not been securely sealed. Flaws in the can or rubbers which were not detected at the time of sealing may cause the spoiling of carefully canned fruit. In the preservation of fruit, every effort should be made to secure sound fruit, perfect jars, and good rubbers, and to have the fruit and utensils perfectly processed, and the jars securely sealed. Failure to accomplish these ends may result in much loss of materials and time.

Kinds of Spoilage. — As mentioned previously, canned foods spoil either from imperfect processing or sealing. Different organisms growing in preserved foods cause spoilage in canned foods. A discussion[1] of the various kinds of spoilage follows:

(*a*) **Fermentation or "Swell."** — When canned foods spoil with a production of gas, fermentation of the food is taking place. The visible indications of such spoilage are gas bubbles in the jar and a bulging of the lid of a jar or a distending of the top and bottom of a can. Because of the latter condition, the term "swell" is used in the commercial

[1] Adapted from Journal of Home Economics, Vol. X (July, 1918), pp. 329–331, "A Consideration of the Canning Problem," by Elizabeth F. Genung.

canning industry to designate this kind of spoilage. When fermentation takes place, the lid of a jar may become loosened instead of bulged.

This type of spoilage is caused by the action either of yeast or of a certain kind of bacterium which thrives best without air. It is usually due to imperfect processing. Fermentation can usually be detected by the presence of bubbles of gas in the jar and a loosening of the sealed cover.

(*b*) **Flat Sour** is a kind of spoilage in which no gas is formed, but acid is produced, giving the food a sour taste. In some cases of flat sour, a milky deposit appears in the bottom of the jar which can be detected if the container is glass. In other cases, no change in the appearance of the jar and its contents takes place.

Little is known of the kind of organism producing flat sour. Whether or not food thus spoiled is injurious also has not been determined.

Flat sour is probably due to imperfect processing.

(*c*) **Putrefaction**. — When putrefaction takes place, food decays and disintegrates, or decay takes place with the production of a gas of a disagreeable odor. This type of spoilage is readily detected. Food thus affected is unfit for use.

Putrefaction is usually caused by imperfect sealing. It may result, however, from imperfect processing.

(*d*) **Botulism**. — A bacillus termed *botulinus* sometimes grows on canned foods. This organism produces a violent poison in the food. The effect of this poison on the body is known as *botulism*. *To avoid botulism, use no canned foods showing any signs whatever of spoilage, and boil non-acid vegetables for at least 10 minutes before tasting or serving them.* This should be done even though the food is to be served cold. It may easily be cooled after boiling. When there is the least suspicion that food is spoiled, however, it should be discarded immediately.

QUESTIONS

Explain why boiled milk keeps sweet for a longer time than uncooked milk. Why do foods need to be sealed to preserve them?

Why does cooked meat " keep " longer than uncooked meat?

LESSON CLXVII

Processing with Little or No Sugar — Canned Fruit

Jars for Canned Fruit. — There are many types of fruit jars. Glass jars rather than metal cans should be used for home canning. Jars should be constructed so that there is no contact of the fruit with metal, hence a jar having a glass cover is desirable. A large opening, simple construction, ease in cleaning, and perfect sealing are characteristics of good fruit jars.

Glass jars should be *tested* before using: Partly fill the jar with water, adjust the rubber and cover, seal, invert the jar. Examine carefully for leakage.

Rubber Rings. — Soft, elastic rubbers should be chosen. It is poor economy to use old rubbers. Rubber after usage becomes hard and inelastic; it may cause imperfect sealing and hence decay of the fruit.

In certain processes of canning, it is necessary to subject the jars provided with rubber rings and covers to long periods of boiling or to the intense heat of a pressure or steam cooker. When such a method is followed it is especially necessary that rubber rings of good quality be used. To meet this requirement, the United States Department of Agriculture advises that rubber rings conform to the following:

1. Inside diameter of $2\frac{1}{4}$ inches (for the jar of standard size).
2. Width of ring or flange from $\frac{1}{4}$ to $\frac{11}{32}$ of an inch.

3. Thickness of $\frac{1}{12}$ of an inch.

4. Tensile strength sufficient to "stretch considerably and return promptly to place without changing the inside diameter."

5. Firm enough so that no crease or break shows after it has been tightly folded.

Selection and Preparation of Fruit for Canning. — Select solid, and not over-ripe, fruit. It is better to have under-ripe than over-ripe fruit. Fresh fruits — if possible picked on the same day they are to be used — are desirable for canning.

Most fruits should be washed before using. Quinces should be rubbed with a coarse towel before they are washed. Berries and small fruits should be washed before they are hulled or stemmed. Most small fruits contain so much water that it is not necessary to add water for cooking. Hence such fruits should be drained thoroughly after washing. If there are any decayed or bruised spots on fruit, the damaged portion should be removed completely.

Peaches and tomatoes may be peeled instead of pared. This is done by placing the fruit in a wire basket and then immersing the basket in a kettle of boiling water for 3 minutes. Remove the basket of fruit from the hot water and plunge it for a moment in cold water. Drain, then peel the fruit. If desired, cut into halves, quarters, or slices. After fruit is peeled or pared, it can be kept from discoloring by covering with cold water.

METHODS OF CANNING FRUIT

Several methods may be used for canning fruit:

(*a*) **Open Kettle.** — This method consists of cooking the fruit in water or sirup and pouring it into jars and sealing. The entire process of processing takes place in the kettle before the food is poured into the jars. Hence the name of the process, — *Open Kettle.*

For this method it is necessary to *boil the jars and rubbers* before placing the food in them. This is done as follows:

Fill and surround jars with cold water. Cover lids and rubbers with cold water. Gradually heat the water and allow it to boil for at least 15 minutes. Allow the jars, covers, and rubbers to remain in the boiling water until just ready to use them. Do not touch the inside of the jars and covers with your fingers. Immerse spoons, cups, knives, skewers, or knitting needles used for testing fruits, in boiling water

Courtesy of *Merrill School.*

FIGURE 90.—CANNING FOODS.

before using them in contact with the foods. If corks are used for sealing bottles, scald them also.

If small juicy fruits are preserved by the open kettle method, no water should be added. Add the sugar to them and allow them to stand until some of the juice is drawn from them, then cook.

If tough fruits are canned by this method, first steam, then cook in sirup, or first cook them in clear water, add the sugar, and finish cooking.

Fruit may be canned with or without sugar. Usually some sugar is used. However, some housekeepers contend that the fresh-fruit flavor is retained better by reheating the fruit and adding the sugar just before it is served. Different quantities of sugar may be used. If the fruit breaks into pieces readily, cook in a thick sirup. The quantity of water used with the sugar varies with the juiciness of the fruit. *For each pound of fruit use from* $\frac{1}{2}$ *to* 1 *cupful of sugar with from* $\frac{1}{8}$ *to* 1 *cupful of water.*

After cooking the fruit, adjust the rubber on the sterilized jar, fill the jar (to overflowing) with the hot fruit and sirup, cover at once, and seal. Invert the can and let it stand until cool.

(*b*) **Cold Pack and Hot Pack**. — Cold pack is followed by placing the prepared food in a clean, tested, hot jar, covering the food with water or sirup, adjusting the rubber ring and cover to the jar, and processing both the jar and its contents in boiling water or steam.

Formerly, it was recommended that in cold pack canning, large, firm fruits should be *blanched, i.e.* subjected to boiling water or steam and then *cold-dipped, i.e.* plunged into cold water before placing in the jar. Blanching or rather scalding and cold dipping are advised now only for those fruits such as peaches whose peel may be removed easily by these processes. After washing, foods whose peeling is to be removed may be *scalded* and *cold-dipped* as follows:

Place the food in a cheese-cloth bag or in a wire basket and immerse it in boiling water, usually for 3 or 4 minutes. Then remove the product from the boiling water, dip it immediately in cold water, remove at once, and drain for a few minutes. *Hot pack* method is followed by first precooking foods and then placing them while hot in jars.

Whether fruit is canned by the cold or hot pack method, place it in hot jars to $\frac{1}{2}$ inch of the top. If a sirup is desired, it may be made by using $\frac{1}{4}$ *to* 1 *cupful of sugar for each quart jar with from* 2 *to* 3 *cupfuls of water.* Adjust a new, wet rubber on the jar; fill the jar to $\frac{1}{4}$ inch of the top with sirup or with boiling water. Place the cover on the jar, but do not seal it tightly. If a screw top jar is used, screw on the lid by grasping it with the thumb and little finger. If the jar has a bail top, adjust the top bail only, — not the lower bail.

Then process the jars and their contents by placing in:

(1) Kettle or clothes boiler provided with a rack (see Figure 91) or some sort of false bottom such as strips of wood, straw, paper, or wire-netting of one half inch mesh.

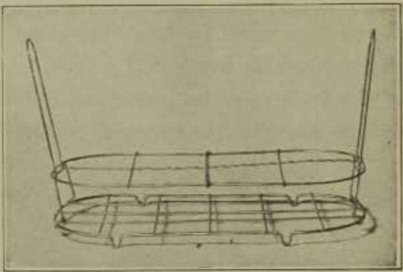


FIGURE 91. — RACK FOR HOLDING JARS. Note that the rack is shaped to fit a wash boiler.

(2) Steam cooker (see Figure 18, p. 37).

(3) Pressure cooker (see Figure 17, p. 36).

If the kettle or wash boiler is used, rest the jars on the rack in the container, fill the latter with enough hot water so that it extends to a depth of one inch above the covers of the jars. Then boil the water. Count the time of processing when the water begins to boil. Keep the water at boiling temperature for the length of time given in the Table on p. 487.

If the steam cooker is used, place the filled jars in the cooker and steam for a few minutes longer than when the jar is immersed in boiling water (see Table, p. 487).

If the pressure cooker is used, process at 212° F.

After processing fruit by any of these methods, remove the jars from the container, seal, invert, and set them aside to cool. Keep the jars at room temperature for at least a week and observe in order to detect signs of spoilage. Wash the outside of the jars, and label. Store in a cool, dark cupboard. Wrapping each jar in paper before storing is advised.

A Discussion of Methods of Canning. — (*a*) While the open kettle is not as safe a method of canning as the cold pack from the standpoint of perfect processing, it may be used for small watery fruits, especially strawberries, since evaporation of some of the water takes place. It is also generally used for fruits preserved with much sugar, such as preserves, jams, conserves, etc. (see p. 489).

(*b*) Either the cold or hot pack method of canning is satisfactory for most fruits. These methods are especially desirable for whole fruits or for fruits in large pieces. The shape of the fruit may be preserved better by these methods than by the open kettle process. They are also safer methods as far as satisfactory processing is concerned. Many housekeepers find them easier than the open kettle method.

The hot pack method is especially desirable for strawberries, since the precooking shrinks the fruit and makes it possible to obtain a full jar after processing. It is desirable to cook strawberries in a sirup of strawberry juice and sugar. By letting the mixture stand over night, the berries will absorb some of the sirup and become more plump. Then the berries should be heated to boiling and packed hot.

The liquid or sirup in which any fruit is precooked should be used in filling the jars so that no food value is lost. The fruit should be put while boiling hot into the jar. It is also very important that the jars of hot fruit be placed *at once* in the hot water bath.

It was formerly thought that the blanching and cold-dipping of vegetables destroyed some of the bacteria and aided in processing the food. Recent experimentation shows that these processes do not affect the bacteria and have no value so far as the preservation of the food is concerned.

CANNING FRUITS BY ONE PERIOD OF PROCESSING[1]

Fruit	Treatment before Processing	Time of Water Bath Processing at 212° F. in Quart Glass Jars[2]	
		Cold Pack	Hot Pack
Apricots and Peaches	Scald, cold-dip, peel. (See p. 484) Pack cold. Add boiling sirup .	20 min.	
Berries (except raspberries, strawberries); Currants	Pack cold, cover with boiling sirup	20	
Cherries	Pack cold, add boiling sirup . .	25	
	Or remove pits. To each quart add 1 to 2 cupfuls sugar. Mix. Let stand until some juice is extracted. Slowly bring to boiling point. Pack hot . .		5 min.
Pears	Pare. Cook in boiling sirup 4 to 8 minutes. Pack hot . . .		20
Pineapples	Slice, pare, and remove eyes. Cut slices into quarters. Pack cold; add boiling sirup . . .	30	
Plums	Prick. Pack cold. Cover with boiling sirup	20	
	Or prick. Cook in hot sirup until boiling. Pack hot . . .		5
Raspberries	Cook in hot sirup until boiling. Pack hot		5
Rhubarb	Cut in half-inch lengths. Add ¼ as much sugar as rhubarb by measure. Bake (350°F.) in covered dish until tender. Pack hot .		5
Strawberries	To each quart add 1 cupful sugar. Mix. Let stand until some juice is extracted. Then boil slowly for 15 minutes. Let stand in kettle over night. Reheat to boiling. Pack hot .		5

NOTE. — Use only fresh, sound fruits for canning. Begin to count the time of processing in a water bath when the water boils.

For altitudes higher than 1000 feet, increase the time of processing 10 per cent for each additional 1000 feet.

[1] Adapted from Bureau of Home Economics Miscellaneous Circular No. 24, "Time Tables for Home Canning of Fruits and Vegetables," May, 1924.

[2] For pint glass jars (cold pack) decrease the time by 5 minutes.

Discussion of the Different Devices Used in the Cold Pack Process. — (1) The kettle or wash boiler provided with a rack is an inexpensive device. It is satisfactory for processing fruits and acid vegetables; as stated previously, non-acid vegetables should not be processed in the hot water bath even though they are processed on three successive days. It is thought by some that the flavor of fruits canned at low temperature, *i.e.* not above 212° F., is superior to that canned at a higher temperature.

(2) The steam cooker is a convenient and satisfactory equipment to use for canning fruits and tomatoes. It is more expensive, however, than the kettle having a rack, but less fuel is required when using it.

(3) The pressure cooker is the most satisfactory from the standpoint of processing. It is especially satisfactory for vegetables and meat, since a much higher temperature than that of boiling water is maintained during the processing period. The higher temperature also makes it possible to process foods in a shorter time. It is thought by some that the texture of fruits and tomatoes canned above 212° F. is inferior to that of those canned at a lower temperature. The pressure cooker is a more expensive device than either of the other two.

QUESTIONS

Why should processed jars, covers, and rubbers remain in boiling water until just ready for use?

Why not touch the inside of jars and covers with the fingers?

Why should berries and small fruits be washed before hulling or stemming?

Why should decayed or bruised spots on fruits be removed completely before canning the fruit?

Why is it that the cold pack method of canning is safer from the standpoint of processing than the open kettle method?

Why should the jar containing fruit that is to be processed by the cold pack method be filled to $\frac{1}{4}$ inch of the top with sirup rather than to overflowing?

Why should the covers of jars not be sealed tightly before placing in the kettle or steamer used for processing?

Why is it unnecessary and undesirable to dislodge air bubbles in jars containing food processed by the cold pack process?

When food is processed by immersing the jars in boiling water, why should the water extend above the covers of the jars to a depth of one inch?

LESSON CLXVIII

Processing with Much Sugar — Preserves, Jams, and Conserves

Experiment 93: The Use of Sugar as a Preservative. — Place 2 thin slices of fresh fruit in a sauce dish. Sprinkle one of the slices generously with sugar. Set the sauce dish aside for at least 24 hours. Examine. What change has taken place in the fruit without sugar? What has caused the change? Compare the sugared fruit with that without sugar. What conclusion can be drawn concerning the use of sugar in preserving fruit?

PRESERVES

Sugar was mentioned as one of the preservatives used in the preservation of food (see *The Principles of Preserving Food*, p. 478). Sugar in large quantity is unfavorable to germ life and hence is a most effective preservative. *Preserves* are made by cooking fruit in a thick sirup as in the *Method of Canning* (*a*) Open Kettle, p. 482. A large quantity of sugar is desirable as far as preservation is concerned; but for flavor less sugar is usually to be preferred. Only a few fruits are better when preserved with considerable sugar. Fruits best adapted for preserving are strawberries, sour cherries, sour plums, quinces, currants, and raspberries. For preserves, use $\frac{3}{4}$ to 1 pound of sugar for 1 pound of fruit. The less quantity of sugar should be used for peaches, plums, quinces, currants, and raspberries; the greater quantity, for strawberries and cherries. Use the quantity of water given in *Method of Canning* (*a*) Open Kettle, p. 482. Cook and seal as canned fruit.

JAMS

Jam is made as follows: Clean the fruit. If large fruits are used, pare or peel them and cut into small pieces. If small fruits, — berries or grapes, — are used, mash them. Cook the fruit in as little water as possible. When the fruit is soft, measure it and add the sugar, — use $\frac{3}{4}$ to 1 part of sugar to 1 part of cooked fruit. Cook until thick, stirring to prevent burning. Test the thickness by dropping from a spoon. If it falls in heavy drops, the jam is sufficiently cooked. Pour into sterilized jelly glasses. Cover the glasses with clean cloth or paper and set aside to cool and stiffen. Melt paraffin. Pour it (hot) over the cold jam. Allow the paraffin to harden and then cover the glasses with the lids. Wipe the outside of the glasses, label, and store.

Fruit that is too soft or too ripe for canning or preserving may be used for making jam.

MARMALADES

Marmalades are made much as jams. However, usually only the pulp and juices of fruits are used. The fruit is first cooked, and the skins and seeds removed before adding the sugar. In Orange Marmalade, the rind is used.

CONSERVES

Conserves consist of a combination of two or more fruits. Nuts and other materials are sometimes added. Conserves may be prepared as preserves, *i.e.* cooking the ingredients with sugar, until thick; or as jam, *i.e.* cooking the ingredients until tender, then adding the sugar and cooking until thick. It is thought by some that the latter method produces a finer flavor; it makes a product less tough and less sticky. In the special recipes for conserves given in this text, the latter method is followed.

ORANGE MARMALADE (I)

1 dozen oranges	1 grapefruit
6 lemons	Sugar

Weigh the fruit, slice it. To each pound of fruit add 1 quart of cold water. Let the mixture stand for 24 hours. Then cook slowly for 2 hours. Weigh the cooked fruit. Add an equal weight of sugar. Cook for 1 hour or until it stiffens. Pour into sterilized jelly glasses, seal, and cover as directed for Jams (see p. 490).

ORANGE MARMALADE (II)

1 dozen oranges	3 pounds sugar
2 quarts rhubarb	Rind of 6 oranges

Wash the fruit. Slice the oranges and cut the rhubarb into pieces. (Do not peel the rhubarb.) Cook the oranges and rhubarb for 30 minutes. Add the sugar and cook slowly for 2 hours or until thick (see *Jams*, p. 490). Pour into sterilized glasses. When cool, seal and cover as directed for Jams.

CARROT MARMALADE

1 pound carrots	3 cupfuls sugar
2 lemons	½ teaspoonful salt

Wash, scrape, and chop the carrots. Extract the juice from the lemons. Put the carrots and lemon rinds through a food chopper, cover them with water, and cook until tender. Add the lemon juice, salt, and sugar to the cooked mixture. Cook until it is thickened. Turn into sterilized jelly glasses. Let stand until cool. Then cover with melted paraffin.

STRAWBERRY AND PINEAPPLE CONSERVE

Use equal quantities of strawberries and shredded pineapple. Cook the shredded pineapple in the least possible quantity of water. When tender, add the strawberries and cook until they are soft. Measure the fruit and add three fourths as much sugar as fruit and a small quantity of salt. Cook until thick (see *Jams*, p. 490). Pour into sterilized glasses. Seal and cover as directed for Jams.

CRANBERRY CONSERVE

1 quart cranberries	½ pound California walnuts, chopped
1½ cupfuls water	1 orange, — juice and grated rind
¼ pound raisins	1½ pounds sugar
	½ teaspoonful salt

Wash the fruit. Cook the cranberries in the water until the berries burst. Strain. Add the remaining ingredients and cook 25 minutes or until the mixture is thick (see *Jams*, p. 490). Pour into sterilized glasses. When cool, seal and cover as directed for Jams.

GRAPE CONSERVE

½ peck grapes	1 cupful chopped nuts
2 oranges, — juice and rind	Sugar
2 lemons, — juice and rind	½ teaspoonful salt

Wash the fruit. Remove the grapes from the stems; remove the skins from the pulp. Cook the pulp until soft; strain, to remove the seeds. Place the strained pulp and skins in a preserving kettle. Extract the juice from the oranges and lemons, then put the rinds through a food-chopper. Add the lemon and orange juice and rind to the grape mixture and cook for 1 hour. Measure the mixture. Then add an equal quantity of sugar and the nuts and salt. Continue cooking until thick (see *Jams*, p. 490). Pour into sterilized glasses. When cool, seal and cover as directed for Jams.

APRICOT CONSERVE

1 pound dried apricots	1 large can shredded pineapple
$1\frac{1}{2}$ quarts water	Sugar
2 pineapples *or*	$\frac{1}{2}$ teaspoonful salt

Wash the dried apricots and soak them in the water. In the water in which they were soaked, cook the apricots until tender. Press through a colander. If fresh pineapples are used, shred them and cook, in as little water as possible, until tender. Combine the cooked fruits and measure. Add $\frac{1}{2}$ as much sugar and the salt. Cook until thick (see *Jams*, p. 490). Pour into sterilized glasses. When cool, seal and cover as directed for Jams.

PLUM CONSERVE

1 pound ($1\frac{1}{2}$ dozen) plums	$\frac{1}{4}$ cupful chopped nuts
1 cupful seeded raisins	2 oranges
1 cupful water	$1\frac{1}{4}$ cupfuls sugar

$\frac{1}{2}$ teaspoonful salt

Wash the plums, stone, and cut into pieces. Extract the juice from the oranges. Put the rind through a food chopper. Mix the plums, raisins, orange rind, and water. Simmer until the fruits and peel are tender. Add the orange juice, sugar, nuts, and salt, and continue cooking until the mixture has the consistency of marmalade. Pour into sterilized glasses. When cool, seal and cover as directed for Jams.

QUESTIONS

How do Preserves differ from Canned Fruit?
How does Jam differ from Preserves?

How does Jam differ from Fruit Sauce (see p. 66)? Why does Jam "keep" better than Fruit Sauce?

Give method of sealing Canned Fruit and method of sealing Jam. Explain why different methods are used.

LESSON CLXIX

Processing with Much Sugar — Jellies

Experiment 94: Pectin in Fruit Juice. — Put a few grapes, slices of apple, or cranberries in a small saucepan, and add enough water to cover and cook until the fruit is tender and soft enough to mash. Strain the cooked fruit through cheese-cloth.

Put 1 teaspoonful of the extracted fruit juice in a saucer, add an equal quantity of alcohol.[1] Mix by gently rotating the saucer. Let the mixture stand for 5 minutes. Then examine. What change has taken place in the fruit juice?

The formation of a solid mass in the mixture of fruit juice and alcohol which has stood for 5 minutes indicates that the fruit juice contains *pectin*, — a vegetable gelatine.

Experiment 95: Pectin in the Inner Portion of Orange or Lemon Peel. — Cut away the yellow portion from orange or lemon rind. Cut or chop the white portion of the rind in small pieces. Cover with water and soak several hours or overnight. Then cook slowly for ½ hour. Strain and set aside to cool. To 1 teaspoonful of this liquid add an equal quantity of alcohol, and proceed as in Experiment 94. Does the lemon or orange rind contain pectin?

The Principle of Jelly Making. — When the juices of certain fruits are extracted and cooked with sugar, the mixture stiffens when cool. This property of stiffening is due to the presence in fruit of two materials, — a certain carbohydrate, called *pectin*, and an acid. Pectin is like starch in that it stiffens when cold; but like sugar, in that it is soluble. Not all fruits contain pectin.

[1] Either grain (ethyl), wood (methyl), or denatured alcohol may be used. *Both wood and denatured alcohol are poisonous.* If they are used for testing, they should be handled and stored away with caution.

Jelly is most easily prepared from fruits which are rich in pectin and contain some acid. Unless pectin is contained in the fruit, the addition of sugar to fruit juice will not cause the juice to jelly. But jelly may be made from a fruit lacking in pectin, if it is combined with a fruit rich in pectin.

Certain fruits contain pectin, but are lacking in acid, hence are not good for jelly making. These fruits can be used for jelly, however, if acid is added.

Selection of Fruit for Jelly Making. — For jelly making, choose fruits which contain considerable pectin and some acid. The fruits should be fresh and not over-ripe. Some "green" fruits make fine jelly. Currant, crabapple, grape, apple, and plum are good jelly-making fruits.

If it is desirable to use a fruit containing little pectin, as strawberries, add a fruit rich in pectin, as currants. If about 10 per cent of the fruit which contain much pectin is added to the other fruit, the flavor of the foundation fruit is not much altered.

If it is desired to use a fruit containing pectin but deficient in acid, as sweet apple and quince, add tartaric or citric acid. Since the acidity of fruits varies, no definite quantity of acid can be stated. It has been suggested [1] that enough acid should be added to make the fruit juice about as acid to taste as good tart apples. At least one teaspoonful of acid is required for one quart of fruit juice. Dissolve the acid in the fruit juice, then taste the mixture. If necessary, add more acid to produce the acidity indicated above. Jelly may be prepared from strawberries, peaches, and pears by the addition of these acids, but the flavor is somewhat impaired.

The suggestion has been made also [2] that the inner white

[1] See University of Illinois Bulletin, "Principles of Jelly Making," p. 249.

[2] *Idem*, p. 25.

portion of lemon or orange peel be used as a source of pectin with fruit deficient in pectin. Remove the yellow portion of the rind, put the white portion through a food chopper, and soak in water for several hours or overnight. Then cook slowly for several hours. Strain out the solid portion. Add the liquid to the fruit juice deficient in pectin and use for jelly making. The rind of lemons and oranges may be dried for use in jelly making. When desired for use, soak and cook as directed above.

GENERAL METHOD OF JELLY MAKING

Wash and pick over the fruit; remove the stems, but use the skin and seeds and thus retain as much of the fruit as possible. The skin of fruit usually adds color to jelly. If large fruit is used, cut it in pieces. Cook the fruit slowly in water. Use very little water for juicy fruits, such as currants and raspberries, — *1 cupful of water to 4 or 5 quarts of fruit.* Crush the fruits during cooking.

To cook large fruits requires water. A general proportion is *half as much water, by measure, as prepared fruit.* A little less water may be used for peaches and plums and a little more for winter apples. A fair estimate is 3 quarts of strained juice from 8 quarts of fruit and 4 quarts of water. If the quantity of juice is greater than this, it should be boiled down to 3 quarts before adding the sugar.

When the fruit is cooked until it is very soft, it is ready for straining. For straining, make a bag of double cheesecloth or flannel. Wring the jelly bag out of hot water and suspend it from a strong support. Pour the cooked fruit into the bag and let the juice drip into a bowl. If transparent jelly is desired, do not press the juice through the bag; let the juice drip for several hours or overnight.

Measure the clear fruit juice and heat it. The time of cooking depends upon the per cent of pectin and the acidity of the juice; the more pectin and acid, the less the time of cooking. The time varies from 8 to 30 minutes. Skim the juice when necessary. While the juice is cooking, *measure three fourths as much sugar* [1] *as fruit juice* and heat the sugar. For currants and green or under-ripe grapes, use equal quantities of sugar and fruit juice. Add the hot sugar to the boiling sirup and cook. The following are *tests for sufficient cooking of jelly.*

(*a*) Coats the spoon.

(*b*) Falls from the spoon in heavy drops.[2]

(*c*) Stiffens when dropped on a cold dish and allowed to cool.

The first two tests are more satisfactory than the last, since the cooking process may be carried too far while the "test-jelly" is cooling.

Seal as Jam or shred paraffin and place it in the bottom of sterilized jelly glasses. Pour the hot jelly into the glasses and set aside to stiffen. Then cover and store. It is well to store jelly in a cool, dry, and dark place. The color of fruit sometimes fades when kept in a light place.

Long cooking of pectin changes it into substances which do not have the property of jellying, hence, make jelly in as short a time as possible. The purpose of heating the

[1] The quantity of sugar used in jelly making depends upon the quantity of pectin in fruit juice, — the more pectin, the more sugar. A most satisfactory method of determining the quantity of pectin and consequently the quantity of sugar to use with fruit juice is suggested by the Bulletin of the National War Garden Commission. The test follows: To a tablespoonful of fruit juice which has been boiled and cooled, add 1 tablespoonful of alcohol (see foot-note, p. 494). Mix by gently rotating and then let stand. If a solid mass forms, *use equal parts of fruit juice and sugar.* If 2 or 3 masses form, *use $\frac{2}{3}$ to $\frac{3}{4}$ as much sugar as juice.* If several small solid particles form, *use $\frac{1}{2}$ as much sugar as juice.* If no solid particles form, the fruit juice should be enriched by the addition of some pectin-rich fruit juice.

[2] Two drops forming side by side along the edge of the spoon has been found to be a reliable test.

sugar is to hasten the process of jelly making. The addition of cold sugar would cool the mixture and thus prolong the process.

The addition of too much sugar is often the cause of unsuccessful jelly making. Crystallization of the sugar from the jelly may result from an excess of sugar.

The *fruit pulp left in the jelly bag* should be utilized. Marmalade may be made from it, or more jelly can be prepared from it. To accomplish the latter, add water to the fruit pulp (enough to cover), mix, and heat slowly until the boiling point is reached. Strain and prepare jelly from the juice. However, more cooking of the juice before the sugar is added is required for the second extraction, since the juice contains so much water. The juice extracted for a third time from most fruits will contain enough pectin for jelly making. It has been found that more desirable jelly can be obtained by this method than by pressing the juice from the bag and thus obtaining what is termed "second quality" jelly.

Fruit Juices without Sugar. — Extract the juice from fruit as directed in *General Method of Jelly Making*. Do not add sugar to the juice. Can it as directed in (*a*) or (*b*).

(*a*) Reheat until the boiling temperature is reached, then pour into sterilized jars. Fill to overflowing and seal.

(*b*) Place the juice in sterilized jars. Partially seal and place in a water bath having the water reach the neck of the jar. Let it cook at a simmering temperature from 20 to 30 minutes. Remove from the water bath, and seal securely.

In the winter time or when desired for use, this fruit juice may be made into jelly as directed in *General Method of Jelly Making*, or it may be sweetened, diluted if necessary, and used as a beverage. This method of preserving fruit juice is especially desirable when there is a scarcity of sugar.

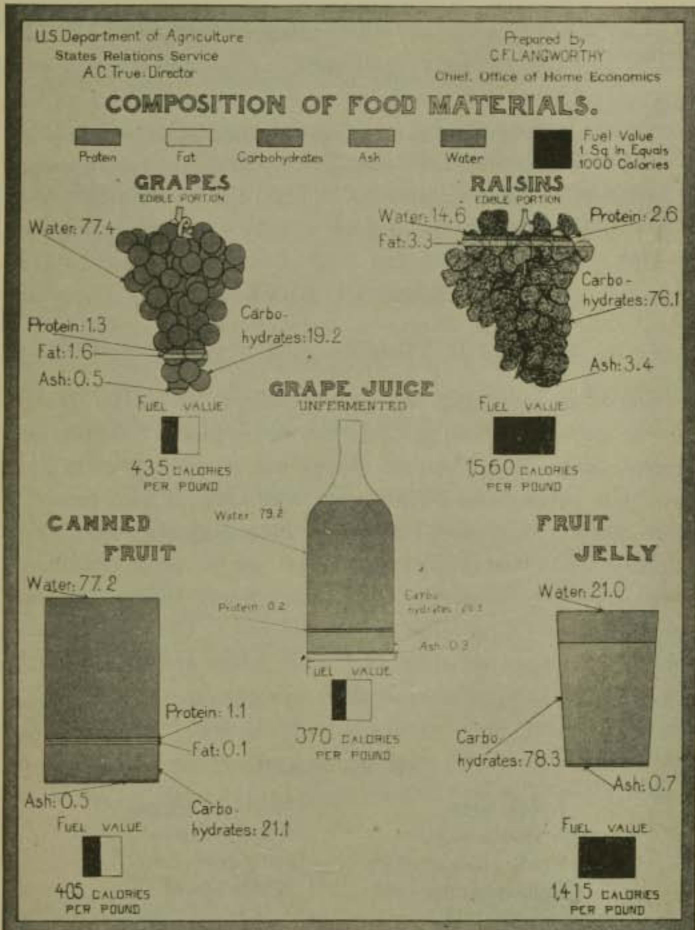


FIGURE 92. — THE COMPOSITION OF FRUITS AND FRUIT PRODUCTS. (Revised edition.)

QUESTIONS

Note the difference in the quantity of carbohydrates in Canned Fruit and Fruit Jelly (see Figure 92). What kind of carbohydrate is present in greatest quantity in these foods?

To what is the difference in flavor of Canned Fruit and Fruit Jelly largely due?

What is the chief difference in the processes of jam making and jelly making?

What is the result if too much sugar is used in jelly making?

What is the result if jelly is cooked too long?

Note the difference in the methods of sealing jams and jellies. Explain.

LESSON CLXX

Processing with Vinegar and Spices — Relishes

Spices and vinegar are preservatives of foods. Not all spices, however, have equal preservative power. It has been found that cinnamon and cloves aid in food preservation, but that pepper and ginger have very little, if any, preservative power. In the lesson on *Flavoring Materials: Food Adjuncts,* it was mentioned that spices and condiments should be used sparingly in the diet, hence spiced fruits and pickles should have only occasional use. There is no doubt that lemon juice or other tart fruit juices are better sources of acid-satisfying materials than vinegar.

SPICED PEARS

½ peck pears	Rind of ½ lemon
3 pounds sugar	Whole allspice
1 pint vinegar	Stick cinnamon
½ ounce ginger root	Whole cloves

Cut the pears in halves, remove the seeds, and pare. Into each piece of pear stick two or three cloves. Make a sirup of the vinegar and sugar. Divide the cinnamon, allspice, and ginger into two parts, tie in cheese-cloth bags, and add to the sirup. When the sirup begins to simmer, add the pears and lemon rind; bring to the boiling point, remove from the fire, and turn into a stone jar. Cover and stand in a cool place overnight. Next day bring the mixture to the boiling point, again place in the stone jar and stand overnight. The following day heat as before. Do this for five consecutive days. The last day, remove the fruit from the sirup, heat the sirup and evaporate it until there is just enough to cover the fruit. Add the fruit to the hot sirup, heat to the boiling point, then put in stone or glass jars or tumblers.

The pears may be finished in one day as follows: Cook the fruit until tender, then remove it, evaporate the sirup, add the fruit, reheat again, and finish as above. Fruit prepared by the first method has a finer flavor.

TOMATO CATSUP

12 ripe tomatoes	2 tablespoonfuls ginger
2 large onions	1 tablespoonful cinnamon
2 green peppers	1 tablespoonful mustard
2 tablespoonfuls salt	1 nutmeg grated
4 tablespoonfuls brown sugar	1 pint vinegar

Peel the tomatoes and onions. Chop the onions and peppers fine. Cook all the ingredients together for 3 hours, or until soft and broken. Stir frequently. Bottle and seal while hot. The mixture may be strained before bottling.

CELERY SAUCE

20 large ripe tomatoes	1 large red pepper
6 large onions	4 tablespoonfuls salt
4 large stalks celery	2 cupfuls vinegar
$\frac{3}{4}$ cupful sugar	

Chop the vegetables, add the salt and vinegar, and cook for 2 hours. Then add the sugar. Allow it to reach the boiling point again. Turn into sterilized bottles or jars, and seal.

OIL PICKLES

2 dozen small cucumbers	$\frac{1}{3}$ cupful salt
2 dozen small onions	$\frac{1}{4}$ cupful mustard seed
$\frac{1}{2}$ cupful olive oil	1 teaspoonful celery seed
$\frac{1}{4}$ cupful sugar	1 pint vinegar

Scrub the cucumbers. Cut them (without paring) into thin slices. Wash and cut the onions into thin slices. Mix the salt with these vegetables (to extract moisture), and let the mixture stand over night. Then drain the moisture from the vegetables so that the vinegar may not be diluted.

Mix the remaining ingredients. Pour the mixture over the onions and cucumbers. Mix well, cover, and set aside for a few hours. Then pour into sterilized jars. Fill the jar with liquid. (If necessary, more vinegar may be used.) To drive out the air, place the jars (with covers loosely adjusted) in a water bath at simmering temperature (180° F.) and heat at this temperature for 15 minutes. Remove from the water bath and seal.

To Seal Bottles. — Melt together, over hot water, equal parts of shoemaker's wax and resin. When liquefied, dip the tops of corked bottles into it. Corks in bottles may be dipped also in hot paraffin. Dip several times.

QUESTIONS

What is the objection to excessive use of spiced foods?

Name some substitutes for pickles. Why is an excessive or continuous use of pickles objectionable in diet?

LESSON CLXXI

Canned Vegetables

Microörganisms in the Spore Form. — Many microörganisms are destroyed by heating them for a few minutes to boiling temperature. However, some microörganisms have a peculiar power of retaining life under most adverse conditions. When subjected to extreme heat or cold, intense drying, or when there is lack of food, certain microorganisms assume a spore form, *i.e.* they cease growing and reproducing, and are able to undergo conditions which would readily kill microörganisms in the active form. Some microörganisms in the spore form are able to resist the temperature of boiling water for an hour or longer. Then as soon as the adverse conditions mentioned above are removed, the microörganisms assume active form and begin to grow and reproduce. In the growing state, their destruction is not so difficult.

Some of the microörganisms in certain foods, especially vegetables and fruits grown in a dry season, are capable of spore formation. When microörganisms in spore form do exist in foods that are to be canned, or the microörganisms change into spore form during the canning process, the microörganisms may not be destroyed by the time the ordinary process of canning is completed. If such is the case, when the canned foods are cooled and the conditions are favorable for growth, the microörganisms assume active form, begin to grow, and cause the decomposition of food. Twenty-four hours is sufficient time for the microörganisms to change from the spore to the active form. Hence the canned foods must be heated again, if they are to be preserved. For foods difficult to process (for the reason given above) processing carried on for three successive days was advised formerly. This is called *intermittent processing.*

Destruction of microörganisms in the spore form can be accomplished in a short time by subjecting them to very intense heat. In canning factories this is done by processing at a temperature higher than that of boiling water. In the home this may be accomplished by processing in the pressure cooker. According to one authority processing intermittently, *i.e.* on three successive days, does not insure satisfactory processing of materials containing spores.

Processing Vegetables in the Pressure Cooker. — The acid of tomatoes and fruits aids in the destruction of microörganisms. Hence processing above 212° F. is unnecessary for these. Processing tomatoes and fruits in a hot water bath for one period has proved very satisfactory and certain.

There is some question, however, regarding the safety of canning all vegetables by one period of processing in the water bath at 212° F., *especially in regions where botulism is known to occur and where foods cannot be stored in a cool place.* In Farmers' Bulletin 1211, "Home Canning of Fruits and Vegetables," revised August, 1922, one period of processing in the water bath at 212° F. is not advised in climates where the storage conditions are trying for the following vegetables: corn, beans, asparagus, okra, spinach and other greens, and peas (especially if at all mature). In a later Bulletin — United States Department of Agriculture, Miscellaneous Circular, No. 24, Bureau of Home Economics, May, 1924 — canning in the ordinary water bath of no vegetables except tomatoes is recommended. For processing non-acid vegetables, a higher temperature than that obtained in the boiling water bath is recommended. Processing at a high temperature (from 228° F. to 250° F.) can be accomplished conveniently by means of a *pressure cooker.*

The canning of beets, carrots, mature lima beans, pumpkins, and squash is not advised. These vegetables, with the exception of lima beans may be stored for winter use. Lima beans and okra may be dried.

Selection and Preparation of Vegetables for Canning. — Young vegetables, especially those that have grown quickly, are recommended for canning. If possible, vegetables, especially corn, should be canned immediately after picking.

Vegetables for canning should be thoroughly washed, pared, scraped, or cut into pieces in the same manner as when they are cooked and served immediately. If the vegetables vary in size, it is well to sort them and fill jars with those of uniform size. If there is much difference in ripeness, sort; can only the young vegetables.

Method of Canning Vegetables. — The method of canning tomatoes for a *single period* does not differ greatly from the method of canning fruits. The chief difference is that jars containing fruit are filled with sirup, while those holding tomatoes are filled with water and salt is added. Scald and cold-dip tomatoes as directed on p. 484. Then peel. If it is desired to can the tomatoes *whole*, pack them cold in jars. Add 1 teaspoonful of salt to each quart jar. Cover the tomatoes with boiling hot tomato juice. Put a new rubber on the jar. Partly seal; process in the hot water bath as directed on p. 506. As soon as processed, seal the jars. Tomatoes *cut in pieces* may be packed cold and processed in the same way as whole tomatoes, or they may be heated until they boil, packed hot in jars and processed in the hot-water bath as directed on p. 506.

All vegetables other than tomatoes should be canned in the pressure cooker. Non-acid vegetables should be precooked and *at once* packed *hot* in jars. To each quart jar add 1 teaspoonful of salt. 1 teaspoonful of sugar may be added to each quart jar of corn and peas. The moisture in which the vegetables are precooked should be used to pour over the hot vegetables in the jars. Then place a new rubber on each jar, partly seal and place the jars in the pressure cooker.

In operating the pressure cooker, keep the petcock open until after the steam escapes, then close the petcock. Do not begin to count the time of processing until the pressure reaches the desired point. See p. 506 for the proper temperature and pressure for processing vegetables.

TABLE FOR CANNING FRESH, SOUND, AND FIRM VEGETABLES BY ONE PERIOD OF PROCESSING[1]

Vegetable	Treatment before Processing	Time of Processing in Quart Glass Jars: (a) Water Bath at 212° F.	(b) Pressure Cooker: 10 lb. 240° F.	(b) Pressure Cooker: 15 lb. 250° F.
		Min.	Min.	Min.
Asparagus	Scrape off tough outer skin. Tie in bundles, stand in a saucepan. Cover tough portions with boiling water. Cover tightly. Boil 5 minutes. At once pack hot. Or cut in half inch lengths. Cover with boiling water. Heat to boiling. At once pack hot		40	
Corn (Cut from cob)	Cover with boiling water. Heat to boiling. At once pack hot			80
Lima beans (Tender)	Cover with boiling water. Heat to boiling. At once pack hot		60	
Okra (Young, tender pods)	Cover with boiling water. Heat to boiling. At once pack hot		40	
Peas (Young, tender peas)	Cover with boiling water. Heat to boiling. At once pack hot		50	
Spinach and other Greens	To loosen grit, cover with scalding water. Let stand 1 or 2 minutes. Wash in several cold waters. Heat in a covered kettle until wilted, using little or no water. At once pack hot. Do not pack too solidly. Cover with hot liquid		90	
String Beans	Cover with boiling water. Heat to boiling. Pack hot		40	
Tomatoes (See foot-notes, p. 487)	Scald, cold dip and peel. Pack cold. Add boiling tomato juice	45		
	Or cut into pieces. Boil until tender. At once pack hot	5		

Note. — Processing in the hot water bath is not advised for non-acid vegetables. See p. 504. Count time of processing in pressure cooker when the pressure reaches the desired point.

[1] Adapted from Miscellaneous Circular 24, U. S. Dept. of Agriculture, Bureau of Home Economics, May, 1924.

Examination of Canned Food before Using.[1]

Indications of Spoilage:

Before Opening

Bulged or swelled tops and bottoms of tin cans; leakage at seams.

Bulged metal covers of glass jars; leakage around rubber ring or on jar.

Unnatural color and texture of contents of jar or can; gas bubbles; unusual cloudiness of liquid.

During Opening

Outrush of gas; spurting of liquid. (Inrush of air is an indication of a sound, unbroken seal.)

After Opening

Unnatural odor, color, and texture of contents of jar or can.

Much blackened or corroded interior of tin can.

Discard without tasting any fruit or vegetable that appears to be spoiled!

Even though a non-acid vegetable appears sound, do not taste it or use it before boiling for at least 10 minutes.

Use of Canned Vegetables. — Open the can and if it is tin, empty its contents at once. If the vegetable is surrounded by liquid, use the water in cooking the vegetable, as it contains valuable materials. There are some who contend, however, that the flavor of certain vegetables such as peas and string beans is improved if the vegetable water is drained from them and they are cooked in fresh water. If this is done, the vegetable water should not be wasted. It should be used in making soup or sauce.

If the vegetable is to be served plain, turn into a saucepan. Cook in its own liquor at boiling temperature, for at least 10 minutes to remove any danger of botulism. (See p. 480.) When cooked, the liquid should be almost entirely evaporated. Add butter, salt, and, if desired, a very little sugar, and serve hot. A White Sauce may also be used with a vegetable that has been heated as above.

[1] Adapted from Leaflet "Directions for Examining All Canned Food before Use," U. S. Dept. of Agriculture, Bureau of Chemistry, Home Economics and Plant Industry, Coöperating, April, 1924.

QUESTIONS

Explain why vegetables (except tomatoes) are more difficult to can successfully than fruits.

What foodstuffs does the water in which vegetables are canned contain? From this explain why the water should not be drained from vegetables when removing them from the cans.

What is the purpose of cooking canned vegetables at boiling temperature?

LESSON CLXXII

Dried Vegetables

Advantages of Drying Foods. — While preserving foods by drying does not take the place of canning foods and storing them in jars or cans, it has certain advantages, viz.:

1. Little storage space is required for dried foods.
2. Dried foods can be stored in containers that cannot be used for canning.

When foods are dried, they may be reduced in bulk as much as 90 per cent; for example, 10 pounds of fresh food may be reduced to 1 pound of dried food. By this reduction no food value is lost, and the flavor is not greatly changed.

Dried foods may be stored in paper bags and boxes which are much less expensive containers than glass jars or tin cans. Hence if space is limited and glass or tin containers are difficult to secure or are expensive, drying may prove a very satisfactory method of preserving food.

Methods of Drying and Driers. — Food may be dried by:

1. Sun.
2. Steam (placing food on a specially constructed tray (see Figure 93) which is heated with steam).
3. Stove or oven drying (placing food above a stove or in the oven).

4. Fan drying (placing an electric fan near the food).

A combination of these methods, especially the two latter, is often used in drying foods.

Plates or dishes may serve as driers when the drying is done in the oven. Trays for drying may be constructed at home or they may be purchased. Most of them consist of a wood or metal frame over which wire netting is tacked. Single trays or a series of trays one placed above the other may serve as driers. When drying is accomplished by heat from a stove, the drier is hung over a stove or it rests on the top of the stove. In the latter case, it is necessary that the frame of the tray be constructed so that the bottom tray does not rest directly on the stove. In case the drying is done over a kerosene stove, the bottom of the tray must be of tin or galvanized iron to protect the food from kerosene fumes. The lowest tray must be placed at least 4 inches above the metal bottom.

Selection and Preparation of Vegetables for Drying. — To secure the best results, select mature but fresh vegetables. They should be in good condition, free from blemish.

Certain foods, such as berries, cherries, peas, lima and shell beans, are dried whole. Most vegetables should be cut into slices from $\frac{1}{8}$ to $\frac{1}{4}$ inch in thickness. The slicing may be done with a paring or kitchen knife, or it may be done by means of a slaw-cutter or a rotary chopper. Foods are sometimes cut into pieces for drying by means of the food chopper. It is necessary that all knives and cutting devices be clean. There should be no discoloration of the vegetable from the cutting utensil. It has been found advisable to blanch most vegetables before drying. The method of blanching given on p. 484 can be used in drying vegetables as well as canning them. Foods are not cold-dipped, however, after blanching when they are to be dried. Fruits are usually not blanched before drying.

Method of Drying Foods. — Place the prepared food on drying trays. Unless the drying is done in the oven, cover the food with cheese-cloth. If possible, tack the cloth to the frame so that no dust or insects can come in contact with the food. Stir or turn foods once or twice a day while they are drying. This is especially necessary when foods are dried in the sun.

If the food is to be dried in the sun, place the tray containing the food in the sun, where there is a breeze. If it rains, take the trays indoors. Also bring the trays indoors just before sunset.

FIGURE 93. — DRIER FOR VEGETABLES OR FRUITS.

If food is to be dried by means of steam, a special device is needed (see Figure 93). The device consists of a large pan for holding water and a hollow tray. The under surface of the tray has an opening about the size of the diameter of the pan. To this opening is fastened a collar which fits snugly into the pan. The pan filled with water is placed over a burner. When the water boils, the steam rises and fills the hollow tray and escapes by means of the small pipe in the upper surface of the tray. The food is placed on the upper surface and is dried by steam heat.

If the food is to be dried in the oven, place the food on suitable trays. Oven drying is much more satisfactorily done if the oven is provided with a thermometer. The temperature for drying foods is much less than that of boiling water, — it varies from 115° to 175° F. It is often necessary to keep the oven door open so that the temperature does not become too high.

If food is dried over a stove in a series of trays one placed above the other, the position of the trays should be changed so that the food may be uniformly dried.

If food is dried by means of an electric fan, the fan should be so placed that the current of air is directed along the trays lengthwise. The drying will be most rapid nearest the fan; hence it is necessary to change the position of the tray or of the food every few hours. Foods may be dried in less than 24 hours by means of an electric fan. A few foods such as sliced string beans may be dried in a few hours. Before drying by means of a fan, food should be blanched. It is also necessary to heat food dried in this way in an oven at 180° F. for 10 or 15 minutes before storing.

Testing for Sufficient Drying and Conditioning. — The time for drying varies with the method of drying and the kind of food. A definite time of drying cannot be stated. There are some tests which may be applied in determining when a food is sufficiently dried. The following is quoted from the Bulletin of the *National War Garden Commission*, Victory Edition, p. 22:

"When first taken from the drier, vegetables should be rather brittle and fruits rather leathery and pliable. One method of determining whether fruit is dry enough is to squeeze a handful; if the fruit separates when the hand is opened, it is dry enough. Another way is to press a single piece; if no moisture comes to the surface the piece is sufficiently dry. Berries are dry enough if they stick to the hand but do not crush when squeezed."

When the food is judged to be sufficiently dried, it should be placed in boxes or bowls and covered with clean cloths. The dried foods should be stirred or poured from one container to another once a day for 10 days or two weeks. It at the end of this time the food is found to be moist, it must be subjected to the drying process for a short time. After the second drying, it should be treated as directed above. If the food is observed for several days and found to be dry, it may be stored away. This process of testing and making them sufficiently dry after removing from the drier is termed *conditioning.*

DRIED CORN

Select such sweet corn for drying as you would for immediate table use. Blanch the corn (on the cob) for 8 to 12 minutes in boiling water. Drain thoroughly. Then cut the corn from the cob as directed on p. 25. Dry by subjecting to a temperature of 130° F. gradually increased to 140° F. Stir the corn often. It is sufficiently dried when it is hard and semi-transparent.

(Adapted from *Bulletin of the National War Garden Commission, Victory Edition.*)

TABLE FOR BLANCHING AND DRYING[1]

The following table shows blanching time for vegetables and the temperatures to be used in drying by artificial heat.

Vegetables	Blanching Time	Temperature (Fahrenheit)
	Minutes	*Degrees*
Beets	2	120 to 145
Cabbage	3 to 4	115 to 135
Carrots	2	120 to 145
Cauliflower	4 to 6	120 to 130
Celery	2 to 3	135
Figs		120 to 140
Garden peas	3 to 5	115 to 140
Green string beans	5 to 8	130 to 145
Lima beans	3	150
Okra	3	115 to 135
Onions		140

[1] From Bulletin of the *National War Garden Commission*, Victory Edition.

TABLE FOR BLANCHING AND DRYING (*Continued*)

Vegetables	Blanching Time	Temperature (Fahrenheit)
	Minutes	*Degrees*
Parsnips	2	120 to 145
Potatoes	2 to 3	125 to 150
Prunes		130 to 175
Pumpkin and winter squash	3 to 6	135 to 160
Spinach	2	130
Summer squash	3 to 6	135 to 160
Sweet corn	8 to 12	130 to 140
Sweet potatoes	6 to 8	145 to 165
Tomatoes	1½	120 to 140
Turnips	1 to 2	135 to 165
Wax beans	3	150
Fruits		
Apples		130 to 175
Apricots		130 to 165
Berries		130 to 155
Cherries		120 to 150
Peaches		130 to 165
Pears		130 to 175
Plums		130 to 165

QUESTIONS

Under what conditions do you think it would be advisable to dry foods rather than can them?

Name the advantages of dried over canned foods and the advantages of canned over dried.

From what you have learned regarding the cooking of dried fruits and dried peas and beans, how would you cook home-dried vegetables?

Give a reason for each step of the process.

Why is it necessary to stir foods occasionally while drying?

Why is oven drying of foods much more satisfactory when the oven is provided with a thermometer?

Explain why it is necessary to condition dried foods before storing.

RELATED WORK

LESSON CLXXIII

The Sick-room Tray

Selection of Foods for the Sick. — Methods of preparation of food for the sick differ somewhat from methods of preparation of food for those in health. The chief difference is in the *selection* of the foods to be prepared. In severe illness the physician prescribes definitely the diet of the patient. In the absence of a trained nurse, it is the home-keeper's work to follow the physician's directions and to prepare such foods as can readily be digested.

Often the home-keeper not only prepares, but selects the foods for the indisposed members of the household. In any case of feeding the sick, the following suggestions should be kept in mind:

(*a*) Choose easily digested foods and prepare them in such a way that they will be easily digested. Liquid or easily liquefied foods are digested with the least effort, hence the use of milk, broths, soups, and gruels in sick-room diet. Such semisolid foods as eggs (uncooked or soft cooked), cereals, softened toast, etc., are also easily digested. Avoid foods that are digested with difficulty, as pastry, fried foods, "rich" sauces, pork, veal, lobster, and baked beans.

(*b*) Give special attention to the selection of foods that appeal to the appetite. When foods are served, even though they are selected according to the physician's directions, likes and dislikes of the patient should be observed. If food suitable for the patient is distasteful to him, substitutions should be made or distasteful foods should be disguised. Eggs, for example, are most valuable foods for the sick. If disliked by the patient they may be slipped into such foods as cocoa or gruels. Appeal to the appetite can be made by changing the methods of preparing foods. The selection and preparation of food for the sick call for ingenuity and resourcefulness on the part of the home-keeper.

(c) Prepare less food for the sick than for those in health. Sometimes a lessened quantity of easily digested food is all that is needed to effect recovery from an indisposed condition. Some energy is needed to carry on the involuntary activities of the body, such as the beating of the heart, and the movements of the lungs (see *Table of Energy Requirements*, p. 378). For the very sick patient, food served in small quantities, but served often, is necessary.

Selection of Foods for the Convalescent. — In recovery from severe illness, there is often the problem of building up an emaciated body. Knowledge of the proper quantity and the kind of food aids greatly in solving this problem.

The basic principles of the selection of food *to increase weight* were discussed previously (see *Daily Carbohydrate and Fat Requirement*, p. 381). The use of concentrated foods, *i.e.* those whose fuel value is high, such as eggs, cream or top milk, and butter, is usually advisable. These foods can be added to foods of less fuel value such as vegetables. A generous use of whole milk is also effective in gaining weight. This can be used to advantage not only at meal times but between meals and at bed time. Milk is one of the few foods which can be used effectively between meals. Because it is bland in flavor, it does not "spoil the appetite" for the following meal. Bread and other grain foods and starch-rich vegetables are useful foods for gaining weight.

Many of the suggestions for the selection of foods for the sick apply to the selection of foods for the convalescent.

Preparation of Special Foods for the Sick and for the Convalescent. — (1) *Milk.* — Milk is one of the most important foods for an invalid because it is a liquid containing valuable nutrients. It is used in a partially predigested condition in Junket "Custard" (see p. 189), peptonized milk, and malted milk. Buttermilk, kumiss, and matzoön are often agreeable and beneficial to the sick; by some, they are more easily digested than whole milk. Frozen desserts made of milk or cream are popular foods for the sick.

(2) *Eggs.* — Since eggs are both high in nutrients and easily digested, they serve as a most important article of diet for the sick. The variety of ways in which eggs can be cooked and served also adds to their value as a sick-room food. Eggs combined with milk (egg-nog, custards), with cereals (rice pudding, gruels), and with toast make suitable foods for the sick and convalescent. The principles used in the preparation of custards (see Lesson LI, p. 177) should be applied in combining eggs with hot liquids.

(3) *Gruels.* — The principle of preparing breakfast cereals may be applied to the preparation of gruels. In the making of gruels less cereal and more liquid are used, *i.e.* mix 1 tablespoonful of cereal with 1 cupful of liquid. The finished product is strained. A gruel may be prepared by diluting a cooked cereal and straining. Gruels should be of the consistency of cream soups. Corn-meal, oatmeal, barley, rice, flour — especially graham, whole wheat, and gluten — arrowroot, and crushed crackers — especially graham and oatmeal — are suitable cereals for gruels. Water or a combination of water and milk is used for the liquid. When both water and milk are used, the method of cooking Rice Pudding given on p. 88 should be followed.

The seasoning and flavoring of gruels are most important. Distaste for gruels is often due to improper seasoning. "High" seasoning is not desirable for the sick or convalescent. Usually a patient does not care for highly seasoned food. But some seasoning is necessary to make a tasty gruel. Gruels may be flavored with whole spices, meat extract, fruits, such as raisins, cranberries, etc., and lemon peel. The flavor of whole spices and fruits is extracted by cooking them with the gruel. If nutmeg is used, it is grated over the surface of the cooked food. The identity of this spice can thus be recognized. Sugar is used sparingly for the sick.

(4) *Broth and Meat.* — Although there is little nourishment contained in meat broths (see *Protein in Meat*, p. 202), beef tea is often used as food for the sick, especially when liquid diet is necessary. It is appetizing and tasty.

To make *beef tea*, soak chopped meat in water for at least one hour. (Use 1 pint of water to 1 pound of lean beef.) Then cook the mixture *slightly*, over hot water (until it becomes reddish brown in color), and stir constantly. Strain through a *coarse* strainer, season, and serve at once.

Sometimes the *juice of beef* without any dilution with water is served to the sick. The meat is cut into pieces and heated slightly; then by means of a lemon "squeezer" or a meat press the juice is extracted.

Meats such as chicken (white meat preferably), lamb, broiled or roasted beef, can be used for convalescents. Scraped meat, *i.e.* meat from which the tough tissue is removed (see Experiment 50, p. 192), can often be given to an invalid when solid meats are denied. The scraped meat contains more nutriment than beef juice (see *Protein in Meat*, p. 202). It should be made into balls and pan-broiled (see *Pan-broiling*, p. 199).

Preparing the Tray. — Attractive serving of foods may make a stronger appeal to the appetite than choice selection or skilful preparation of foods. It should be remembered that the foods are to be carried from the kitchen to the sick room. For this reason, it is well to place foods, especially liquids, in deep dishes suitable for transit. All hot foods should be placed in covered dishes, that they may be hot when the bedside is reached.

For serving sick-room foods, the daintiest china available should be used. The tray should be spread with a clean napkin or doily. In the case of a contagious disease, a paper napkin or doily may be used. It should be destroyed at once after using.

A bedside stand which supports the tray without any effort of the patient is a comfort.

For contagious diseases, burn any remaining bits of food and sterilize the dishes, — cover with cold water, heat, and boil.

QUESTIONS

Keeping in mind that the requisite for food for the sick is ease of digestion, make a list of liquid, semisolid, and solid foods suitable for the sick room.

Explain why it is that liquid foods are invariably prescribed for the sick.

Give a variety of ways of cooking and serving eggs for the sick.

Keeping in mind the suggestions given in the chapter on *Menu-making* (see p. 318) and in the present chapter, write several menus for an indisposed or convalescent patient.

LESSON CLXXIV

Preparing Trays for the Sick and Convalescent

Plan [1] menus for the sick and for the convalescent. Prepare the foods and arrange them on trays.

[1] See Foot-note, p. 327.

LESSON CLXXV

Review — Meal Cooking

MENU

Cream of Potato Soup
Croutons
Baked Custard

See Lesson XIV (p. 68) for suggestions regarding the preparation of the lesson.

LESSON CLXXVI

Home Projects[1]

Suggestions for Home Work. — Can fruit or vegetables, or make marmalades, jellies, etc. If possible, select the fruits or vegetables at market.

Suggested Aims: (1) To compare home-canned and factory-canned products. Determine the difference in cost per pint or quart. Compare the difference in flavor and appearance.

(2) To compare the yield of fruit made into jam or conserve and jelly. Note the weight of the fruit, sugar, and other ingredients before preserving. How many glasses of jam or conserve does each five pounds of material yield? State the advantages of preparing jelly from fruit and of preparing jam or conserve.

[1] See Lesson IX, p. 51.

DIVISION EIGHTEEN

SUPPLEMENTARY

LESSON I

Thanksgiving Sauce

CRANBERRY SAUCE

1 quart (1 pound) cranberries	2 cupfuls sugar
2 cupfuls water	Salt

Pick over and wash the cranberries. Cook them in water until they are soft and the skins are broken. Remove from the fire; strain if desired, add the sugar and salt, and stir until dissolved. Set aside to cool.

CRANBERRY "JELLY"

1 quart (1 pound) cranberries	2 cupfuls sugar
1 cupful water	Salt

Prepare and cook the cranberries in water, as for Cranberry Sauce. Press through a strainer, add the sugar and salt, and mix well. Without further cooking pour the mixture into molds which have been rinsed in cold water. Set aside to cool and stiffen.

QUESTIONS

Give a practical method of washing cranberries.

How does Cranberry Sauce differ from Cranberry Jelly?

If you desired to make *clear* Cranberry Jelly what change would you make in the method given above?

LESSON II

Thanksgiving Desserts

PLUM PUDDING

2 cupfuls soft bread crumbs	$\frac{1}{2}$ cupful suet
$\frac{1}{4}$ teaspoonful baking soda	$\frac{1}{2}$ cupful brown sugar
2 teaspoonfuls baking powder	1 egg
$\frac{1}{8}$ teaspoonful cloves	$\frac{3}{4}$ cupful milk
$\frac{1}{2}$ teaspoonful cinnamon	$\frac{1}{2}$ cupful currants
$\frac{1}{4}$ teaspoonful salt	$\frac{1}{2}$ cupful raisins

To prevent suet from sticking while being chopped, sprinkle it with a little flour. Use a meat grinder, or a chopping bowl and knife, to chop the suet. Beat the eggs lightly and add the milk to them. The currants and raisins should be cleaned as directed on p. 77, and sprinkled with flour. Mix the ingredients in the order given. Steam in an oiled pudding mold for at least 2 hours, or bake at 250° F. for 3 hours. Serve with Hard Sauce, I (see p. 31) or II, Yellow Sauce, or Vanilla Sauce (see p. 186).

VEGETABLE PLUM PUDDING

2 cupfuls flour	1 teaspoonful salt
1 pound seeded raisins	1 teaspoonful baking soda
1 cupful potatoes	1 tablespoonful cold water
1 cupful carrots	1 cupful suet
1 cupful sugar	2 oranges — juice and grated rind

1 lemon — juice and grated rind

Mix the flour and raisins. Put the potatoes, carrots, and suet through a food chopper. Mix the baking soda and water. Combine these three mixtures. Then add the remaining ingredients. Turn into a greased mold and steam or bake (at 250° F.) 3 hours. Serve hot with Lemon Sauce (see p. 114) or with Hard or Yellow Sauce.

HARD SAUCE II

¾ cupful brown sugar
⅓ cupful butter
2 tablespoonfuls cream or milk
1 teaspoonful vanilla *or*
1 teaspoonful lemon juice and ½ teaspoonful vanilla

Cream the butter, add the sugar gradually, and mix thoroughly. Add the cream or milk gradually. Add the flavoring. Chill; serve over hot puddings.

YELLOW SAUCE

2 eggs
½ cupful powdered sugar
1 tablespoonful milk or cream
½ teaspoonful vanilla
Salt

Separate the eggs; beat the whites until they are stiff and dry. Add the yolks and continue beating until the mixture is very light. Then add the powdered sugar and beat again. Continue beating and add the milk or cream gradually; finally add the vanilla and salt. Serve at once over hot puddings.

CRANBERRY FRAPPÉ

1 quart (1 pound) cranberries
2½ cupfuls sugar
4 cupfuls water
Juice 1 large lemon
Salt

Cook the cranberries and water slowly, until soft. Force through a sieve, and add the sugar, lemon juice, and salt. When cool, freeze (see *Preparing and Packing the Freezer* and *Freezing*, pp. 460 and 461).

Serve with roast chicken or turkey, or as a dessert.

QUESTIONS

What are the leavening materials used in Plum Pudding? Explain their action.

Why are raisins and currants sprinkled with flour before adding to the pudding?

How should pudding molds be prepared for pour batters (see *General Suggestions for Steamed Quick-bread Mixtures*, p. 347)? If it is desired to use left-over steamed pudding, how should it be reheated?

What is the price per pound of suet? How much by weight is required to make one half cupful?

See Figure 63, p. 277, and tabulate the percentage composition of beef suet and butter. Which contains the more fat?

How many persons does the Plum Pudding recipe serve?

How many persons does the Cranberry Frappé recipe serve?

LESSON III

Christmas Sweets

The Use of Candy in Diet. — Candy is an energy-giving food, but, unfortunately perhaps, it is not (at all times) a most desirable energy-giving food. Sugar exists in candy in concentrated form. As stated on p. 71, such sugar is irritating to the organs of digestion. Sugar is contained in large quantity in some fruits, especially in dried fruits, figs, dates, prunes, etc. These fruits are a much better source of sweets for children than is candy, because they do not contain as much sugar, and have, in addition, valuable food materials in the form of ash. (See Figures 92, p. 499, and 94. Note the large quantity of carbohydrates and ash in raisins. Also note the large quantity of carbohydrates — which are in the form of sugar — in stick candy.)

Candy should never be used to excess or at the wrong time. A little eaten at the end of a meal is not harmful to the normal person. At that time the sugar is diluted because it is mixed with other foods. When diluted it does not irritate the digestive tract to the extent that it would if eaten between meals with no other foods. It is well to drink a generous quantity of water when eating candy or other sweets. Since molasses, honey, and maple sirup are not so

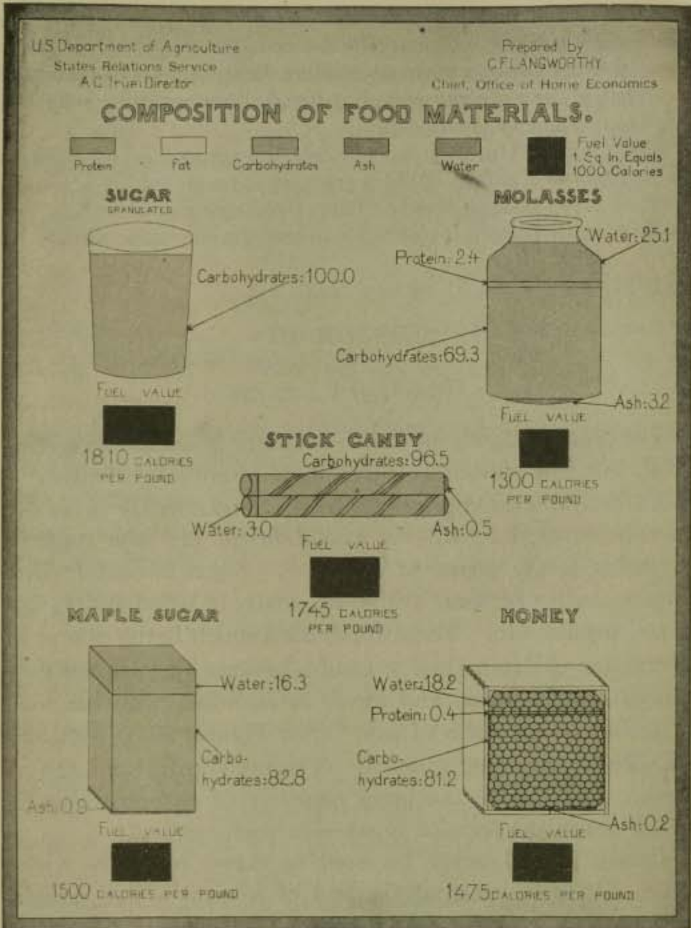


FIGURE 94. — THE COMPOSITION OF SUGAR AND SIMILAR FOODS.
(Revised edition.)

concentrated as is sugar (see Figure 94), they are desirable sweets for children, — provided they are used moderately, at the right time, and are mixed with other foods.

PARISIAN SWEETS

Chop equal parts of figs, dates, or raisins, and nuts together. Knead on a board dredged with confectioner's sugar, until well blended. Roll to $\frac{1}{3}$ inch thickness, cut into cubes or rounds, and dip each piece in confectioner's sugar. Store in tin boxes.

STUFFED FRUITS

Cover *prunes* with cold water, and let them soak for 30 minutes. Then heat and cook at boiling temperature for 15 minutes. Now drain off the water and place prunes in the top part of a double boiler and cook over boiling water for 45 minutes. Or put the prunes in a tightly covered pan and place in the fireless cooker for several hours. Cool and remove the stones and fill the open space with a nut or a mixture of chopped dates or raisins, figs, and nuts. Press the prunes into symmetrical shape, then roll them in fine granulated sugar. (The Parisian Sweet mixture may be used for stuffing prunes.) Prunes may also be stuffed with marshmallows. One half of a marshmallow should be inserted in each cooked and seeded prune.

Dates stuffed with chopped nuts, peanut butter, or candied ginger are tasty sweets. They may be rolled in granulated sugar after stuffing.

DATE BARS

1 egg	2 teaspoonfuls baking powder
1 cupful sugar	$\frac{1}{4}$ teaspoonful salt
1 teaspoonful vanilla	$\frac{3}{4}$ cupful dates, seeded and cut into pieces
1 cupful flour	1 cupful nuts, chopped
	$\frac{1}{2}$ cupful milk

Mix as Date Pudding (see p. 79). Turn into an oblong or square pan about 9 by 9 inches. Bake at 350° F., for from 30 to 40 minutes. When sufficiently baked, remove from the pan and place on a cake cooler for a few minutes. Then cut the cake into halves, and cut each half into narrow strips about 1 inch wide and $4\frac{1}{2}$ inches long. Roll each strip in powdered sugar. Store in a tightly covered tin box. These cakes have a finer flavor after they have been stored for a few days.

Raisins may be substituted for dates.

POP-CORN BALLS

1 cupful molasses	$\frac{1}{4}$ teaspoonful baking soda
1 cupful corn sirup or sugar	$\frac{1}{2}$ teaspoonful salt

Mix the molasses and sirup or sugar and cook them to the crack stage (see p. 528). Then add the soda and salt and pour the mixture over popped corn, — about six quarts. Stir the corn while pouring the sirup. Let the sweetened corn stand a few minutes. Then dip the hands into cold water, shake off the water, and with the two hands press some corn into a ball. Repeat until all the corn is shaped into balls.

QUESTIONS

Explain why Parisian Sweets and Stuffed Fruits are a more desirable sweet food than candy.

When is the best time to eat candy? Explain your answer.

Why are mints served at the close, rather than at the beginning of a meal?

Why is it advisable to drink a generous quantity of water when eating candy or sweets?

Compare the recipes for Date Pudding (p. 79) and Date Bars. Account for the greater quantity of flour, sugar, and milk in Date Bars.

Why is it necessary to dip the hands in cold water before shaping Pop-corn Balls?

LESSON IV

Christmas Candy

Sugar and Glucose. — Granulated sugar and glucose differ in taste and composition. Granulated sugar is crystalline in structure, while commercial glucose exists in the form of a heavy sirup, *i.e.* is non-crystalline in form.

In many candies, a creamy consistency is desired. This is not possible, if all the sugar of the candy exists in coarse crystalline form. Hence in the making of candy from granulated sugar, it is desirable to add glucose or sirup to granulated sugar or to change some of the crystallized sugar to a sugar which crystallizes with difficulty, *i.e.* *invert sugar*. This can be accomplished by boiling granulated sugar with acid.

Recent experimentation [1] with sugars, however, shows that the quantity of acid required varies with the degree of hardness or the alkalinity of the water, — the more alkaline the water, the greater the quantity of acid needed. This experimental work also shows that unless soft water is used in boiling sugar to which acid is added, more constant and satisfactory results may be secured by adding glucose rather than acid to sugar.

Cooking Sirups. — Sugar and water are boiled to different degrees of temperature for making different kinds of candy. The thicker the sirup, the higher the temperature. Tests for sirups of different consistencies are:

(*a*) Thread, — when dropped from a spoon, the sirup forms a thread about two inches long (230° F.).[2]

(*b*) Soft ball, — when dropped into cold water, the sirup forms a soft ball if rolled between the fingers (236° F.).

(*c*) Hard ball, — when dropped into cold water, the sirup forms a firm ball (252° F.).

[1] See Journal of Home Economics, February, 1919 (Vol. XI), p. 65, "Factors Influencing the Amount of Invert Sugar in Fondant," by Daniels and Cook.

[2] These temperatures apply to sirups made from cane sugar. The addition of glucose to cane sugar lowers the temperatures of the sirups at the various stages. See Note to the Teacher, p. 353, regarding the use of the Fahrenheit scale of temperature.

(*d*) Crack, — when dropped into cold water, the sirup becomes brittle (270° F.).

(*e*) Hard crack, — when dropped into cold water, the sirup becomes very hard and brittle (293° F.).

(*f*) Caramel, — when sugar (without addition of water) liquefies when hot and becomes very hard and brittle when cold (310° F.).

FUDGE

2 cupfuls sugar	2 ounces chocolate
½ cupful water or milk	2 tablespoonfuls butter
½ cupful corn sirup	1 teaspoonful vanilla
¼ teaspoonful salt	

Mix the sugar with the liquid. Add the chocolate and sirup. Boil *gently* to a "soft ball" stage. Just before removing from the fire, add the butter. Cool, then beat the mixture until it thickens. Add the vanilla and salt and pour into a buttered pan. Cut into squares; when cool the fudge is ready for serving.

The butter may be omitted.

PANOCHA

2 cupfuls light brown sugar	2 tablespoonfuls butter or substitute
½ cupful milk	½ pound nuts
⅛ teaspoonful cream of tartar	⅛ teaspoonful salt

Mix the sugar with the milk. Add the cream of tartar, and boil gently to a "soft ball" stage. Just before removing from the fire, add the butter and salt. Cool and beat until the mixture thickens. Add nuts that have been cut into pieces; pour into a buttered pan; cut into squares. When cool, the Panocha is ready for serving.

Sour milk or cream may be substituted for sweet milk and cream of tartar. When sour cream is used, omit the butter or substitute.

BUTTERSCOTCH

½ cupful water	Juice of 1 lemon *or*
3 cupfuls light brown sugar	¼ cupful vinegar
2 to 4 tablespoonfuls butter	

Mix the sugar and liquids thoroughly. Boil gently to the "crack" stage. Add the butter. Pour into buttered pans. When almost cool, cut into squares with a chopping knife. Break into pieces when cold.

The butter may be omitted. If this is done, add ⅛ teaspoonful of salt.

CINNAMON BALLS

1 cupful sirup	1 tablespoonful water
2 cupfuls sugar	1 tablespoonful vinegar
1 tablespoonful butter	1 tablespoonful ground cinnamon *or*
⅛ teaspoonful salt	2 drops of oil of cinnamon

Put all the ingredients except oil of cinnamon into a saucepan and boil to the crack stage (see p. 528). If oil of cinnamon is used for flavoring, add it to the mixture after cooking. Pour into a greased pan. When cool enough to handle, take a small portion and shape it into a ball. If the candy becomes too stiff to shape, it may be placed in an oven until it is soft enough to handle.

Oil of cinnamon produces a more pleasing flavor than ground cinnamon. However, the former is expensive. If it is added, the use of a medicine dropper prevents its waste.

QUESTIONS

What ingredient does corn sirup contain that would make it effective in preparing creamy candy (see p. 72)?

Explain the use of corn sirup, cream of tartar, sour milk, and vinegar in these candies. In Fudge, why is the butter added just before removing the candy from the fire (see *Frying and Digestion*, p. 140)?

Why are not the nuts cooked in the Panocha mixture?

Why is butter or substitute omitted in Panocha if sour cream is substituted for sweet milk?

If a thermometer is used for testing sirups, what precaution should be taken against breaking?

From *U. S. Department of Agriculture*, Bulletin No. 28, tabulate the percentage composition of granulated (see Figure 94), powdered, brown, and maple sugars. What is the price per pound of each?

How many cupfuls in a pound of brown sugar?

Considering the percentage of carbohydrates, and the price per pound of granulated and brown sugar, which is the cheaper?

Tabulate the percentage composition of honey, of molasses, and of maple sirup.

How much fudge, by weight, does 1 pound of sugar make?

What is the cost per pound of homemade fudge?

APPENDIX

SUGGESTIONS FOR TEACHING

In using this text, the teacher may follow the *order* of *presenting* a lesson which she considers most satisfactory. She may prefer to preface processes of cooking with a discussion of foods and reasons for the steps involved in the processes, or she may consider it advisable to have the pupils do the cooking and discuss foods and methods later. In case both the so-called "theory" and practical work are undertaken in the same lesson, the time required to cook the food often determines the order of the lesson. In either case, this text may be used to advantage.

Although recipes in definitely stated form appear in the book, the teacher need not refer to them in class, or place them upon the board previous to the lesson. She may prefer to lead the pupils to develop a recipe. The latter method is valuable in training pupils to know the proper quantity of food materials to combine for practical *recipe making*, and to know how to *substitute* one food material for another.

The *relation* of one recipe to another is shown in this text and should be constantly emphasized. The pupils should be made to understand that there are a few basic recipes from which many may be developed.

Much attention should be given to the *cost* of foods. At frequent intervals, pupils should be required to compute the cost of particular dishes or of entire meals. The *buying* of foods by the pupils is most valuable. In table service lessons, it is advisable to have the pupils not only plan and cook foods but, when possible, buy them.

In teaching *table service lessons*, the greatest care should be taken to adapt the lessons to the standard of living of the pupils. In communities where the equipment for serving foods is most meagre, a special effort should be made to make the best use of such dishes and furnishings as are found in the homes of the pupils. Serving meals in a more pleasing way with more adequate (but not elaborate) equipment should also be taught. Methods of serving without a maid meet best the needs of most pupils of the public schools.

The cooking of foods by each pupil in *family quantity* rather than in individual amount is valuable. To do this some practical way of disposing of the cooked products must be arranged. The lunch rooms of the school may serve as the means of disposal. In case the pupils of a school cook for the lunch room, the greatest care needs to be exercised by the teacher to place the responsibility of preparing a salable product upon the pupil. Too much assistance on the part of the teacher in directing the pupils' work and in deciding when a food is sufficiently cooked or baked, may interfere in developing initiative in pupils, — one of the aims to be accomplished in education. The plan of having each pupil prepare a food for the first time in individual quantity and then later in family quantity for the lunch room has proved satisfactory in some cases.

This text furnishes material for *a year's* work, if five lessons per week (at least ninety minutes in length) are given; or for *two years'* work, if the curriculum provides for but two or three lessons per week. If it is necessary to arrange a shorter course, certain lessons may be omitted or assigned for home work, or lessons may be combined.

If the teacher wishes to *correlate* food study with some other subject such as general science, or physiology, chemistry, or physics, the time may be extended, or the order of work may be changed to fit the particular requirements. Because many of the lessons of the first eight divisions treat of the uses of the foods in the body, they are especially good for correlation with physiology. The remaining lessons, many of which emphasize food composition, may be correlated to advantage with chemistry.

If for any reason an entire semester's work is to be devoted to table service, including the planning, buying, cooking, and serving of foods and determining the cost and computing the calorific value of the foods, the material found in *Related Work* — the lessons placed at the end of each division — will be found adequate for such a course.

BOOKS FOR REFERENCE

Bevier and Van Meter: Selection and Preparation of Food.
Brechner: Household Physics.
Brownlee and Others: Chemistry of Common Things.
Buchanan: Household Bacteriology.
Child Health Organization of America: Pamphlets.
Cooley and Others: Teaching Home Economics.
Conn: Bacteria, Yeasts, and Molds in the Home.
Department of Household Science, University of Illinois: Principles of Jelly-Making (Bulletin).
Farmer: Food and Cookery for the Sick and the Convalescent.
Farmer: The Boston Cooking School Cook Book.
Hill: Cooking for Two.
Hill: The Up-To-Date Waitress.
Holt: The Care and Feeding of Children.
Holt and Sedgwick: The Human Mechanism.
Holt and Shaw: Save the Babies, Pamphlet.
Kansas Agricultural College: Table Etiquette and Table Service (Bulletin).
Lincoln and Barrows: Home Science Cook Book.
Lusk: Elements of the Science of Nutrition.
Lusk: Fundamental Basis of Nutrition.
McCollum: The American Home Diet.
Mitchell: Fireless Cook Book.
Pattee: Practical Dietetics.
Richards, Ellen H.: The Cost of Food.
Rose: Feeding the Family.
Rose: Laboratory Handbook for Dietetics.
Sherman: Chemistry of Food and Nutrition, Second Edition.
Sherman: Food Products.
Styles: Human Physiology.
Taber: The Business of the Household.
U. S. Department of Agriculture: Bulletins.
Van Rensselaer and Others: A Manual of Home-Making.
Vulté: Household Chemistry.
Vulté and Vanderbilt: Food Industries.

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