TEXTBOOK OF COOKING

GREER

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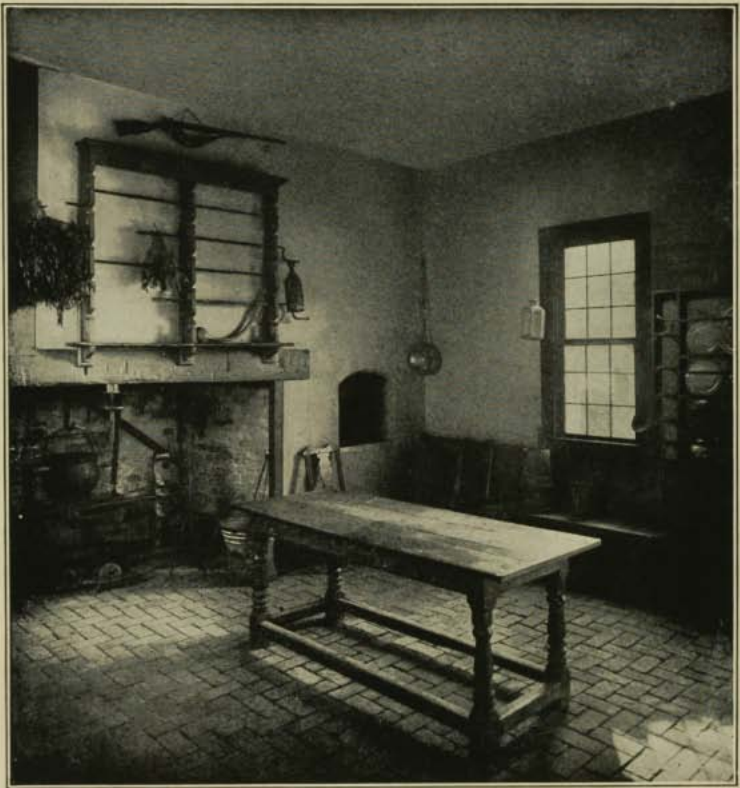
Junior I
1919-1920



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

A corner of Washington's kitchen at Mount Vernon.

A TEXT-BOOK
OF
COOKING

BY

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PREFACE

Skill in cooking is dependent not only upon much practice in the actual process of cooking, but upon the exercise of the powers of observation and reasoning.

This book aims to lay the foundation for skill in cooking by directing the pupil to follow established recipes and to treat processes of cooking as experiments in a scientific study. Recipes and directions for cooking are supplemented by suggestions which assist the pupil to appreciate the significance of each step he takes and to observe the change that is taking place in the substances he is using.

The use of this book does not preclude the use of the inductive method of teaching, which many teachers find satisfactory when no text-book is used. The lessons are arranged in such order that the teacher can develop a lesson in her own way from instruction previously given to the class, and can do this without any reference to the text-book except for the experiments and questions. A text-book, however, is invaluable for recipes and reviews, and, moreover, has the advantage of saving time; for it does away with note-taking, which in reality is dictation and which involves a tremendous expenditure of time.

An adaptation of the "meal method" 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.

Subjects follow the logical order, except where some other order is required because of the perishable or seasonable nature of the foods.

In the first portion of Part I, special emphasis is placed upon the uses of foods in the body; and in the second portion, food composition is given prominence. Part II has a study of table service and the food value of meals. This study of food value gives the pupil a new conception of the importance of planning meals with reference to the relative nutritive value of foods.

In this book are used adaptations of recipes from standard cook books.

Special thanks are due to Miss S. Gertrude Hadlow, High School of Commerce, Cleveland, for painstaking reading of the text; to Mr. F. W. Blaisdell, East Technical High School, Cleveland, for reading the manuscript; to Mrs. Mary Swartz Rose, Assistant Professor of Nutrition, Teachers College, Columbia University, for helpful suggestions concerning Part II; to Miss Mary E. Parker, Head of Department of Household Administration, Western Reserve University, for valuable criticisms; and to the following for the use of illustrative material: The Macmillan Company, D. Appleton and Company, William Wood and Company, The Journal of the American Medical Association, and the United States Department of Agriculture.

CLEVELAND,
June, 1915.

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FOREWORD

In "The Ethics of the Dust," Ruskin says:

"Cooking means the knowledge of Medea, and of Circe, and of Calypso, and of Helen, and of Rebekah, and of the Queen of Sheba. It means the knowledge of all herbs, and fruits, and balms, and spices, and of all that is healing and sweet in fields and groves, and savory in meats; it means carefulness and inventiveness and watchfulness and willingness, and readiness of appliance; it means the economy of your great-grandmothers, and the science of modern chemists; it means much tasting and no wasting; it means English thoroughness, and French art, and Arabian hospitality; and it means, in fine, that you are to be perfectly and always 'Ladies' — loaf-givers."

These words from the lips of one who devoted his life to the correlation of the beautiful and useful show that he considered cooking no homely art. And indeed it is an art that calls for much knowledge and skill and is worthy of one's best effort. It is not enough to follow directions in a recipe. One must infuse into cooking one's own thought and ingenuity.

There are many things one needs to know concerning the foods one is to prepare. 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. Since intelligent expenditure of the income is necessary for thrifty living, one needs to know how to get the best values in foods. For this, the composition and nutritive value of foods must be known. There are a great variety of foods in the present-day market; some are rich in nutrients; others contain little nourishment, yet are high in price.

After the foods have been purchased, the pupil should know *how* to prepare them. If he would attain the art of cooking, he must strive to understand perfectly what he is doing. This means that he must think, *i.e.* observe and reason, as he works. For example, as the pupil works from this text, he will learn the effect of heat upon the various materials contained in foods. If a food is to be cooked at simmering temperature, he must think of the effect of slight and of intense heat upon the materials making up the food and then draw his conclusions as to why cooking at simmering temperature brings better results than cooking at boiling or baking temperature.

Also the results of every process of cooking 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.

Science is classified knowledge. In applying science to the preparation of food, one class of foods or one principle of cooking is *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 readily be made. If the pupil has learned to prepare Creamed Potatoes, he 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.

The ability to observe and reason while working is one of the most valuable assets for success in any kind of work. Handwork guided by an active mind is always prized. Skill in cooking may mean the acquisition of characteristics which make for success in any field of activity.

In addition to the foregoing, a good cook must know what foods to *combine* for the most perfect nutrition and flavor; he must know how foods are *served* and how they are *digested.*

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.

One of the first considerations in the preparation of foods is, — why they are cooked. Let us see:

Raw potatoes sometimes occasion distress when eaten, yet cooked potatoes generally prove satisfactory food. To most people the taste of raw meat is unpleasant, yet meat properly cooked is exceedingly palatable. A tasteless green apple sometimes makes apple sauce of pleasing flavor. Raw pork may prove harmful, yet thorough cooking makes it safe to use as food. From these and many other examples that might be mentioned, it is evident that foods are cooked:

(*a*) To make them more digestible,
(*b*) To make them more palatable,
(*c*) To develop their flavor,
(*d*) To destroy harmful germs.

To sum up the considerations regarding success in learning to cook:

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

(*b*) Observe and reason when working. Also observe the results of the work; know why the results are successful or why they are unsuccessful.

(*c*) Relate or associate one class of foods with another and one principle of cooking with another. Remember that real cooking is classified knowledge. Cooking becomes a source of continued interest and pleasure if one consciously strives to accomplish these ends in preparing foods.

PART I

THE COOKING OF FOODS

DIVISION ONE

INTRODUCTION TO COOKING

LESSON I

Fuels and Combustion

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. — That fuels must be heated before they will burn is evident when one stops to think. 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.

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 sulphur, 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 them burn. The burning sulphur and phosphorus 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 is called the *kindling temperature* of that substance.

Oxygen; Draft. — 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 the following experiments:

Experiment 1: Lack of Draft. — 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?[1]

Experiment 2: Lack of Draft. — 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?

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

Experiment 3: Presence of Draft. — Remove the cover from the top of the chimney, and again light the candle. Does it continue to burn? Why?

QUESTIONS

Name the three requisites for combustion.

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

LESSON II

Coal and Gas Ranges

Examination of a Coal Range. — Remove the lids from the coal range. Note the location of the fire box. What is its

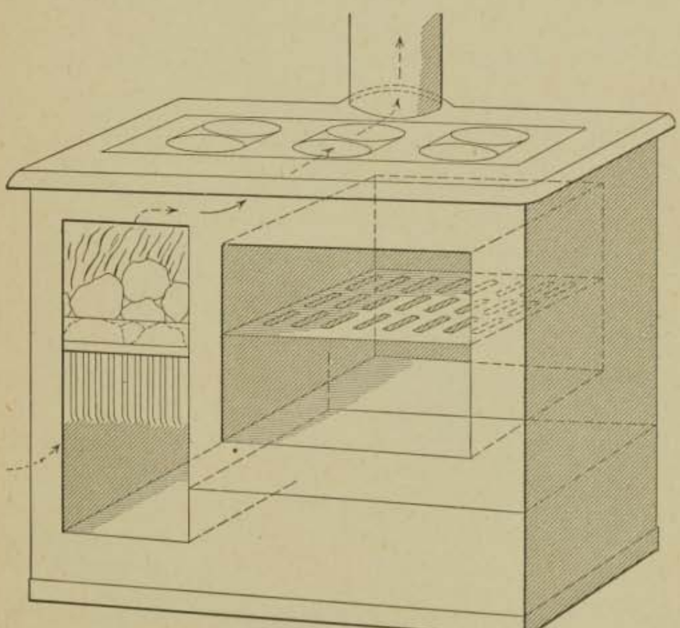


Fig. 1. — Coal range showing course of direct draft.

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 oven damper permits a direct draft to pass through the range. (See Fig. 1.)

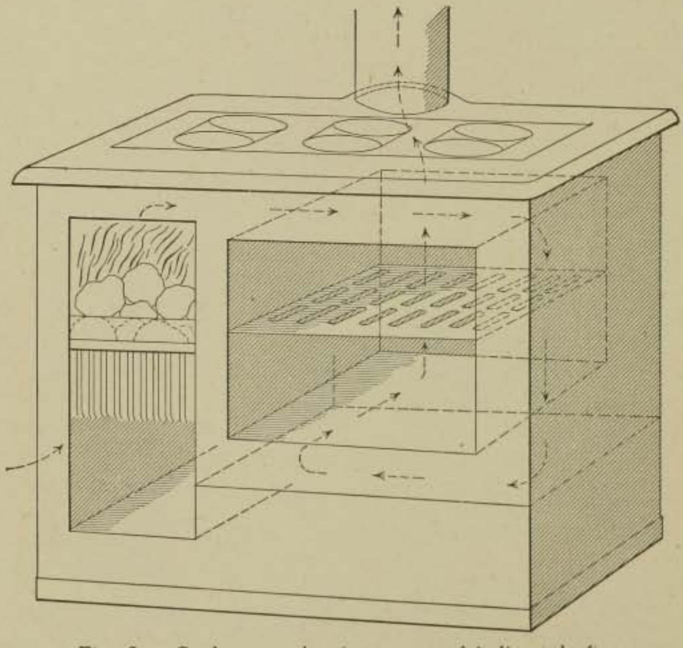


Fig. 2. — Coal range showing course of indirect draft.

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 Fig. 2.)

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

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 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." Use light paraffin oil for this purpose. Apply the oil with cotton waste, or a soft cloth. Rub off the excess of oil with fresh waste, cloth, or paper. Polish with flannelette or a 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.

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

(*a*) Supply pipe. (*c*) Burner.
(*b*) Stopcock. (*d*) Mixer. (See Fig. 3.)

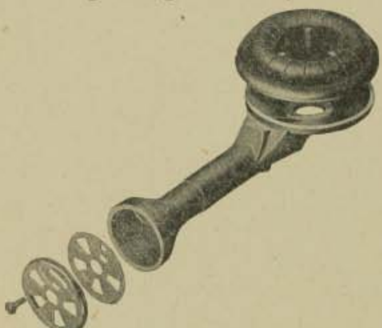
To light a gas burner, observe the following directions, and in the order named:

(*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.*

Fig. 3. — Gas burner showing mixer.

Experiment 4: 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 (see Fig. 4), giant (see Fig. 5), and simmering.

(*b*) Stopcocks of top burners.

(*c*) Oven burners.

(*d*) Stopcocks of oven burners.

(*e*) Pilot (if there is one).

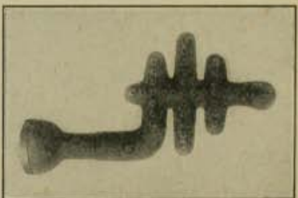
(*f*) Baking oven.

(*g*) Broiling oven.

(*h*) Warming oven and its burner (if there is one).

(*i*) Supply pipe.

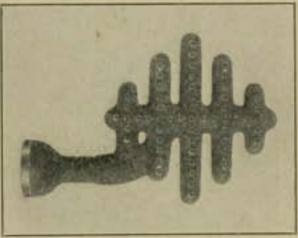
(*j*) Stovepipe.



Courtesy of *Reliable Stove Co.*

Fig. 4. — Gas burner (regular).

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.



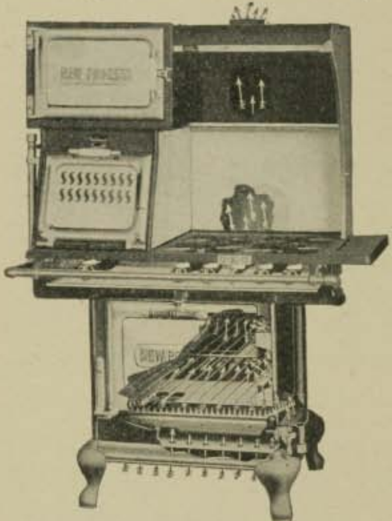
Courtesy of *Reliable Stove Co.*

Fig. 5.— Gas burner (giant).

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

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 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.

Ashes, soot, and smoke are called the *products of combustion*, and they contain many different materials. In the case of fuel gas, carbon and carbon dioxide are the products of combustion that most interest the householder. 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 necessity for 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 Fig. 6.)



Courtesy of the *New Process Stove Co.*

Fig. 6. — Gas range showing direction of draft.

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, *i.e.* not enough air is supplied for the quantity of gas consumed. Moreover, when combustion is incomplete, *carbon monoxide* sometimes escapes without burning. This is an exceedingly poisonous gas. Hence it is specially necessary for a householder to see that the gas burner is clean, well regulated, and properly constructed, so that sufficient air can unite with the gas to produce a blue flame.

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 flannelette or a 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.

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.

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?

LESSON III

Dishwashing

Note. — The writer feels that the only justification for inserting the directions for broiling tomatoes or baking squash in this lesson, is to relieve the prosaic yet necessary directions for dishwashing.

BROILED TOMATOES

Wash and cut tomatoes in halves, crosswise. Place them (with cut surface up) in a "frying" pan (without fat). Cook on top of the range or in the oven at a low temperature for about 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.

BAKED SQUASH

Wash a squash and cut it into pieces of suitable size for serving. Place the pieces on the grating in the oven and bake (at moderate temperature) until the pulp is tender. Serve hot, with butter, salt, and pepper.

Dishwashing. — Dishwashing is one of the unvarying duties of housekeeping, — a duty to which the principles of efficiency need most to be applied. The equipment for dishwashing should embrace a number of necessary labor-saving devices, so that the process may involve the least effort and time. There is almost invariably a waste of effort in both the washing and the drying of dishes.

Fig. 7. — Kitchen equipped for efficiency in dishwashing.

However, if forethought and intelligence are applied to the preparation of dishes for washing, the washing itself can be easily and quickly accomplished. And if the washed dishes are placed in dish racks and rinsed in very hot water, little towel drying, if any, is necessary.

Suggestions for "Efficiency" in Dishwashing. — (*a*) *Have the necessary equipment for thorough and rapid dishwashing.* Such equipment is as follows: Paper toweling, tissue paper,

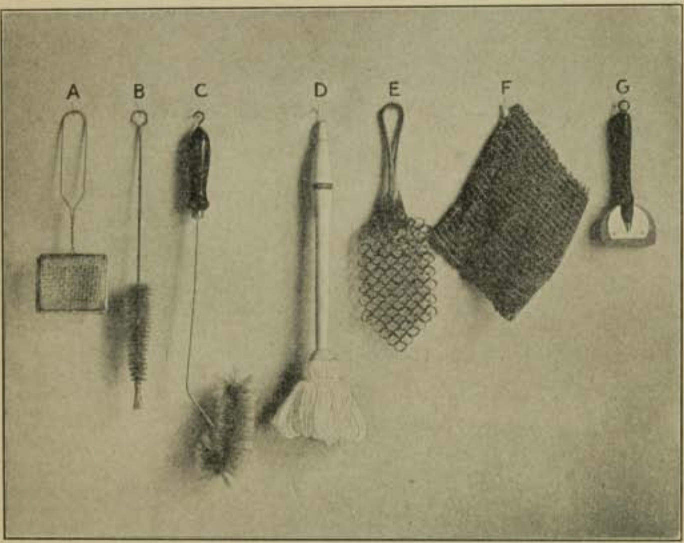


Fig. 8. — Utensils for dishwashing.

or newspapers cut in pieces of convenient size for use; soap holder (see Fig. 8, A) or can of powdered soap; can of scouring soap and a large cork for scouring; scrubbing brush; bottle brush (see Fig. 8, B, C); rubber tubing for attaching to the faucet; rubber disk to stopper the drainpipe of the sink; dish and draining pans; dish drainer; dish rack; dish mop (see Fig. 8, D); wire dishcloth or pot scraper (see Fig. 8, E, F); dishcloths (not rags); dish towels; rack for drying cloths and towels. The sink should be at a height that admits of an erect position while washing dishes.

(*b*) *Carefully remove bits of food from dishes before washing.* Instead of scraping dishes with a knife, wipe them with soft paper, a crust of bread, or use a plate scraper. (See Fig. 8, G.) "Oil and water do not mix"! The grease from dishwater often collects in the drainpipe and prevents or retards the drainage of waste water. This often means expensive plumber's bills and great inconvenience. Bear in mind the following familiar cautions in washing greasy dishes. Before putting a greasy dish or pan into the dishwater, 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 with hot water and then adding washing soda. Boil the solution a few minutes. Fat and washing soda combine and form soap; hence the effectiveness of the above method. (See Experiment 28, p. 78.) (This method should not be applied to aluminum utensils; washing soda or any alkaline substance "acts" upon aluminum.)

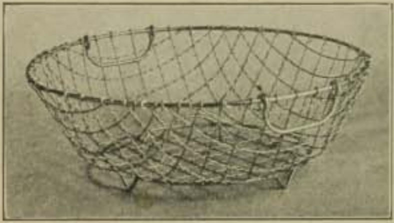


Fig. 9. — Dish drainer.

(*c*) *Soak every dish and pan before washing.* Fill each dish with water, using cold water for all dishes which have held milk, cream, eggs, flour, or starch, and hot water for all dishes having contained sugar or syrup. While one is preparing a meal, dishes may be soaked by having ready a large pan of water. Place all dishes in this as soon as used. If the sink is provided with a stopper, it may be filled with water and the dishes placed in it to soak.

(*d*) *Eliminate unnecessary movements.* Place the dishes and all the requisite dishwashing utensils together and arrange them in the proper order for use.

A large wire basket or dish drainer placed in the rinsing pan simplifies the rinsing and draining of dishes. Place the basket (see Figs. 9, 10) containing the dishes in the rinsing

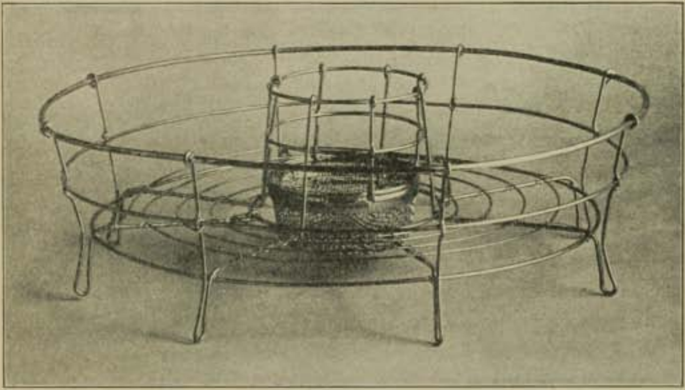


Fig. 10. — Dish drainer.

pan and then lift the basket out of the water to drain the dishes.

(*e*) *Be "efficient."* The following "efficiency" method for washing dishes in a sink has been suggested. A sink provided with a stopper over the drainpipe and with a rubber hose attached to the hot water faucet saves the use of several pans and eliminates lifting the dishes from one pan to another. Place the prepared dishes in proper order in the sink, and soak them as directed in (*c*) *Soak every dish and pan before washing* (p. 18). Then empty the water out of the dishes; arrange the stopper over the drainpipe and fill the sink with hot water. As the hot water issues from the hose, hold a soap holder at the mouth of the hose and "wash" the dishes by directing the water from the hose all over the dishes. This procedure usually cleans most of the dishes. A few may require washing with a cloth or dish mop. Then remove the stopper and drain off the soapy water. Replace the stopper and fill the sink with clear hot water. Lift the dishes out of the sink and place the china dishes on dish racks or drainers. (See Figs. 11 and 12.) If necessary, dry them. Then drain and dry the glasses and silver.

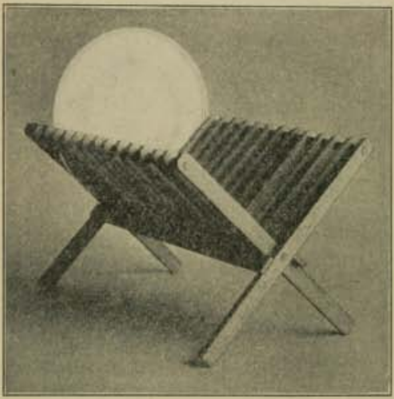
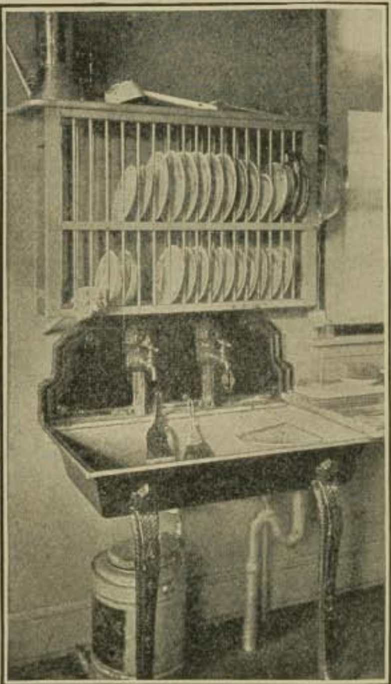


Fig. 11. — Dish rack.

Directions for Washing Dishes. — (1) *Preparation.* Prepare the dishes for washing by removing food and soaking as previously suggested. See (*b*): *Carefully remove bits of food from dishes before washing* (p. 18); and (*c*): *Soak every dish and pan before washing* (p. 18). Arrange the dishes in convenient order for washing, — place all of one kind together.

If the dishpan is used, fill it 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. Place a wire basket in the rinsing pan. See (*d*). *Eliminate unnecessary movements* (p. 19).

(2) *Washing and Scouring.* Do not put too many dishes in the pan at one time. 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 dishpan. In washing decorated china, use soap sparingly. Do not wash cut glass 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.



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

Fig. 12. — A rack for drying dishes.

Wash steel knives and forks and place them at once 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.

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 dishcloth 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 with cold water and scouring soap. Then rinse and wipe the scoured wood with a cloth which is free from grease. (Do not use the dishcloth for this purpose.) 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.

Drain the dishes as previously directed. See (*d*) *Eliminate unnecessary movements* (p. 19).

(3) *Drying.* Dry the glass and silver with a soft, fine towel. Towels made from flour sacks or from glass toweling are good for this purpose. 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.

(4) *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 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.

Experiment 5: 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 a spoon — tin or wood — should be used for acid foods? Why? (See *Suggestions for Cooking Fruits*, p. 32.)

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

Suggestions for Personal Neatness in the School Kitchen and at Home. — For both comfort and cleanliness a washable gown should be worn. It should be short enough to clear the floor.

The hair should be covered with a hair net or cap. Rings are an inconvenience when worn in the kitchen. Always wash the hands *before* preparing or cooking food and *after* touching the hair or handkerchief. Have a hand towel conveniently placed while cooking.

Ruskin says: "Good cooking means much tasting." *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

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

Why should dishes having contained sugar or syrup 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 cut glass be washed in warm (not hot) water?

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

Is the *cloth* used for washing dishes satisfactory for washing wooden table tops, pastry boards, etc.? Why?

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. 292.)

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

LESSON IV

Measurements

Experiment 6: Measurement Equivalents. — In measuring solid materials with teaspoon, tablespoon, or standard measuring cup (see Fig. 13), fill the measuring utensil with the material and then "level" it with a knife.

Fig. 13. — Measuring cup.

Use both water and sugar for the following measurements:

(*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.

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

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

A measuring spoon (see Fig. 14) is most convenient for measuring fractional teaspoonfuls.

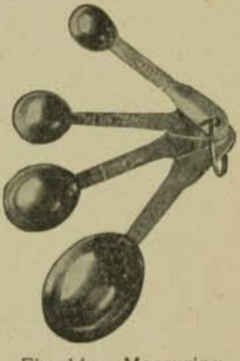


Fig. 14. — Measuring spoon.

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 th
far as possible, the exact quantity of a recipe
this text. When the quantity of an ingre
small for practical measurement, merely the name of the ingredient is given and no quantity indicated.

The amateur should, however, train his eye to approximate measurements. He 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. One would make a sad failure if he prepared just enough rice to serve four persons when six were seated at the table. He 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.

STUFFED TOMATOES

6 ripe tomatoes
2 cupfuls soft bread crumbs
1½ teaspoonfuls salt
¼ teaspoonful pepper
¾ teaspoonful mixed herbs
2 tablespoonfuls butter

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 butter, then add the seasoned bread crumbs to the butter. Fill the tomatoes with the prepared crumbs, place them in an oiled baking pan, and bake slowly (about 20 minutes) until the tomatoes are soft but not broken, and the crumbs brown. Test the tomatoes with a knitting-needle or skewer (see Fig. 15) 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 or earthenware utensil for cooking tomatoes. (See *Suggestions for Cooking Fruits*, p. 32.)

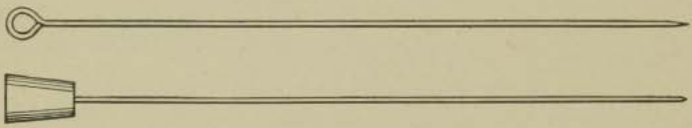


Fig. 15. — Skewer and knitting-needle for testing foods.

To Butter 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, or vegetable fats, olive or salad oil may be used for oiling pans or baking dishes.

SCALLOPED CORN

1 can corn	$\frac{1}{4}$ teaspoonful pepper
$\frac{3}{4}$ cupful milk	2 tablespoonfuls butter
$1\frac{1}{4}$ teaspoonfuls salt	2 cupfuls soft bread crumbs

Mix the corn, milk, and seasonings. Mix the crumbs and butter (see previous recipe), 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 20 to 30 minutes. Serve hot.

SCALLOPED TOMATOES

1 can or 1 quart tomatoes	$\frac{1}{8}$ teaspoonful pepper
1 tablespoonful salt	3 cupfuls soft bread crumbs
3 tablespoonfuls butter	

Mix the salt and pepper with the tomatoes and pour into a buttered baking dish. Cover with buttered crumbs (see Stuffed Tomatoes) and bake in a slow oven for $\frac{1}{2}$ hour or longer. Cover during first part of baking to prevent the crumbs from browning too rapidly. Serve hot.

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 a baking pan — tin, granite, or earthenware — is best to use for Stuffed or Scalloped Tomatoes? Why? (See *Suggestions for Cooking Fruits*, p. 32.)

Which contains the more moisture, — corn or tomatoes? From this explain the difference in mixing the crumbs in the corn and tomato mixtures.

What is the price of tomatoes per peck?

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

DIVISION TWO

ENERGY-GIVING OR FUEL FOODS: CARBOHYDRATES

LESSON V

Sugar: Digestion of Sugar

Fuel; Energy. — Heat for warming the atmosphere is obtained by burning a fuel (*i.e.* uniting a fuel with oxygen) in a stove. Heat for warming the body is obtained by "burning" *fuel foods* slowly in the body.

Heat is energy; some of the heat from burning fuel in a locomotive is used to move the train. In the body, the heat or the energy of the fuel foods gives the body ability to do work. Thus by means of fuel foods energy is supplied to the body.

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

Experiment 7: 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?

When a solid substance, by mixing with water, disappears in the water, the solid substance is *dissolved.* The granulated sugar was therefore dissolved in cold water, or it may be said that granulated sugar is *soluble* in cold water, or that water was the *solvent* of the sugar.

In your own words explain what is meant by a substance being soluble. What is meant by a solvent?

Experiment 8: The Solubility of Granulated Sugar in Hot Water. — Dissolve half a teaspoonful of granulated sugar in hot water. Compare with Experiment 7. Which dissolves sugar more readily, — cold or hot water? If you desired to dissolve some sugar, salt, or washing soda quickly, at what temperature would you have the water?

Experiment 9: The Solubility of Powdered Sugar. — Dissolve half a teaspoonful of powdered sugar in the same quantity of hot water used in Experiment 8. Does it dissolve more readily than granulated sugar? Explain this difference. If you desired to dissolve some lumpy sugar, salt, or washing soda quickly, how would you prepare it?

Solution and Digestion. — The change of foods in the body from insoluble to a soluble form is digestion. Foods are dissolved in the digestive juices of the mouth, stomach, and intestines. Since sugar is dissolved so readily in water, it would seem that its digestion would be easy. The digestion of some sugar is comparatively simple provided it is not too concentrated. The digestion of other sugar is 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. Excessive use of sugar should be avoided. If used in moderation and at the proper time, it is valuable in diet. (See *The Use of Candy in Diet*, p. 313.)

Effect of Heat on Sugar. — When granulated sugar is heated, it undergoes interesting changes. First it becomes lumpy; it then liquefies and becomes brown in color. This brown liquid is called *caramel.*

PEANUT CANDY

2 cupfuls granulated sugar
¾ cupful chopped peanuts
¼ teaspoonful salt

Heat the peanuts and salt together. Put the sugar in an iron pan. Place over a low flame and stir constantly until the sugar is changed to a light brown syrup. Add the chopped peanuts and salt, stirring them in as quickly as possible. Pour immediately into a hot, unbuttered pan. Divide into squares with a chopping knife.

Puffed cereals or *shredded cocoanut* 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.

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 an iron utensil should be used for caramelizing sugar.

Experiment 10: 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?

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?

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

LESSON VI

SUGAR WITH FRUITS (I)

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. When granulated sugar is boiled with an acid, it is changed in part to *invert* sugar, or the sugar becomes *inverted*. Invert sugar has a flavor different from that of granulated sugar. Some authorities say that it is not as sweet as granulated sugar. Others say that invert and granulated sugar differ in flavor and not in intensity of sweetness. However that may be, it is conceded that a less desirable flavor results — the fruit "loses" more of its "fresh flavor" — if the sugar is cooked with the fruit. Hence sugar should be added to the 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 syrup if it is desired to preserve its shape.

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, but because it contains the same substances as fruit, it is used as such.

As to nutritive value, fruits are divided into two classes: (*a*) flavor fruits and (*b*) food fruits. Fruits containing a large quantity of water, such as apples and oranges, are called flavor fruits. The flavor fruits contain very little nutriment. They are valuable in diet, however, for the acid they contain. These acids are pleasant in flavor and stimulate digestion.

Fruits containing a considerable quantity of sugar are called food fruits. Bananas and the dried fruits belong to this class.

Fruits should be used in abundance in the diet. When fresh fruits are out of season, the dried fruits are especially valuable as well as economical.

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 or earthenware 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, or in, the oven of a range 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 syrup of sugar and water, using one cupful of water and $\frac{1}{2}$ to 1 cupful of sugar. When the syrup is boiling, add the fruit and cook *gently* until tender. If the syrup is not thick enough when the fruit is tender, remove the fruit from the syrup, cook the syrup 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 taste and appearance. Do you notice any difference in the sweetness of the fruit?

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 7 and 8, pp. 28 and 29.)

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 syrup, 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.

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.

STEWED 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.

STEWED APRICOTS

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

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 7, p. 28.)

What is the purpose of soaking dried fruit before cooking?

What is the purpose of covering the fruit while soaking?

What is the present price per peck of apples? How many pounds in one peck?

What is the price per pound of fresh peaches? Of dried peaches? Using the data 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.

LESSON VII

Sugar with Fruits (II)

SCALLOPED APPLES

2 cupfuls soft bread crumbs	$\frac{1}{4}$ teaspoonful cinnamon
2 tablespoonfuls butter	$\frac{1}{2}$ teaspoonful nutmeg
3 cupfuls apples	$\frac{1}{2}$ lemon, — juice and rind
$\frac{1}{2}$ cupful sugar	$\frac{1}{4}$ cupful water

Butter the bread crumbs. Chop or cut the apples in small pieces, and add the remaining ingredients to the apples. Put $\frac{1}{4}$ of the crumbs in the bottom of a buttered baking dish, add $\frac{1}{2}$ of the apple mixture, then $\frac{1}{4}$ of the crumbs, the remainder of the apple mixture, and then cover with the remainder of the crumbs. Bake 40 to 60 minutes (until the apples are tender and the crumbs brown), in a moderate oven. 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

$\frac{1}{4}$ 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 for 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. (It will take about 15 minutes.) Serve as Scalloped Apples.

35

QUESTIONS

...red apples to become discolored ?

... of preparation of ingredients for Scalloped Apples ...tion of the apples will be avoided.

...edium-sized apples are required to make three cupfuls o... ...les ?

What is ...e 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 ?

When should sugar be added to fruit, — before or after cooking ? (See previous lesson.) Explain why this is not observed in the preparation of scalloped fruit.

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

[Note to the Teacher : — If desired, the lessons of Division Sixteen, *The Preservation of Food*, may follow this lesson.]

LESSON VIII

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.

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

Experiment 11 : The Starch Test. — Test various substances for starch, — corn starch, flour, rice, cream of wheat, wheatena, oatmeal, tapioca, potato, meat, and egg.

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

not soluble

Experiment 12: The Effect of Cold Water on Starch. — Mix ½ teaspoonful of cornstarch or flour with cold water in a test tube. How is a solid substance changed when dissolved? (See Experiment 7, p. 28.) 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 13: The Effect of Heat on Starch. — Hold to the light the starch and water mixture from Experiment 12. Is it opaque or transparent? Turn the mixture into a saucepan, heat, and stir it; return the mixture to the test tube 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 14: Stiffening of Cooked Starch. — Place the test tube containing cooked starch from Experiment 13 in cold water. After ten minutes examine it. Can you pour it out of the tube? How does cooked starch change when cooled?

Experiment 15: 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 somewhat like the fiber of wood. The skins of vegetables and fruits and the covering of seeds contain much cellulose. Indeed it forms not only the outside covering of fruits, vegetables, and seeds, but their interior framework as well. The fibrous material found in rolled oats consists almost entirely of cellulose.

Experiment 16: 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 cheesecloth 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 Fig. 16) 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.

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

Fig. 16. — Grains of starch.

a, potato starch; *b*, corn starch. (Much magnified.)

The cellulose of some plants in the raw condition can be eaten without distress by the normal person. However, the cellulose of many foods is very tough; it is necessary to soften it, if it is to be used as a food. This may be accomplished by cooking it. *Cellulose is valuable in diet because mineral matter* (p. 163) *exists with it; it also furnishes bulk to foods* and stimulates the flow of the digestive juices as it brushes against the walls of the digestive organs.

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

(*a*) They soften the cellulose.

(*b*) They change the starch to a paste or make it semi-soluble.

Foodstuffs Defined.— All the nutritious materials contained in foods can be grouped into five great classes. These classes of materials are called the *foodstuffs* (formerly called *food principles*). A few foods contain but one foodstuff, some contain several foodstuffs, many contain all the foodstuffs.

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 but one foodstuff. Cereals contain all of the foodstuffs. Cereals contain, however, a larger quantity of carbohydrate than any of the other foodstuffs, hence they are classed as carbohydrate 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 first in nutriment among the vegetable foods. Many of them contain about 75 per cent of starch. Because they are widely distributed in various climates, they have an important place in man's diet. Most of the cereals used as breakfast foods have a large quantity of cellulose. To make them palatable it is necessary to soften the cellulose and swell the large quantity of starch. This is accomplished by *long cooking,* the time of cooking depending upon the character of the cellulose and the method of preparation of the cereal for market.

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* 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.

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 1½ hours.

CREAM OF WHEAT OR WHEATENA

3 cupfuls boiling water
1 teaspoonful salt
½ cupful cereal

Prepare according to the general rule, cooking in the double boiler at least ½ hour.

A few minutes before taking from the fire, ½ 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?

REVIEW I. — MEAL COOKING

Menu[1]

A Seasonable Fruit Sauce
Breakfast Cereal
Broiled Tomato

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*) Learn proportions of materials, taking no written recipes to class.

(*d*) Study methods of preparation, making sure they are understood perfectly. 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.

(*b*) Cook a sufficient quantity of each food to serve one person.

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

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

[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 the usual class period.

(*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 IX

Cereals: Rice

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 [1] (cooked over boiling water)

1/3

3 cupfuls boiling water — 1 teaspoonful salt

1 cupful rice

Follow the General Rules for Cooking Cereals (p. 39); 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 Fig. 23) 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] *Unpolished* rice is the more desirable, because polished rice is deficient in mineral matter. Unpolished rice, however, requires longer cooking. It may be soaked in water before cooking.

BOILED RICE

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 Tomato or Cheese Sauce for class work.

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

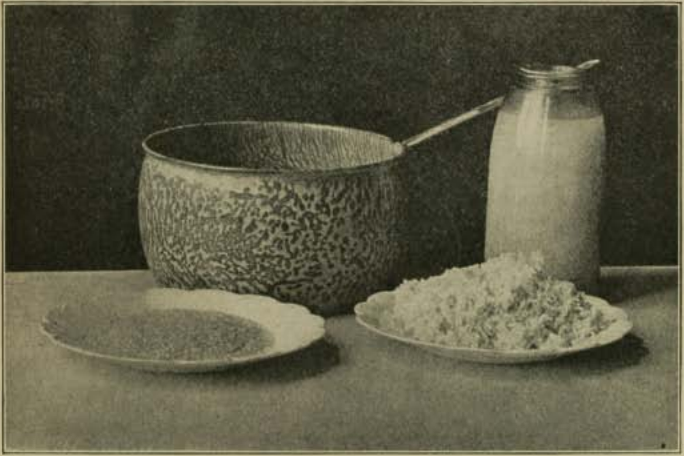


Fig. 17. — A cupful of rice before and after boiling; the large utensil required to boil it; the water drained from it.

Experiment 17: 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 it with iodine for starch. Is any of the starch from rice cooked over boiling water wasted? Which method of cooking rice leaves more nourishment in the cooked product?

TOMATO SAUCE (made with rice water)

Water in which 1 cupful rice (measured before cooking) was boiled.

1 cupful tomato pulp or 3 fresh tomatoes
2 slices onion — ¼ teaspoonful paprika
2 teaspoonfuls salt — ½ cupful grated cheese
2 tablespoonfuls butter

Evaporate the rice water to one pint. Add the tomatoes and onion and cook for 15 minutes. Remove the onion from the mixture. Add the remainder of the ingredients and stir until the cheese and butter are melted. Serve hot over cooked rice.

CHEESE SAUCE (made with rice water)

Omit the tomatoes and onion from the above recipe; increase the quantity of cheese.

Evaporate the rice water to one pint. Add 1 cupful of grated cheese, the seasonings and butter (given above). Stir until the cheese and butter are melted. Serve hot over cooked rice.

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. 39.)

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 14, p. 37)? Which is the better for molding, — boiled rice or rice cooked over boiling water? Why?

What is the advantage in using rice water to prepare Tomato or Cheese Sauce?

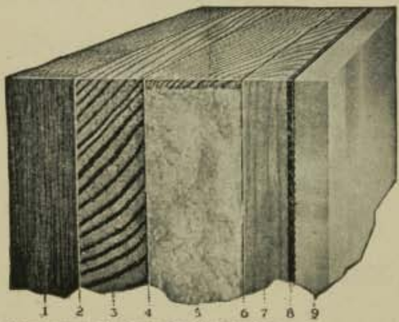
What other use could be made of rice water?

LESSON X

Cereals and the Fireless Cooker

The Fireless Cooker. — As was mentioned in Lesson VIII, the fireless cooker is a most satisfactory device for cooking cereals. It has been said: "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.

The Principle of Fireless Cookery. — In Experiment 5 (p. 22) it was found that wood did not transmit heat readily, 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 subtance 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. The walls of a well-built refrigerator consist of a number of layers of non-conducting materials. (See Fig. 18.)



Courtesy of *McCray Refrigerator Co.*

Fig. 18. — Insulated wall of a refrigerator.

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

Experiment 18: 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.

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. The most improved fireless cookers have a metallic or an enamel lining and are 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 Figs. 19 and 20.)

The principle of the fireless cooker is used on some of the modern gas and electric ranges. The walls of the ovens of

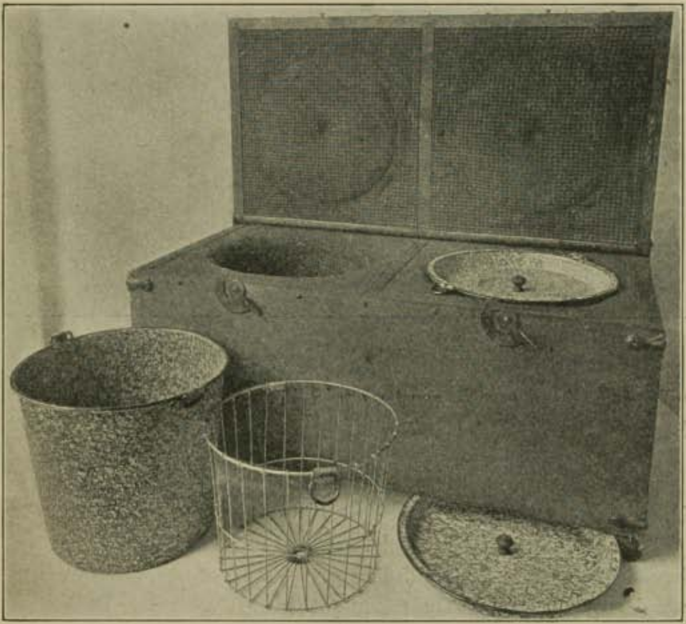


Fig. 19. — Fireless cooker.

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

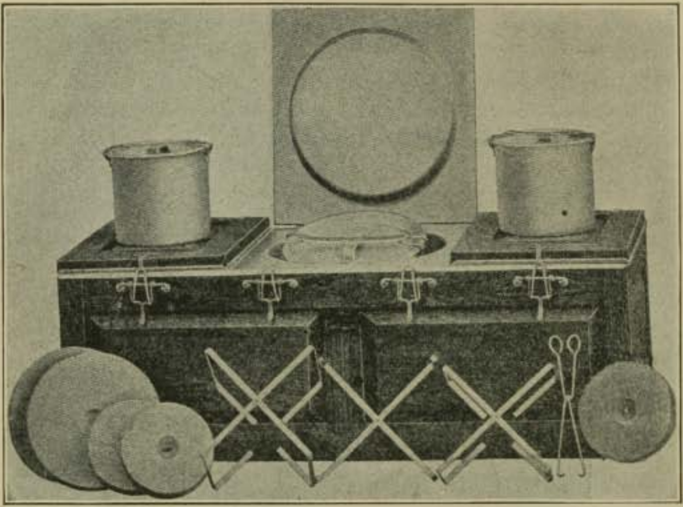


Fig. 20. — Fireless cooker with stone disks.

off. The food continues to cook, however, by the retained heat. (See Fig. 21.)

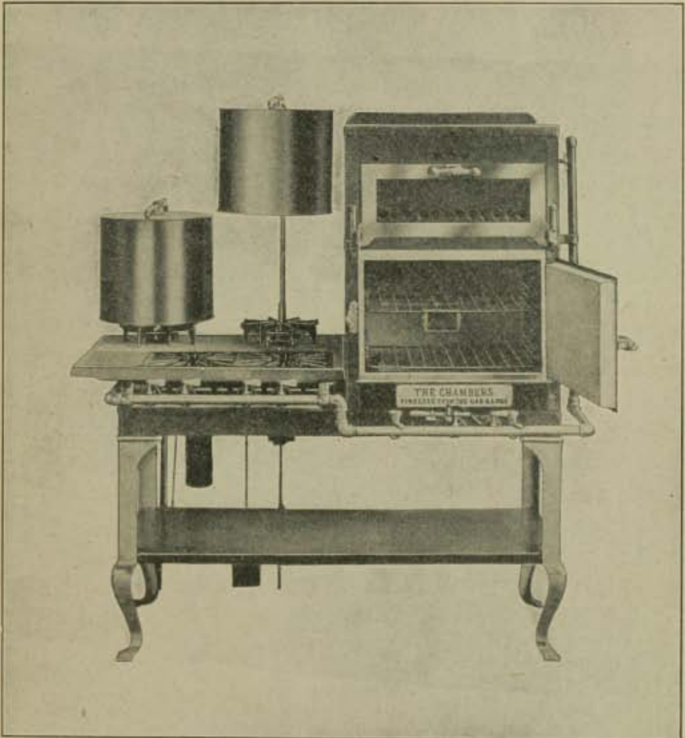
Suggestions for using a Fireless Cooker. — One should keep the following in mind in using the ordinary fireless cooker:

1. Have the food heated thoroughly before placing in the fireless cooker. If the foods are small, as cereals, 5 minutes' boiling is usually sufficient cooking 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 Fig. 19.) Or place the food in a pan with sloping sides and broad



Courtesy of the *Chambers Manufacturing Co.*

Fig. 21.—Gas range having fireless cooker attachment,—insulated oven and hoods.

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.*

Every thrifty housekeeper should possess and use a fireless cooker. It saves fuel, prevents the strong odor of food penetrating all parts of the house, lessens work and care in cooking, prevents burning and scorching, and provides workers and picknickers with warm lunches. A fireless cooker can be made satisfactorily at home with little expenditure of effort and money. Detailed directions for making a fireless cooker are given in several popular books. It has been found that paper crumpled so as to afford considerable air space is a satisfactory non-conducting material for a fireless cooker.

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.

If corn meal mush is to be cooked 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.

Corn Meal Mush for frying may be prepared in a double boiler according to the recipe given above. Cook it for several hours over boiling water.

RICE AND TOMATOES

½ cupful rice	1 cupful tomatoes
1 tablespoonful butter	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 butter, 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.

Rice and Tomatoes may be cooked in a double boiler until the rice is tender.

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. 215.)

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 XI

Cereals for Frying

"FRIED" MUSH

Cut corn meal mush for "frying" (see p. 51) into slices $\frac{1}{3}$ inch thick. Dip each slice in flour and brown in a little hot fat (oleomargarine, butter, 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. Serve the hot mush plain or with syrup.

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

FRENCH TOAST

1 or 2 eggs	1 cupful milk
$\frac{1}{4}$ 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, oleomargarine, 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 with a mixture of powdered sugar and cinnamon, or syrup.

CARAMEL SYRUP

½ cupful sugar ½ cupful boiling water

Caramelize the sugar (see Peanut Candy, p. 29). Add the boiling water carefully and allow the mixture to simmer until the caramelized sugar is dissolved. If necessary dilute or evaporate until the mixture is of the consistency of maple syrup. Serve with the above foods or with griddle cakes.

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?

Which is hotter, caramelized sugar or boiling water? How does the boiling water affect the caramelized sugar when poured upon it? From this explain why it is necessary to add the boiling water cautiously to the caramelized sugar in making Caramel Syrup.

If, after dissolving the caramelized sugar, the syrup is too thick, how can it be remedied? If too thin, how can it be remedied?

LESSON XII

Powdered Cereals used for Thickening

Experiment 19: 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 of the starch grains swelled and semisoluble?

To cook starch successfully, it is necessary to soften the cellulose and 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, it becomes necessary to mix it with certain materials so that the heat and moisture can penetrate every grain at the same time.

Experiment 20: 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 21: 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 22: 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.

BLANC MANGE

2 cupfuls milk	2 teaspoonfuls vanilla
$\frac{1}{4}$ cupful cornstarch	Nutmeg
$\frac{1}{4}$ cupful sugar	Salt

Scald the milk in a double boiler. Mix the sugar and cornstarch. Add the hot milk slowly to the sugar and cornstarch 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.

CHOCOLATE CORNSTARCH PUDDING

Proceed as for Blanc Mange, using $\frac{3}{8}$ cupful of sugar instead of $\frac{1}{4}$ cupful. Cut into pieces 1 square 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 cornstarch mixture just before taking from the fire. Add ½ teaspoonful of vanilla. Mold and serve as 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, cornstarch, 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 cornstarch, sugar, and hot milk mixture?

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. 39.)

Why is Blanc Mange 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?

What is the price per package of cornstarch?

How much does a package of cornstarch weigh and measure?

Which material — flour or cornstarch — is the cheaper to use for thickening?

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

LESSON XIII

TOAST: DIGESTION OF STARCH

Experiment 23: 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 (port-wine) color when treated with iodine.

Experiment 24: The Solubility of Dextrin. Pour the remainder of the browned flour from Experiment 23 into a test tube. Add water and shake. Pour through filter paper[1] into another test tube. (See Fig. 22.) 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?

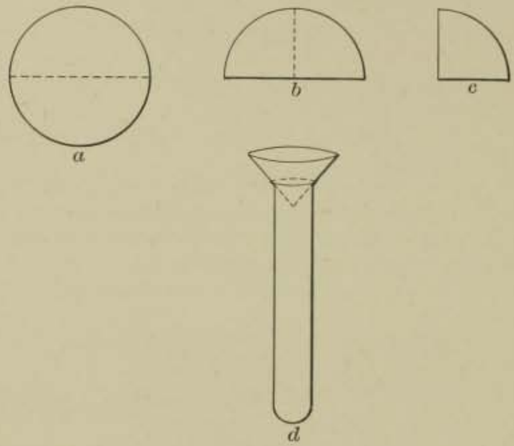


Fig. 22. — Method of folding filter paper.

From these experiments, we find that dry heat has changed insoluble starch into a soluble substance called *dextrin*. Dextrin is found in the crust of bread and in toast. Since digesting is dissolving, which is the more quickly digested, toast or the crumb of bread? Give reasons for your answer. (See *Solution and Digestion*, p. 29.)

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 and digestion and is easily digested or dissolved. (See Experiments 8 and 9, p. 29.)

[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.

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 dissolved or digested with difficulty.

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

CREAM TOAST

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

6 to 8 slices of toast

Heat the butter; 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. Twice this quantity of butter is sometimes used for making Cream Toast.

Digestion of Starch. — It was found in a previous lesson (Lesson V) that sugar is entirely soluble in water, and since digestion and solution are closely related, the digestion of some sugar is simple. Starch was found to be insoluble in cold water and only semisoluble 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 ferments which are in the saliva of the mouth and in the digestive juices of the intestines cause this change. To show that this change takes place to some extent in the mouth, try the following experiments:

Experiment 25: Starch in Cracker. — Test a bit of cracker with iodine for starch. What indicates the presence of starch? Does the cracker contain starch?

Experiment 26.: Action of Saliva upon Starch. — Thoroughly chew a bit of cracker, remove from the mouth, and place upon a piece of paper. Test it with iodine. A purple (port-wine) color indicates a soluble carbohydrate. (See Experiment 24, p. 55.) What substance does the masticated cracker contain? Explain the change that has taken place in the cracker by mastication.

QUESTIONS

Give the reason for mixing flour and butter as directed in White Sauce. (See Experiment 22, p. 54.)

What is the proportion of butter 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 easily digested? Give reasons for your answer.

REVIEW II. — MEAL COOKING

Menu

Boiled Rice with Tomato or Cheese Sauce
Chocolate Corn Starch Pudding

See Review I, p. 41, for suggestions regarding the preparation of the lesson.

LESSON XIV

Root Vegetables (I)

Starch in Plants. — Plants have their stored-up food in the form of starch. The parts of the plant underneath the ground 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 some starch and sugar. Turnips contain much cellulose.

Comparison of Vegetables cooked with or without the Skins, and in Water or in Steam.[1] — Clean, prepare, and cook in water a pared and an unpared potato, a scraped and an unscraped carrot, and cook in steam a pared potato and a scraped carrot.

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.

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

Which vegetables without the skins, — those cooked in

[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 oook in water and in steam, potatoes and carrots as directed above.

water or those cooked in steam, — lose the more nutriment?

As far as 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
¼ teaspoonful salt
1 tablespoonful butter
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. 57.) 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?

General Rules for Cooking 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 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. If the outside skin of a vegetable is removed, it should be pared as thin as possible. Turnips are an exception to this rule; note the thick layer of cellular material covering them. The covering of the carrot and new potato is so thin that it can be removed by scraping, thereby saving the valuable nutritive substance just beneath the skin.

Courtesy of *Geo. H. Bowman Co.*

Fig. 23.—Utensil for steaming, —"steamer."

Most root vegetables may be baked, steamed (see Fig. 23), or cooked in boiling, salted water, using one teaspoonful of salt for each quart of water. The water 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.

Most satisfactory results may be obtained by *steaming* vegetables. By using this method, vegetables can be pared and cut into pieces and then cooked with little loss of nutrients.

TIME FOR COOKING VEGETABLES IN WATER

Potatoes	25–30 minutes
Sweet Potatoes	15–25 minutes
Carrots	35–45 minutes
Turnips	45 minutes
Beets (young)	45 minutes
Beets (old)	3–4 hours
Parsnips	30–45 minutes
Green Corn	12–20 minutes

BOILED POTATOES

In cooking potatoes, observe the General Rules for Cooking Vegetables. Cook until the potatoes are soft when pierced with a fork or knitting needle. 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. — Vegetables may be creamed by cutting them into cubes when cooked, 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. A scalloped vegetable should be served from the dish in which it is baked.

WHITE SAUCE FOR VEGETABLES

	1½ tablespoonfuls flour 1 tablespoonful butter	½ teaspoonful salt
or		White pepper
	2 tablespoonfuls flour 1½ tablespoonfuls butter	½ cupful milk ½ cupful vegetable stock

Cook as directed for Cream Sauce. (See *Cream Toast*, p. 57.) 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	White pepper or cayenne
⅛ teaspoonful salt	1 tablespoonful butter

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

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?

How should the water boil in cooking vegetables? Why?

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

LESSON XV

Root Vegetables (II)

Experiment 27: The Effect of Soaking Starchy Vegetables in Water. — Over several pieces of potato or other starchy vegetable 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?

BEETS

Scrub beets carefully so as not to break the skin. Leave two or three inches of the stems on until the beets are cooked. Cook whole. (Refer to the *General Rules for Cooking Vegetables*, p. 60.) 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, 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.

SWEET POTATOES

Cook with or without the skins according to the General Rules for Cooking Vegetables (p. 60). 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, sprinkled with a very little sugar. and browned in the oven.

SWEET POTATOES (Southern Style)

3 tablespoonfuls butter	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 of the water should be evaporated when the potatoes are cooked. That which remains should be poured over the potatoes as a sauce for serving. For the purpose of economy, less butter may be used.

Sweet potatoes may also be cooked in a casserole in the oven. Uncover the casserole when the potatoes are almost tender, in order to brown them.

GREEN CORN

NOTE: — Although green corn is neither a root nor a tuber, it contains carbohydrates in sufficient quantity to be grouped with these vegetables.

In selecting corn for cooking, choose ears of corn with brown silk. Tear off some of the husk and select 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.

BOILED 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. Corn may also be cooked by cutting through the center of each row of grains, slicing off the tops of the kernels, scraping the pulp thoroughly from the cob, seasoning with salt and pepper, adding a little milk and butter, and allowing to simmer for a few minutes.

QUESTIONS

Why should vegetables be placed in boiling rather than in cold water for cooking? (See Experiment 27, p. 63.)

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

Since sugar is manufactured from beets, the latter must contain considerable sugar. From this fact and the results of Experiment 8 (p. 29), explain why beets must not be pared or cut in pieces before 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.

From your grocer, find out in what quantities white potatoes and sweet potatoes are usually purchased. What is the price of each? Calculate the difference in cost of 1 peck or 15 pounds of each.

What is the purpose of serving corn on a folded napkin?

In cutting corn from the cob, why slice off the tops of the kernels and then scrape the pulp, rather than slice the entire kernel from the cob?

What is the price per dozen ears of green corn?

LESSON XVI

Root Vegetables (III)

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 almost entirely of starch. In its preparation, tapioca is heated so that some of the starch grains are swelled. The starch of tapioca is thus 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, 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. 39.) 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 moderate oven 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 syrup 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.

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 cornstarch.

The quantity of fat used with the flour of white sauces (see p. 68) is less than the flour. But it is difficult to separate starch grains when the 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. 54.) In the recipe for Lemon Sauce on page 68, 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 (Vegetables (see page 63), gravy, tomato sauce, etc.)	2 tablespoonfuls,	1½ tablespoonfuls,	1 cup
Thick White Sauce (Gravy, tomato sauce, etc.)	3 tablespoonfuls,	2 tablespoonfuls,	1 cup
Very Thick White Sauce (Croquettes, etc.)	4 tablespoonfuls,	3 tablespoonfuls,	1 cup

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

LEMON SAUCE

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

Mix sugar and flour thoroughly; then slowly add the boiling water. Cook 15 minutes. Add the lemon juice and rind, then the butter. Stir until the butter is melted, when the sauce will be ready to serve.

QUESTIONS

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

What is the use of flour in Lemon Sauce? Why is the flour mixed with the sugar before adding the boiling water? (See Experiment

21, p. 54.) 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. When considering the digestion of fats, which is the preferable method? (See *Digestion of Pastry*, p. 254.)

LESSON XVII

Vegetable Cream Soups (I)

Thick Soups. — Various vegetables, grains, and fish are used in making Cream Soups and Purées. The vegetables are cooked and mashed or forced through a strainer and then combined with milk and often with the 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, 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: ½ 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, or vegetables and meat are combined as: Peas and beans, corn and beans, or corn and cauliflower, or any vegetable with chicken, veal, lamb, or beef stock.

POTATO SOUP

3 potatoes	1 tablespoonful flour
1 pint milk or	$1\frac{1}{2}$ teaspoonfuls salt
1 pint milk and water	$\frac{1}{8}$ teaspoonful white pepper
2 slices of onion	Celery salt
$\frac{3}{4}$ tablespoonful butter	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 *slowly* in the oven until a golden brown. Stir often. Serve with soups.

Save the crusts and prepare Dried Bread Crumbs with them. (See p 72.)

QUESTIONS

What is the proportion of flour and liquid in one cup of White Sauce for Vegetables? (See p. 63.)

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. 56.)

REVIEW III. — MEAL COOKING

Menu

Stewed Dried Fruit
French Toast
Creamed Potatoes

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON XVIII

Vegetable Cream Soups (II)

Food Value of Soup. — Soups contain much water, hence their food value is not high. However, they are a valuable part of a meal; a hot liquid taken into an empty stomach is easily assimilated, acts as a stimulant, and thus prepares for the digestion of the remainder of the meal.

CORN SOUP

1 can of corn or cornlet	2 tablespoonfuls flour
1 pint water	1 teaspoonful salt
1½ tablespoonfuls butter	⅛ teaspoonful white pepper
1 slice onion	1 pint milk

Add the water to the corn or cornlet and *simmer* 20 minutes. Melt the butter, 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.

SOUP STICKS

Cut stale bread into slices, remove the crusts, and spread with butter. Cut into strips and brown slowly in the oven. Save the crusts and prepare Dried Bread Crumbs with them.

DRIED BREAD CRUMBS

Dried Bread Crumbs may be prepared from crusts and small pieces of bread. Dry the bread in a slow oven 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. 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 Fig. 24.)

Fig. 24. — Jar of dried bread crumbs.

QUESTIONS

Explain why soup is 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 *Boiled Green Corn*, p. 65.)

What is cornlet? What is the price per can of corn and of cornlet?

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?

LESSON XIX

Starchy Foods Cooked at High Temperature

Steam under Pressure. — Because there is a large proportion of cellulose and starch in cereals, and because the cooking of cereals is done for the most part at a temperature below the boiling point of water, it is necessary to cook them for a considerable time. It is possible, however, to cook some starchy foods *at a high temperature in a short time.*

Fig. 25. — Steam without pressure, and steam under pressure.

Is the steam coming from boiling water in an uncovered saucepan or teakettle hotter than steam which has been held underneath the lid of a covered saucepan or teakettle? (See Fig. 25.) Steam confined in a small space or held under pressure may reach a temperature higher than that of boiling water. Popcorn 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.

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 the starch of a baked potato is more thoroughly cooked and therefore more easily digested. When the potato is baked, no nutrients are lost.

POP CORN

Moisten popcorn 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. 1

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. 2

1 tablespoonful butter and 1 tablespoonful lard or
2 tablespoonfuls olive oil ½ cupful shelled popcorn
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

Place scrubbed potatoes on the grate of a *hot* oven. (Potatoes should be baked in a *hot* oven, to prevent them from becoming waxy or soggy.) Bake until they are soft when tested with a fork or knitting needle. 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. It is well to place the steaming potatoes on a folded napkin for serving.

STUFFED POTATOES

2 tablespoonfuls butter	1 teaspoonful salt
3 tablespoonfuls milk	Pepper
6 baked potatoes	

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 until browned.

QUESTIONS

Explain why popcorn 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 23, p. 55.) Explain fully why baked potatoes are more easily digested than boiled potatoes. (See Experiment 23 and *Solution and Digestion*, p. 29.)

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. 59.)

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?

DIVISION THREE

ENERGY-GIVING OR FUEL FOODS: FATS AND OILS

LESSON XX

Fat as a Frying Medium

Comparison of Fat and Carbohydrates. — Fat and oil form another great class of energy-giving or fuel foods. In the body, these foods, like carbohydrates, give energy; in fact they furnish more than twice as much energy as carbohydrates. In comparing their energy-giving power, fat and carbohydrates have been likened to coal and wood. If a lump of coal and a block of wood of exactly the same size are burned, one knows that the wood will burn up quickly while the coal will burn for a much longer time, and, in so doing, will give off more heat. There is about as much fat 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. Carbohydrates (like wood) burn quickly but give off less heat.

Fat and oil are very similar, oil being fat that is liquid at ordinary temperature.

Lard and its Substitutes. — 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, but 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.

Butter and its Substitutes. — Butter is one of the most expensive foods of a household. Its use, therefore, should be carefully considered. In flavor, it is perhaps the most pleasing of all the solid fats. For some purposes, nothing is as desirable as butter; yet in 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. Oleomargarine and some of the butter and lard substitutes may be used. Every thrifty housekeeper should have butter and several other 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 lard, or suet and chicken fat.

To try out Fat. — Remove the tough outside skin and lean parts from 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. When the fat is still, and pieces of tissue are shriveled at the bottom of the kettle, cool, strain through a cloth or a very fine strainer, and set aside to become firm.

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.

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 28: Saponification of Fat. — Into a test tube put ½ teaspoonful of washing soda and 1 teaspoonful water, then heat until the washing soda is entirely dissolved. Melt 1 teaspoonful of lard 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 *Carefully remove bits of food from dishes before washing*, p. 18.)

Fats for Deep-fat Frying. — Olive oil, cotton seed oil, cottolene, beef drippings, and lard, or a mixture of several fats are used for cooking. The best fat for frying is that which can be heated to a very high temperature without burning. For this reason olive oil is the best and butter the poorest fat for frying. Olive oil is, however, too expensive for practical use. One of the cheaper vegetable fats, or a mixture of one third beef drippings and two thirds lard is perhaps the most advisable for deep-fat frying.

Experiment 29: Bread fried in "Foaming" Fat (Class Experiment). — Put some vegetable fat, or lard and suet, in an iron pan and heat. Note carefully the change that takes place in fat as it heats. When the fat "foams" or bubbles, 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 "foaming" fats?

Experiment 30: The Temperature of Fat for Frying (Class Experiment). — Continue to heat the fat of Experiment 29. When blue fumes begin to rise from the fat, 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 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. (See *To Clarify Fat*, p. 78.)

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.

FRIED OYSTERS

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. 285.) Season with salt and pepper. Beat the eggs slightly and dilute by adding one tablespoonful of water or strained oyster juice to each egg. Season the dried bread crumbs. Dip the 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.

LESSON XXI

Fat as a Frying Medium; Digestion of Fat

Experiment 31: Action of Oil and Water. — Pour a little salad 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?

Breaking up of Fats. — Fats and oils are not soluble in any substance found in the digestive juices, but they are acted upon by a ferment and by an alkaline substance found in the pancreatic juice. The ferment breaks up some of the fat into a fatty acid and glycerine. (An example of a fatty acid is found in rancid butter. Its presence in butter causes the strong odor.) At some time during digestion, probably before its separation,[1] 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. To show the action of soap solution on fat, try the following:

Experiment 32: Emulsion of Fat. — In a test tube put a bit of soap and 2 tablespoonfuls of water. Heat until the soap is melted. Add ½ teaspoonful of salad 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 31? In what form does the fat now exist?

If fats are emulsified by means of soap, one might ask where the soap comes from in the process of digestion? The 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. Although there is some difference of opinion as to which process of fat digestion takes place first, it is now generally agreed that fat is absorbed as fatty acid and glycerine.

FISH BALLS

1 cupful salt codfish	1 egg
4 small potatoes	½ tablespoonful butter
⅛ teaspoonful pepper	

[1] See "Textbook of Physiology," by Wm. H. Howell, p. 731.

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, butter, 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.

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?

REVIEW IV. — MEAL COOKING

Menu

Corn Soup
Baked Potato
Scalloped Fruit

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON XXII

Fat as a Frying and Sautéing Medium

Sautéing and Frying. — *Sautéing* is browning in a small quantity of fat, and *frying* is browning in deep fat. At best, foods coated with fat are somewhat difficult of digestion. Fat is not soluble in water (see Experiment 31, p. 80) and forms a seal about other materials, thus hindering their solution or digestion. 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 than when fried. The greatest care should be taken, 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 29 and 30, pp. 78, 79), the food as dry as possible, and the browned food drained on paper. Although hot fat must be used for frying, care should be taken not to overheat it. Fat is rendered unwholesome by overcooking.

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 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. 80.) Fry in deep fat until brown.

RICE CROQUETTES

1 pint cooked rice	White pepper
2 or 3 tablespoonfuls milk	Cayenne
3 tablespoonfuls butter	1 egg
½ teaspoonful salt	2 teaspoonfuls chopped parsley

Warm the rice in a double boiler with enough milk to moisten it. Add the butter, seasoning, and beaten egg and cook until the egg thickens. Spread the mixture on a plate. When cool, shape into cylinders. Dip in dried bread crumbs, egg, and dried bread crumbs again. (See *Fried Oysters*, p. 80.) Cook in deep fat, drain, garnish, and serve.

SWEET RICE CROQUETTES

To make Sweet Rice Croquettes, omit white pepper, cayenne, and parsley; add 2 tablespoonfuls of powdered sugar and the grated rind of ½ lemon. Shape in the form of nests. Roll in dry bread crumbs and egg as above. Fry, drain, place a cube of jelly in each nest, and then serve.

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 note under Peanut Candy recipe, p. 30.)

What happens to foods that are cooked in fat too cool for frying? (See Experiment 29, p. 78.)

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?

DIVISION FOUR

ENERGY-GIVING AND BODY-BUILDING FOODS: PROTEIN

LESSON XXIII

Eggs[1]

Protein, a Body-Builder. — A steam engine requires not only fuels for its greatest usefulness but occasional repair. The body also needs both fuel and repairing materials. However, a steam engine needs only occasional repair, while the body needs constant repair. The function of the 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 and repair it. The process of repairing takes place in the body cells. Hence the body differs from an engine in that it possesses the property of self-repair. Since the slightest using of the body causes the wearing away of some of the tissues, the body-building power of protein is especially important.

Albumin in Eggs. — One of the protein substances occurring in foods in large quantities is albumin. Eggs contain considerable albumin. The white of egg consists of albumin and water enclosed in millions of cells.

When the egg white is separated from the yolk and the

[1] Note to the Teacher. — If the egg lessons come in the mid-winter months, they may be omitted until eggs are reasonable in price; or the "theory" concerning eggs and the experiment concerning the temperature of cooking protein foods may be given, and the cooking of eggs may take place later in the year.

shell, explain why it remains massed together, *i.e.* does not separate into particles. partly

Experiment 33: The Solubility of Albumin. — 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, add a little cold water, and shake the tube. Is albumin soluble in cold water? How do you account for the foaming on the surface?

Experiment 34: The Coagulation of Albumin. — Apply heat to the diluted white of egg of Experiment 33. Into what form is the liquid albumin changed by heat? coagulated

When eggs are cooked, the albumin in the white stiffens or *coagulates*. The yolk also contains a kind of protein which coagulates when heated.

Experiment 35: 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 Fig. 26). 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?

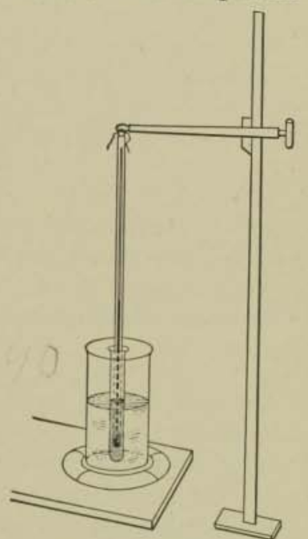


Fig. 26. — Apparatus to determine temperature at which eggs coagulate.

Experiment 36: Comparison of Cooked and Boiled Eggs. — Remove *at once* about half of the coagulated egg from the test tube of Experiment 35. 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 most 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. — Since the more tender egg would dissolve more readily, it would seem that it would digest much more quickly. It is true that eggs cooked below the boiling temperature will digest in a little less time than those cooked in boiling water. However, since 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.

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 before using. 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 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 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. In cooking with other materials, preserved eggs may be used; but only fresh eggs should be served plain, or in omelets or other egg dishes.

(*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.

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 above method, 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.

[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.

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 some other food (see *Goldenrod Eggs*, p. 91). 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 XXIV

Eggs: Digestion of Protein

The digestion of protein begins in the stomach and continues in the intestines. The pepsin and hydrochloric acid of the stomach, the trypsin of the pancreatic juice, and the erepsin of the intestinal juice change protein into soluble forms.

Experiment 37: Digestion of Protein. — With a fork break 2 teaspoonfuls of a soft-cooked white of an egg into fine pieces. Add to it 7 teaspoonfuls of the diluted hydrochloric acid solution.[1] Rub the bits of egg-white with a spoon against the sides of the dish. Then add one teaspoonful of acid pepsin solution.[1] Pour the mixture into a bot-

[1] Note to the Teacher. — For the dilute hydrochloric acid solution use 5 cubic centimeters (1 teaspoonful) of hydrochloric acid with 295 cubic centimeters (1¼ cupfuls) of distilled water. For the acid pepsin solution use $\frac{1}{10}$ gram (⅛ teaspoonful) of pepsin with 150 cubic centimeters (⅝ cupful) of the dilute hydrochloric acid solution.

tle or test tube, cork, place in warm water (about 126° F.), and set aside in a warm place. After 1½ hours examine. Is the white of egg or albumin dissolved, *i.e.* digested? Tell how this may be compared with the digestion of protein in the stomach.

Experiment 38: Effect of Vinegar on Albumin. — Add some vinegar to a little egg-white. Allow to stand, and after a few minutes, examine. How has the egg been changed by the acid? What practical application in the cooking of eggs can be made from this experiment? (See Poached Egg below.)

POACHED EGG

Fill a shallow pan about two thirds full of boiling water. Add ½ teaspoonful of salt and 1 teaspoonful of vinegar 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 ring. Cover the pan and place it where the water will keep hot *but not boil.*

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.

GOLDENROD EGGS

4 hard-cooked eggs	1½ tablespoonfuls butter
2 tablespoonfuls flour	1½ cupfuls milk
⅛ teaspoonful pepper	6 pieces of toast
¾ teaspoonful salt	Parsley

Separate the yolk and white of the cooked eggs, and chop the whites. Make a white sauce of flour, seasoning, butter, 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. 57.)

QUESTIONS

Explain why the chopped hard-cooked eggs in Goldenrod Eggs should be more easily digested than plain hard-cooked eggs. (See Experiment 9, p. 29).

LESSON XXV

EGGS: OMELETS (I)

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 been found most 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 39: 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 40: 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 41: 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 tablespoonful 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 not tough, remove from the double boiler and serve at once.

FOAMY OMELET

4 eggs	½ teaspoonful salt
4 tablespoonfuls milk or water	Pepper
2 teaspoonfuls butter	

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 butter 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 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 Fig. 27.)

NOTE. — It will be noticed that no directions for frying eggs have been given. The reason for this is evident when the digestion of foods coated with fat is taken into consideration. (See *Digestion of Pastry*, p. 254.)

QUESTIONS

How are Scrambled Eggs usually cooked? From your work concerning the effect of heat upon eggs, explain why you should use the method given above for Scrambled Eggs.

Fig. 27. — Method of turning omelet upon a platter.

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 the above recipes for Scrambled Eggs and Foamy Omelet?

REVIEW V. — MEAL COOKING

Menu

Cereal with Fruit
Poached Egg on Toast

See Review I (p. 41.) for suggestions regarding the preparation of the lesson.

LESSON XXVI

Eggs: Omelets (II)

WHITE SAUCE OMELET

3 tablespoonfuls flour	2½ tablespoonfuls butter
½ teasponful salt	1 cupful milk
Pepper	4 eggs

2 teaspoonfuls butter

Make a White Sauce of the milk, butter, 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.

Modifications 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 ½ 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 XXVII

Milk; Milk with Cocoa and Chocolate

Value of Milk. — Although more than four fifths of milk is water, it contains valuable nutritive substances and must properly be considered a food, rather than a mere beverage or thirst quencher. One of the most valuable foodstuffs in milk is protein. This exists in the form of *casein* and *albumin.* Almost all of the protein is casein, there being little albumin. The latter has about the same properties as egg albumin. Casein 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 a ferment occurring in the digestive juice of the stomach.

Experiment 42: Scalding Milk. — Fill the lower part of a double-boiler one third full of boiling water. Put ½ cupful of milk in the top of the double boiler, cover, and heat over the boiling water. In a few minutes examine. What foodstuff in the milk has coagulated to form the coating over the top? 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 never well to boil milk unless it is necessary to sterilize it.

Cocoa and Chocolate. — 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 nutritious. They are foods, not mere beverages or thirst quenchers. Cocoa and chocolate also contain stimulating materials.

Chocolate is not soluble in water. Therefore, it 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 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 teaspoonful cornstarch	¼ cupful sugar
1 cupful water	⅛ teaspoonful salt

Mix cocoa, cornstarch, and water together 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. The cornstarch may be omitted.

CHOCOLATE

2 squares chocolate	3 cupfuls milk
1 cupful boiling water	⅛ teaspoonful salt
⅓ cupful sugar	½ teaspoonful vanilla

Cut the chocolate into bits and put it in a pan; add the boiling water. 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 may be served with chocolate.

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 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 it highest and when lowest in price?

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?

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?

Compare the recipes on page 98, and determine how much cocoa should 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 XXVIII

Milk and Cream

Care of Milk. — Milk is one of the foods that require the greatest care; it 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. 289.) 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. Because milk readily absorbs odors and flavors, it should be kept away from any substance having a strong odor or flavor.

Cream. — Cream contains much 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 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.

To show one of the points involved in chilling materials try the following:

Experiment 43: 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 a 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 the bowl.

RICE DAINTY

¾ cupful cooked rice	¾ cupful powdered sugar
¾ cupful fruit, cut into pieces	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

4 cupfuls milk	½ teaspoonful salt
⅓ cupful rice	⅓ cupful sugar

Grated rind of ½ lemon

Wash rice; put it and all other ingredients into a buttered pudding dish. Bake in a *slow* oven 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 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 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. 99.)

Why should the utensils that have contained milk be scalded or boiled?

LESSON XXIX

Milk with Rice

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. 42, using 1½ cupfuls of water and 1½ 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.

Raw

RICE PUDDING (made with Cooked Rice)

2 cupfuls cooked rice	½ cupful raisins
¾–1 cupful milk	⅓ cupful sugar

Grated rind ½ 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 above materials.

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

Mix the ingredients, place in a buttered baking dish, and bake in a slow oven until the rice has absorbed the milk and is brown. Vanilla or nutmeg, or both, may be substituted for the lemon rind.

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 a hot sauce.

Lemon Sauce 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.

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 carefully in the flour. 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.

CARAMEL SAUCE

½ cupful sugar	1 cupful milk
2 tablespoonfuls flour	½ teaspoonful vanilla
1 tablespoonful butter	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 vanilla and salt. Serve hot or cold over puddings.

QUESTIONS

Why is it advisable to use a double boiler for cooking both rice and milk? (See Lessons IX, p. 42, and XXVII, p. 97.)

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?

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.

How do you account for the difference in the quantity of milk used in Cream of Rice Pudding and in Rice Pudding (made with cooked rice)?

REVIEW VI. — MEAL COOKING

Menu

Goldenrod Egg
Fruit Sauce
Cocoa

See Review I (p. 41), for suggestions regarding the preparation of the lesson.

LESSON XXX

Milk Thickened with Eggs (I)

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*.

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*.

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.

Directions for Mixing and Cooking Custards. — Scald the milk in a double boiler. Beat the eggs *slightly*, add the sugar and salt, mix. Add the hot milk to this mixture. If *steamed custard* is desired, strain the mixture, flavor, and pour it into a mold. Steam (without stirring) until the custard is firm. 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 until firm. Test as steamed custard.

If *soft custard* is desired, return the mixture 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.

When eggs are high in price omit 1 or 2 from a custard recipe. Substitute ½ tablespoonful of cornstarch for each omitted egg. For methods of thickening milk with both eggs and starchy materials, see Lessons XXXIII and XXXIV, p. 109.

STEAMED OR BAKED CUSTARD

1 pint milk	$\frac{1}{8}$ teaspoonful salt
2 or 3 eggs	2 tablespoonfuls caramel syrup or
$\frac{1}{4}$ cupful sugar	$\frac{1}{16}$ teaspoonful nutmeg

Prepare and steam or bake according to *Directions for Mixing and Cooking Custards*, p. 105.

If a custard is poured into *one* bowl for steaming or baking, the greater number of eggs should be used.

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 Syrup in the bottom of each mold, a custard may be easily turned out of the mold. The custard mixture should be poured very gently on top of the syrup to prevent the custard and syrup from mixing. The caramel also serves as a sauce for the custard when served. (For method of preparing Caramel Syrup, see p. 53.)

SOFT CUSTARD

1 pint milk	$\frac{1}{4}$ cupful sugar
2 eggs	$\frac{1}{8}$ teaspoonful salt

$\frac{1}{2}$ teaspoonful vanilla

Prepare according to *Directions for Mixing and Cooking Custards*, p. 105.

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, bananas, peaches, and other foods.

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 kinds of custard.

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 XXXI

Milk Thickened with Egg (II)

FLOATING ISLAND

CUSTARD

1 pint milk	¼ cupful sugar
3 egg yolks	⅛ teaspoonful salt
½ 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 40, page 93, which egg beater do you consider most advisable for preparing meringue?

If desired, the meringue may be cooked. Place it on the *hot* custard at once after preparing the custard, or steam it by dropping it on hot milk before preparing the custard. (See *Gelatine Pudding*, p. 148.) After dropping the meringue on the custard, it may be cooked and browned 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 and color?

LESSON XXXII

Milk Thickened with Eggs (III)

APRICOT DAINTY

1 cupful dried apricots	¼ 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, and 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.

CUSTARD SAUCE

Use the recipe for Soft Custard (p. 106) for Custard Sauce, substituting 3 yolks for 2 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 XXXIII

Milk Thickened with Egg and Starchy Materials (I)

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. 54.) 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.

CARAMEL TAPIOCA

1 cupful sugar	¼ teaspoonful salt
1 pint milk	1 egg
¼ cupful granulated tapioca	½ teaspoonful vanilla

Scald the milk. Caramelize the sugar, and then add it to the hot milk. When the sugar is dissolved, add the tapioca. Cook in a double boiler until the tapioca is transparent; add the salt; stir in the egg carefully, and cook until the egg thickens. Add the vanilla and turn into dishes for serving. Cool. Serve with plain or whipped cream.

Chopped nuts may be added to the dessert just before turning into the serving dishes.

CREAM OF POTATO SOUP

3 potatoes	1 teaspoonful salt
$2\frac{1}{2}$ cupfuls milk	Pepper
2 egg yolks or 1 egg	$\frac{1}{8}$ 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

What care should be taken in caramelizing sugar for Caramel Tapioca?

What ingredient in Caramel Tapioca could be omitted for the sake of economy?

What ingredient could be substituted for tapioca? How much of this ingredient should be used? (See *Blanc Mange*, p. 54.)

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. 70.)

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. 106) in which cornstarch is substituted for one of the eggs. Write out the method of cooking such a custard.

LESSON XXXIV

Milk Thickened with Egg and Starchy Materials (II)

CORN CUSTARD

1 can corn, or	1 teaspoonful salt
6 ears green corn	$1\frac{1}{2}$ tablespoonfuls butter
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. 65.) 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 in a moderate oven until the mixture is firm. Serve hot as a vegetable.

CHEESE PUDDING

1 cupful cheese grated or cut into pieces	1 egg
1 cupful milk	½ teaspoonful salt
¼ cupful dried bread crumbs	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 in a moderate oven until the mixture is firm. Serve hot. (For method of preparing *Dried Bread Crumbs*, see p. 72.)

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? Explain 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?

REVIEW VII. — MEAL COOKING

Menu

Cheese or Meat Omelet
Creamed Vegetable
Chocolate

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON XXXV

Milk Thickened with Egg and Starchy Materials (III)

Bread Puddings are made by adding bread to a custard mixture, and then baking in the oven like Baked Custard. (See p. 106.) 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. 106.) 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	¼ teaspoonful salt
1 tablespoonful butter	1 teaspoonful vanilla or
3 tablespoonfuls sugar	½ 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 golden brown. Cover during the first 15 minutes of baking. Serve with cream, Hard Sauce, or Vanilla Sauce.

VANILLA SAUCE

½ cupful sugar	2 cupfuls boiling water
2 tablespoonfuls flour	2 tablespoonfuls butter

1 teaspoonful vanilla

Mix sugar and flour thoroughly, then add boiling water slowly. Cook 15 minutes. Dilute or evaporate if necessary. Add the butter and vanilla just before serving.

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.

In preparing Vanilla Sauce, why is the flour mixed with the sugar? (See Experiment 21, p. 54.)

How does the quantity of thickening for Vanilla Sauce compare with the quantity of thickening for the Sauce for Cream Toast? (See p. 57.)

Give the four different quantities of flour generally used to thicken one pint of sauce. (See p. 68.)

What is the advantage in adding the butter after cooking the Vanilla Sauce? (See *Digestion of Pastry*, p. 254.)

What care should be taken in cooking Vanilla Sauce?

LESSON XXXVI

Milk Thickened with Egg and Starchy Materials (IV)

See recipe for Bread Pudding, p. 112. If chocolate were added to this recipe, what change should be made in the other ingredients? (See *Chocolate Cornstarch Pudding*, p. 54.) Since chocolate contains much fat, what ingredient could be omitted, if chocolate were used?

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 as mooth paste is formed. Add this to the bread mixture. Beat the eggs; add the sugar and salt. Add the first mixture to the egg mixture; then add the vanilla, and turn into a buttered pudding dish; bake as the plain pudding in a moderate oven. Served with plain or whipped cream or Lemon Sauce.

BREAD PUDDING WITH PRUNES

1 cupful prunes	4 slices buttered bread
⅛ cupful sugar	1 cupful milk
Nutmeg	1 egg
	Salt

Wash and soak the prunes for several hours or overnight. Cook until the fruit is soft, so that the stones may be easily removed. Drain the water from the prunes, remove the stones, and add the sugar and nutmeg. Break the buttered bread into pieces. Put a layer of the bread in a buttered baking dish, add half of the prunes, then another layer of bread, the remainder of the prunes, and finally a layer of bread with the buttered side up.

Beat the egg; add the milk and salt to it; and pour the mixture over the bread and prunes. Bake slowly (as the plain pudding) until the milk is thickened. Cover for the first 15 minutes. Serve with Hard Sauce or Lemon Sauce.

When the latter sauce is used for this pudding, it is desirable to use the water in which the prunes were cooked for making the sauce. For Hard Sauce, see p. 35. For Lemon Sauce, see p. 68.

QUESTIONS

What is the difference between soft bread crumbs (see note under recipe for Stuffed Tomato, p. 26) and dried bread crumbs? (See

p. 72.) 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.

What care should be taken in cooking chocolate in boiling water?

LESSON XXXVII

Cheese (I)

To show the relation of cheese to milk, and to understand the manufacture of cheese, try the following.

Experiment 44: 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 XXVII, p. 97.)

Experiment 45: Separation of Curd and Whey. — Again heat the contents of the test tube of Experiment 44, turn the mixture into a cheesecloth, 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 44 and 45, except that it is colored and allowed to ripen. While ripening, there take place in the ingredients of cheese changes which develop characteristic flavors and make the cheese firm.

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. A ferment called *rennin* exists in the gastric juice of the human stomach also. When milk is digested, it is first clotted by the ferment in the stomach.

JUNKET "CUSTARD"

1 quart milk	1 tablespoonful liquid rennet, or
$\frac{1}{4}$ 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.

Experiment 46: 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. 99.) Knowing the effect of acid on milk, explain the clotted condition of sour milk.

COTTAGE CHEESE

1 quart thick sour milk	$\frac{1}{4}$ teaspoonful salt	Cream 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 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 9, p. 29.)

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 XXXVIII

CHEESE (II)

MACARONI AND CHEESE

½ lb. macaroni 1 cupful grated cheese
2 cupfuls medium white sauce (see p. 68)
2 cupfuls buttered crumbs (see p. 63)

Break macaroni into one-inch pieces. Cook in a large quantity of boiling, salted water, in the same manner as Boiled Rice. (See p. 43.) 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 until brown.

Rice or noodles, cooked in the same way, may be substituted for macaroni.

Food Value of Cheese. — Cheese is concentrated food; *i.e.* it contains much nourishment in small bulk. One pound of cheese contains as much nutriment as two pounds of meat, and thus it may occasionally be substituted for meat. Cheese has been considered somewhat difficult of digestion, but recent 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. Much cooking of cheese, however, causes decomposition of the fat contained in it. This decomposition sometimes occasions digestive disturbance. In some cases, potassium bicarbonate added to cheese dishes aids in the digestion of the cheese. One teaspoonful of potassium bicarbonate is used with one pound of cheese. It can be said with safety that for healthy people, especially men and women engaged in active work, cheese is one of the best foods. It should be used more commonly than it is.

Care of Cheese. — Molds grow readily upon cheese, especially if it is placed in a warm place and the air is excluded from it. (See *Why Foods Spoil*, p. 289.) 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. However, it should not be kept in the damp cloth too long; molds will grow upon it.

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 14, p. 37.)

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 *Tomato and Cheese Sauces*, p. 44.)

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
does it compare in nutritive value ? How much of th
material ? How much of beefsteak is waste material
cheaper food ?

REVIEW VIII. — MEAL COOKING

Menu

Potato Soup
Cheese Pudding
Fruit cooked in casserole

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON XXXIX

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 (ox), 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 47 : 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 ?

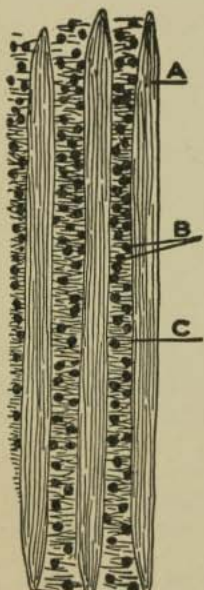
Lean meat, or muscle, of animals may be divided into two parts: (*a*) connective tissue or framework, and (*b*) muscle fiber.

Experiment 48 : Effect of Dry Heat on 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 ?

Experiment 49 : Effect of Moisture and Heat on Connective Tissue. — Place the connective tissue from Experiment 48 in a pan and cover it with water. Let it simmer for at least 15 minutes. How do moisture and heat affect its toughness ?

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?

Muscle Fiber. — 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 Fig. 28.) The microscopic tubes hold the juice and a clotted protein which furnishes most of the nourishment of meat. In cutting meat into steaks or slices, the cut is made at right angles to the strands so that the nutritive material and the juice is exposed.



From *Food and Dietetics*, by R. Hutchison.

Fig. 28. — Structure of meat.

A, muscle fibers; *B*, fat cells; *C*, connective tissue.

Experiment 50: Division of Muscle Fiber. — Form the scraped meat or muscle fiber into a ball, then heat it (not enough to sear it) in a frying pan. Place the hot meat in a cheesecloth; then press the juice out of the fiber, catching it in a test tube. What is the color of the liquid in the tube?

Muscle fiber may be divided into two parts: (*a*) solid, and (*b*) liquid (juice).

Experiment 51: Effect of Heat on the "Juice" of Meat. — Add a little water to the liquid in the test tube of Experiment 50. Heat it and note the change which takes place. How does it change in color?

Can you compare this substance with any other material that coagulates on heating? (See Experiment 34, p. 87.) From the results of previous experiments on protein, state what effect long cooking would have on muscle fiber.

The solid material left in the cheesecloth from Experiment 50 contains most of the nourishment found in meat. Its properties will be discussed in another 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.

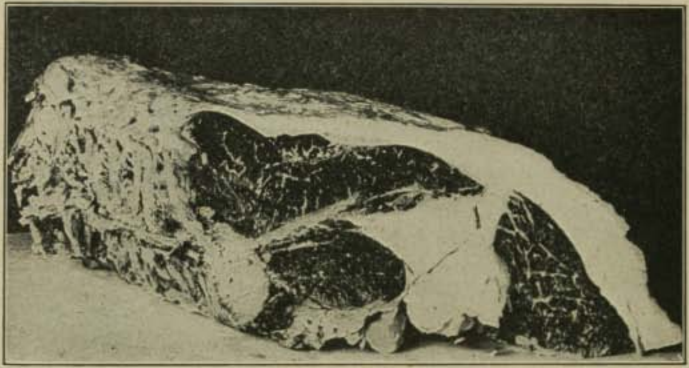
Searing Meat. — In cooking meat it is desirable to retain the "juice," and thus lose no flavor or nutriment. Since protein coagulates on heating, meat can be hardened or sealed on the outside by subjecting it to intense heat. This process is called *searing*. All meat in which it is desired to retain the juices should be seared first, then the temperature of cooking should be lowered in order to cook the interior of the meat.

Courtesy of *Bureau of Publications*, Teachers College.

Fig. 29. — Club or Delmonico steak.

Tender Cuts of Beef. — The difference between tender and tough cuts of meat will be discussed in another lesson.

It is sufficient to say that the muscles which are the least used by the animal are most tender. What parts of the beef would one expect to find most tender?



Courtesy of *Bureau of Publications*, Teachers College.

Fig. 30. — Porterhouse.

Certain methods of cooking meat are adapted to cooking the tender cuts. Unless meat is chopped, only tender cuts

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Fig. 31. — Sirloin, — hip steak (portion next to porterhouse).

of meat can be cooked successfully by *dry* heat. The following methods are used for tender cuts of meat: (*a*) broiling, (*b*) pan-broiling, and (*c*) roasting (baking).

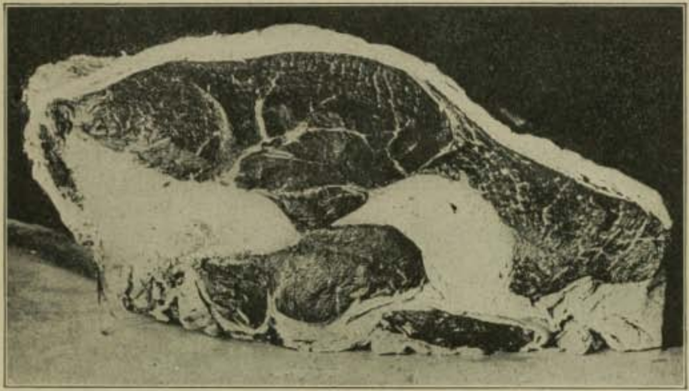

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Fig. 32. — Sirloin, — flat bone (choice cut, in middle of sirloin section).

The best steaks of beef for broiling or pan-broiling are club (see Fig. 29), porterhouse (see Fig. 30), sirloin (see Figs.

Courtesy of *Bureau of Publications*, Teachers College.

Fig. 33. — Sirloin, — round bone (next to rump and round).

31, 32, 33), and first cuts of round. The best cuts for roasting are porterhouse, prime ribs (see Figs. 34, 35), and sirloin.

Long shoulder or chuck (see Figs. 36, 37), top round, and rump (see Figs. 39 and 42) are inferior roasts.

BROILING

Remove the extra fat and place the meat on a broiler. Broil over glowing coals or in the broiling oven, holding the

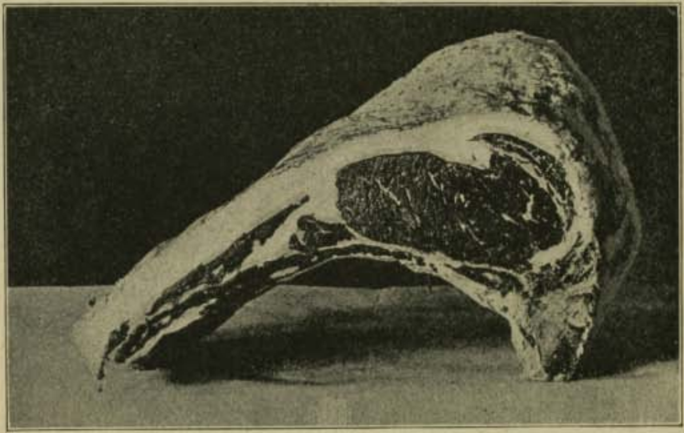

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Fig. 34. — First cut prime rib roast.

broiler very close to the coals, or placing it near the gas flame. The meat should be seared on both sides. Finish cooking the meat by holding it farther 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

Remove all 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

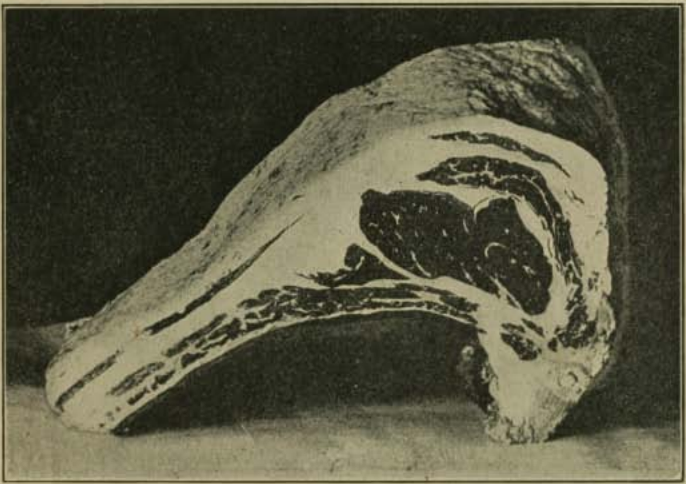

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Fig. 35. — Second cut prime rib roast.

fried steak), in: (*a*) ease of digestion, and (*b*) flavor. As explained on p. 254 (*Digestion of Pastry*), fat cooked at 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

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Fig. 36. — Blade rib roast (7th and 8th ribs).

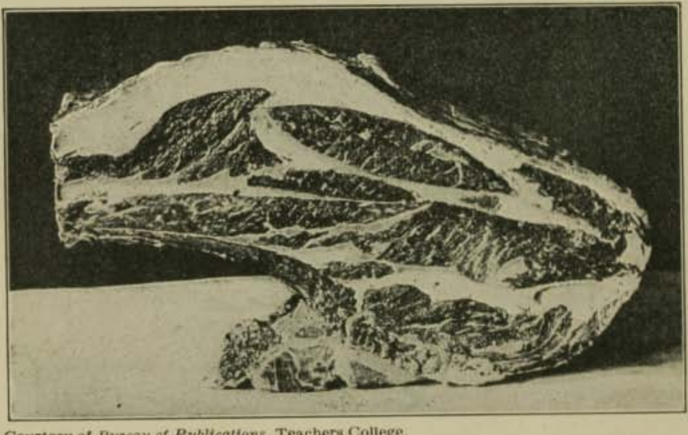

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Fig. 37. — Chuck rib roast (9th and 10th ribs).

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 Fig. 38.) "Roasts"

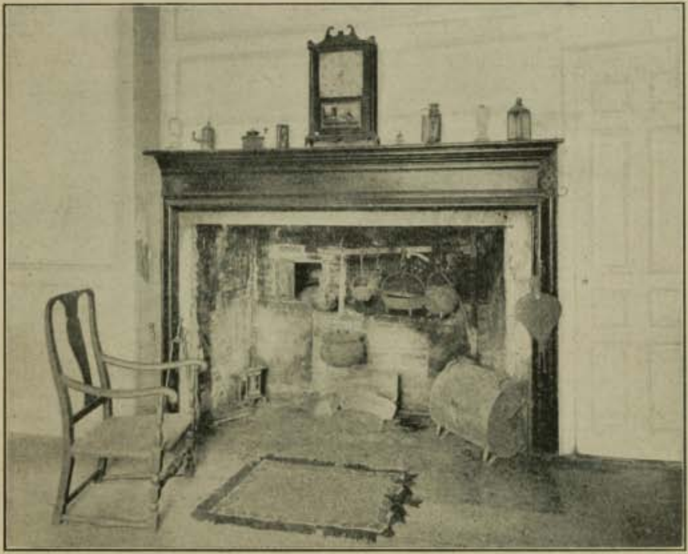


Fig. 38. — Colonial fireplace, showing "roasting-kitchen" — device for roasting meat — at lower right-hand corner.

are now placed in the oven and baked. The term roasting, however, is still used. Meat is roasted as follows:

Skewer the meat into shape and then 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 for about 10 minutes or until the meat is seared. 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 5 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 XL

Beef: Methods of Cooking Tender Cuts (Applied to Chopped Beef) I

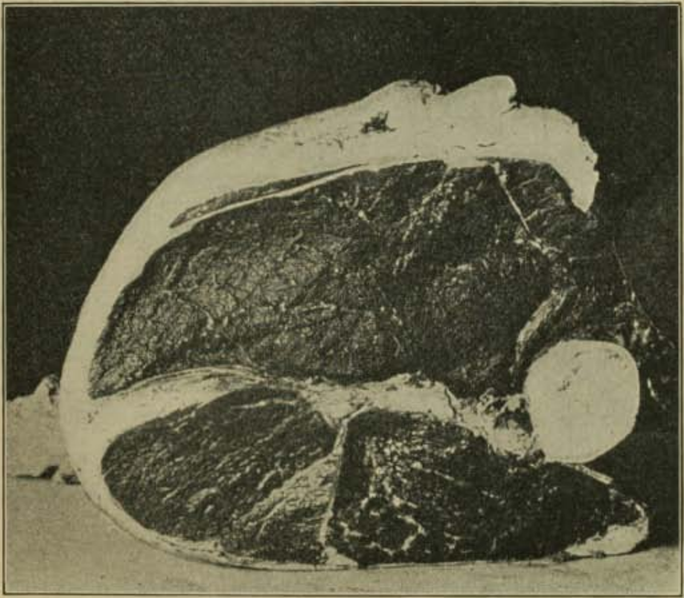
Chopped Beef. — If meat is chopped, what is the effect of the cutting on its structure? How would this affect its toughness?

It is possible to pan-broil or roast some of the tough cuts of meat, if the meat is chopped fine. Round (see Fig. 39, p. 129) and shoulder or chuck (see Fig. 40, p. 130) are especially desirable cuts for this purpose.

CANNELON OF BEEF

2 pounds of uncooked meat, chopped fine	¼ cupful soft bread crumbs
2 tablespoonfuls butter	2 tablespoonfuls chopped parsley
2 egg yolks or 1 egg	Nutmeg

Mix all the ingredients together and shape into a roll. Wrap in an oiled paper and place on a rack in a baking pan.



Courtesy of *Bureau of Publications*, Teachers College.

Fig. 39. — Round.

Roast in a hot oven for about 30 minutes. When done remove the paper, season with salt and pepper, place the meat on a platter, and pour over it Brown Sauce.

Experiment 52: Comparison of Starch and Dextrin for Thickening. — When flour is browned what substance is formed from some of the starch? (See Experiment 23, p. 55.)

Courtesy of *Bureau of Publications,* Teachers College.

Fig. 40. — Chuck.

Make a White Sauce, using 1 teaspoonful of fat, ½ tablespoonful of flour, and ¼ 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 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 Cannelon of Beef.

BROWN SAUCE

1½ tablespoonfuls fat
2 tablespoonfuls flour
½ teaspoonful salt
Pepper
1 cupful meat stock or hot water
1 teaspoonful onion juice

Remove the stock from the roasting pan, and make the "Brown Sauce" in the pan. Put fat and onion juice in the pan, and brown them. Add the flour and brown it, then add the other ingredients and cook as *White Sauce.*

QUESTIONS

What is the purpose of wrapping Cannelon of Beef in paper?

Other than preventing food from sticking to the paper, what is the purpose of oiling the paper, for Cannelon of Beef? (See Experiment 31, p. 80.)

LESSON XLI

BEEF: METHODS OF COOKING TENDER CUTS (APPLIED TO CHOPPED BEEF) II

HAMBURG STEAK

1 pound beef steak, chopped	$\frac{1}{2}$ cupful water
Juice of 1 onion	1 teaspoonful parsley

Mix all the ingredients together, 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.

SALISBURY STEAK

1 pound beefsteak chopped	1 tablespoonful lemon juice
$\frac{1}{2}$ cupful water	2 tablespoonfuls chopped parsley

Mix and cook as Hamburg Steak.

Protein in Meat. — The most important protein in meat is found in the microscopic tubes or muscle fibers. (See Muscle Fiber, p. 120.) This protein is in liquid form during life, but clots after death. It is called either *muscle globulin* or *myosin*. The solid substance of muscle fiber from which the juice was extracted (see Experiment 50, p. 120) contains much myosin. Immediately after clotting, myosin is very tough, but softens when the meat is allowed "to hang" two or three weeks before using for food.

In meat myosin exists in greater quantity than the other proteins. It is practically insoluble in both hot and cold water, though 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.*

Protein is found also in the juice of meat. (See Experiment 51, p. 120.) This is, of course, soluble in cold water, and is coagulated by heating; hence it exists in solid particles in meat broth and soup. Since this supplies much of the nutriment in soup, it should not be removed from the broth. If it is necessary to strain meat soup, a coarse strainer should be used.

Extractives also exist in the juice of meat. These substances give flavor to meat; they are stimulating, but have no food value. These substances give their decided flavor to beef tea and beef extract.

Connective tissue contains proteins which are changed into *gelatine* by cooking in water. Protein which may be changed into gelatine by cooking also exists in the walls of the microscopic tubes or muscle fibers.

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 Hamburg Steak can be obtained from one pound of meat?

LESSON XLII

Beef: Methods of Cooking Tough Cuts (I)

Tough Cuts of Beef. — From the Experiments of Lesson XXXIX, p. 119, 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 48 and 49.) 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 of the flavor of tough meat is rarely extracted because it is so hard to chew.

Experiment 53: 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 54: 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 55: 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?

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
$\frac{1}{4}$ teaspoonful celery seed	2 quarts cold water
5 peppercorns	$\frac{1}{2}$ bay leaf

$2\frac{1}{2}$ teaspoonfuls salt

Cut the meat and fat into small pieces; crack the bone. Try out some of the fat and brown about $\frac{1}{3}$ 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.

QUESTIONS

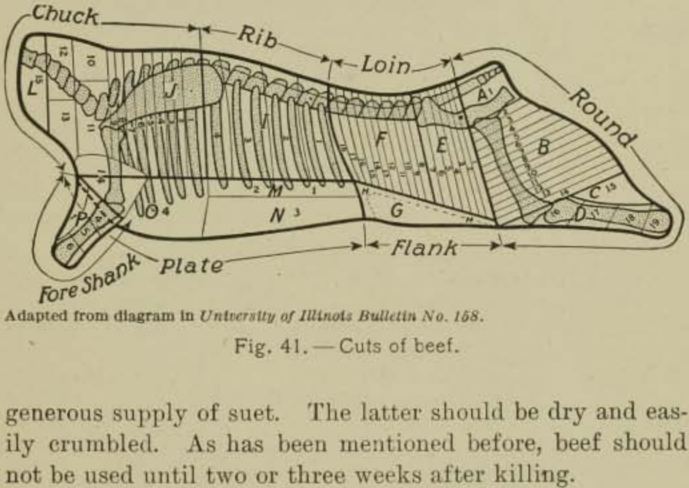
Other than the differences in cost, what advantages are there in using tough cuts of meat for soup?

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 55, p. 133.)

Cuts of Beef (see Fig. 41). — 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



Adapted from diagram in *University of Illinois Bulletin No. 158.*

Fig. 41. — Cuts of beef.

generous supply of suet. The latter should be dry and easily crumbled. As has been mentioned before, beef should not be used until two or three weeks after killing.

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 are "cheaper" than some cuts whose price per pound is lower.

EXPLANATION OF FIG. 41. CUTS OF BEEF

HIND QUARTER

	Name and Form of Cut	Method of Cooking
Round	*A*. Rump. 1. Rump piece (see Fig. 42, p. 140).	Pot-roasting. Stewing. Corning.
	B. Round (not including rump and shank). 2–14. Round steaks (see Fig. 39, p. 129).	Sautéing. Stewing. Braising. Pot-roasting.
	C. Horseshoe or Heel. 15. Pot roast.	Pot-roasting. Stewing.
	D. Hind shank. 16. Knuckle soup bone. 17–19. Soup bones.	Soup Making.
Loin	*E*. Sirloin. 1–4. Round-bone sirloin steaks (see Fig. 33, p. 123). 5–6. Flat-bone sirloin steaks (see Fig. 32, p. 123). 7. Hip-bone sirloin steak (see Fig. 31, p. 122).	Broiling. Roasting (when cut into thick pieces).
	F. Porterhouse. 8–15. Porterhouse steaks (see Fig. 30, p. 122). 16–18. Club or Delmonico steaks (see Fig. 29, p. 121).	Broiling. Roasting (when cut into thick pieces)
Flank	*G*. Flank steak (see Fig. 44, p. 143).	Sautéing. Rolling and Braising.
	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 Figs. 34 and 35, pp. 124 and 125).	Roasting.
Chuck	*J*. Chuck roasts and steaks. 1. Chuck-rib roast (see Figs. 36 and 37, p. 126). 2-9. Chuck or shoulder steaks (see Fig. 40, p. 130). 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 Fig. 43, p. 141). 14. Clod, no bone (over knuckle soup bone).	Roasting. Braising. Pot-roasting. Broiling. Sautéing.
	L. Neck. 15. Stew.	Stewing. Soup Making. Corning.
Plate	*M*. Rib ends. 1, 2. Stews.	Stewing. Soup Making. Corning.
	N. Navel. 3. Stew.	Stewing. Soup Making. Corning.
	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 Fig. 44, p. 143).	Rolling and Braising. Stewing.
	Tail.	Soup Making.

LESSON XLIII

BEEF: METHODS OF COOKING TOUGH CUTS (II)

Examination of Cold Beef Stock. — Examine the beef stock of the previous lesson. Why has the fat risen to the top? (See Experiment 31, p. 80.) 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 gelatin 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 53, p. 133.)

VEGETABLE SOUP

2 quarts beef stock	1 carrot
2 tablespoonfuls sugar	1 turnip
1 onion, sliced	$\frac{1}{2}$ stalk celery or dried celery leaves

Heat the sugar and sliced onion. Cook until the onion is browned, and the sugar is almost black in color and is thoroughly caramelized (*i.e.* until it has lost its sweetness).[1] Cut the vegetables into dice, add a *little water;* 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 toma-

[1] NOTE TO THE TEACHER. — Since the process of cooking sugar for coloring soup is difficult for the inexperienced pupil, it is well for the instructor to demonstrate this process of cooking.

toes, 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. 131.) 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

Mix all the ingredients, except the butter and crumbs. Add enough water or stock to moisten all ingredients. Place the mixture in a buttered baking dish. Butter the bread or cracker crumbs. Cover the hash mixture with the buttered crumbs, and bake slowly until the meat is thoroughly heated and the crumbs browned. Serve at once.

REVIEW IX. — MEAL COOKING

Menu

Broiled Steak
Mashed Potatoes
Junket "Custard" with Sliced Bananas

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON XLIV

Beef: Methods of Cooking Tough Cuts (III)

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, chopped
Hot water or milk, salt, pepper, flour, and fat

Cut round steak of $\frac{1}{2}$ inch thickness into pieces 3 by 4 inches. Make a stuffing of the bread crumbs, chopped

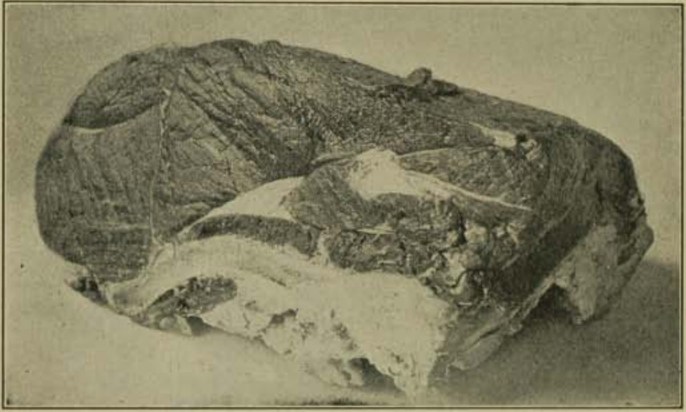


Fig. 42. — Rump.

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 tooth picks. 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 tooth picks, and serve the meat with the sauce in which it was cooked.

BEEF STEW

2 pounds beef	1 quart hot water
¼ cupful flour	2 carrots, cut in dice
2 teaspoonfuls salt	1 turnip, cut in dice
¼ 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; crack the bone. Dredge the meat

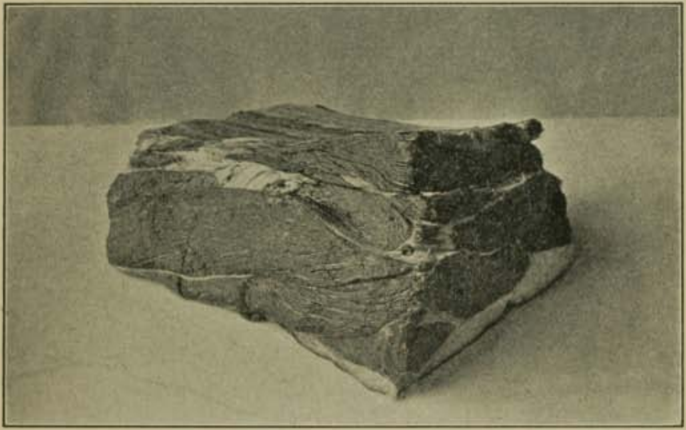


Fig. 43. — English cut.

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 ½ 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.

POT ROAST

3 pounds beef
Flour
2 thin slices salt pork or other fat
½ bay leaf
6 peppercorns
Salt and pepper
¼ cupful each, — diced carrot, turnip, onion, and celery

Try out the pork 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. Strain the sauce, and pour it over the meat before serving.

STUFFED SKIRT OR FLANK STEAK

1 skirt or flank steak
2 cupfuls soft bread crumbs
2 tablespoonfuls chopped parsley
2 tablespoonfuls butter
2 teaspoonfuls sweet marjoram
1 teaspoonful salt
4 dashes of pepper

Mix the bread crumbs, parsley, and seasoning; melt the butter; add the seasoned bread crumbs to it. Spread over the steak. Roll tightly and tie with twine. Sear in suet, butter, or other fat. Place the steak on the rack in a roasting pan, and put bits of fat over the top. Add ½ cupful of hot water, cover, and bake in a quick oven for ¾ hour. Serve with Brown Sauce. (See Brown Sauce, p. 130.)

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

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Fig. 44. — Skirt steak; flank steak.

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.

Summary of the Methods of Cooking Tough Cuts of Meat. — There are many recipes for cooking meats. All of them, however, are modifications of a few methods. Moist heat must be applied to tough cuts of meat. (See Tough Cuts of Beef, p. 132.) 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

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 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? Why should the bone be cracked?

Name at least two cuts of beef that would be suitable for Beef Stew. What are the prices per pound of these cuts?

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. 127.) Why is braising suitable for tough cuts, and roasting for tender cuts? (See Experiments 48 and 49, p. 119.)

Name at least three cuts of meat suitable for pot roasts. Give price per pound of each.

From what parts of the beef are skirt and flank steaks obtained? What is the price per pound of each?

LESSON XLV

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 highly seasoned 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. Cold meats should be chopped fine or cut into pieces, in order to be heated quickly. They should be thoroughly seasoned.

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
2 tablespoonfuls fat
3 tablespoonfuls flour
1½ teaspoonfuls salt
¼ teaspoonful pepper
1 teaspoonful scraped onion or chopped parsley
1¼ cupfuls milk, stock or water
2 cupfuls buttered crumbs
(See *Crumbs for Scalloped Dishes*, p. 63.)

Make a brown sauce of the fat, salt, pepper, flour, onion or parsley, and milk or stock. 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 in the oven 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. 139.)

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?

LESSON XLVI

Gelatine

When the beef stock of Lesson XLIII, p. 138, 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. 131; *Use of Bone and Fat in Soup Making*, p. 133; *Examination of Cold Beef Stock*, p. 138.)

Experiment 56: Effect of Cold Water on Gelatine. — Pour 1 teaspoonful of cold water on ¼ 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 57: Effect of Hot Water on Gelatine. — Pour 1 teaspoonful boiling water on ¼ 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.

Use of Gelatine in the Body. — There is a difference of opinion concerning the use of gelatine in the body. Although it is classed as a protein, some think that it does not have the same property as most protein, *i.e.* it does not build the body. However, in the usual diet, such a small quantity of gelatine is used, that the question of its food value is not a serious one. The sugar that is invariably used in gelatine dishes gives them food value. Gelatine liquefies readily by heating, hence is valuable in liquid diet.

General Rules for Gelatine Dishes. — 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. Mix the gelatine and cold water, using four times as much cold water as gelatine. 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.

LEMON JELLY

1 tablespoonful granulated gelatine or	$\frac{3}{4}$ cupful sugar
$\frac{1}{4}$ ounce shredded gelatine	Salt
$\frac{1}{4}$ cupful cold water	$1\frac{1}{4}$ cupfuls boiling water

$\frac{1}{4}$ cupful lemon juice

Prepare according to *General Rules for Gelatine Dishes.*

FRUIT JELLY

Prepare Lemon Jelly. Cover and allow to cool until just ready 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.

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.

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?

REVIEW X. — MEAL COOKING

Menu

Cottage Pie

Rice Pudding with Soft Custard Sauce or with Caramel Sauce

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON XLVII

Gelatine Pudding

JELLY

2 tablespoonfuls granulated gelatine
½ cupful cold water
1 cupful sugar
1 pint boiling water
Juice 2 lemons
Juice 2 oranges

CUSTARD SAUCE AND MERINGUE

1 pint milk		2 tablespoonfuls sugar
3 eggs	Salt	1 teaspoonful vanilla

Prepare jelly according to the *General Rules for Gelatine Dishes.* After straining, reserve one half cupful of the mixture and color it pink with a little fruit coloring. Pour it

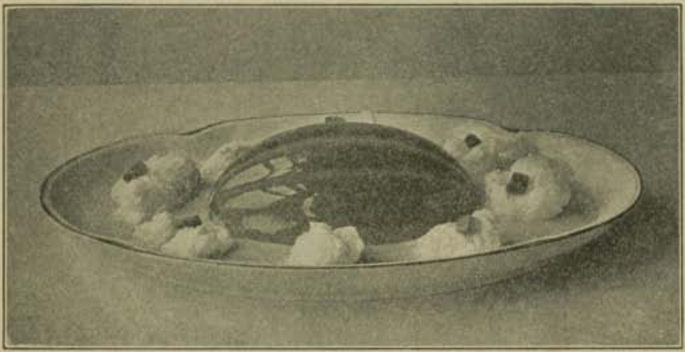


Fig. 45. — Gelatine pudding.

into a small mold to harden. Pour the remainder of the jelly into a large fancy mold.

In preparing the Custard Sauce and Meringue, heat the milk in a double boiler; beat the whites of the eggs until very stiff. Take up the egg-white by spoonfuls and drop on the hot milk ; cover, and allow it to cook about 2 minutes. Remove the whites of the eggs. Proceed with the remainder of the whites until all have been steamed. Cook milk, yolks of eggs, salt, and sugar as for custard, and then cool. (See *Soft Custard*, p. 106.) When firm, turn the jelly from the mold, and pour the custard around it. Place the cooked egg-white on the custard. Cut the colored jelly into cubes and garnish the egg-white with it. (See Fig. 45.)

QUESTIONS

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.

How does the Custard Sauce and Meringue differ from Floating Island, both as to the method of cooking and the quantity of ingredients used? (See *Floating Island*, p. 107.)

How is the meringue cooked? Why should it be covered while cooking?

What change in size takes place in meringue during cooking? Why?

What is the price per package of gelatine?

How many ounces are there in one package?

LESSON XLVIII

Fish (I)

Experiment 58: 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 59: 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 58 and 59, 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; hence many consider it quite as nutritious as beef. It is lacking in extractives, and needs high seasoning.

Fat of Fish. —The fat content of fish varies greatly in different kinds of fish. A few of the red-blooded fish, as salmon, 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 white fish*, and (*b*) *oily, or red-blooded fish*. The flesh of dry fish is light in color, and the oil is concentrated in the liver. The flesh of oily fish is dark in color, and the oil is distributed throughout the body. Halibut, cod, haddock, smelts, flounders, etc., are dry, or white fish. Salmon, shad, mackerel, herring, eel, bluefish, etc., are oily fish.

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*.

SALMON TIMBALE OR LOAF

1 can salmon	Pepper
1 cupful soft bread crumbs	2 eggs
1½ teaspoonfuls chopped parsley	1 tablespoonful lemon juice
½ teaspoonful salt	¼ to ½ cupful milk

Mix all the ingredients thoroughly, adding enough milk to moisten. Pour into buttered timbale molds or into one bowl. Place on a rack in a pan, surround with hot water, and cover. Bake in the oven or 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. 63.) 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. Other fish may be used instead of Salmon.

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?

Name two fresh fish that are in market now. What is the price per pound of each?

LESSON XLIX

Fish (II)

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.

Frozen fish is not desirable; but if 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 is said to contain at times poisonous substances called *ptomaines*. Ptomaines in food may produce distressing effects or may even prove fatal.

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 with a cloth wet with salted water. 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, 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. "Lace" (see *Dressing and*

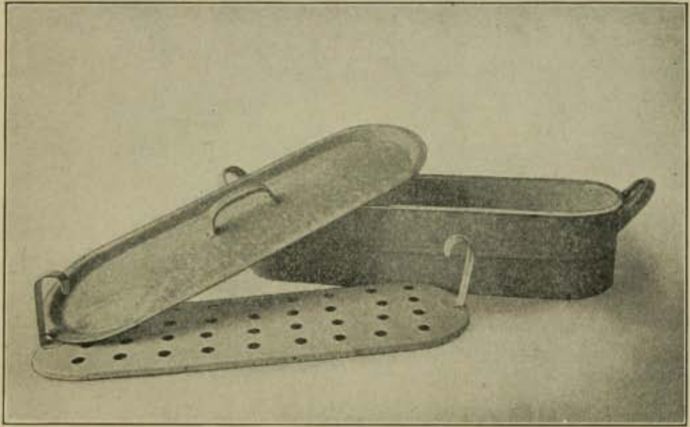


Fig. 46. — Fish kettle, showing rack.

Cleaning Poultry, p. 279) or skewer the edges together. 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 Fig. 46) 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 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 a sauce.

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
½ teaspoonful salt
⅛ teaspoonful pepper
Cayenne
1 teaspoonful onion juice
1 teaspoonful chopped parsley
1 teaspoonful capers or chopped pickles
2 tablespoonfuls butter

Mix the ingredients in the order given. (See *Crumbs for Scalloped Dishes*, p. 63.)

Fish Baked in Paper Bags. — Paper bag cookery has no more satisfactory application, perhaps, than in the baking of fish. Cleaning an odorous fish kettle is invariably disagreeable to a housekeeper. A pleasing flavor and an absence of odor in the kitchen also result from this method of cooking.

A small fish may be prepared and stuffed as directed above, using about one fourth of the quantity of stuffing given.

Oil the inside of the bag with butter, oleomargarine, drippings, or vegetable fat. Place the fish in the bag. Then fold the open end of the bag several times, and fasten it securely with wire clips or gummed labels. Place the bag, seam side up, on a wire rack so that the heat may reach the fish evenly on all sides. Finally, put the wire utensil on a pan as a precaution in case the bag breaks. (See Fig. 47.) Place in a moderate oven to bake for the length of time given above, — 15 minutes to the pound. The time of cooking is only approximate. Insert a knitting needle through the bag into the fish to find if it is sufficiently cooked. In order to have the fish browned, the bag must be charred. The following method has been found satisfactory for removing a fish from the bag: Lift the wire utensil and bag on to a platter. Slit the bag open; lift up the fish,

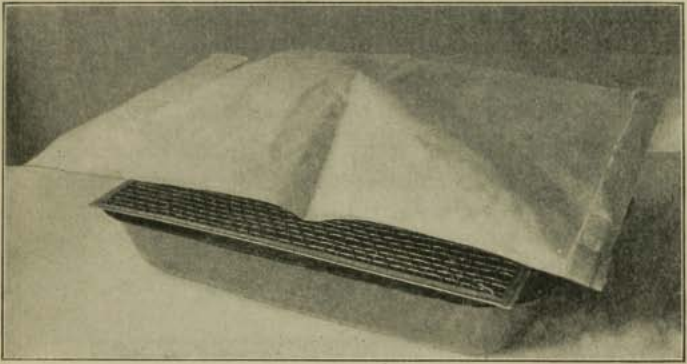


Fig. 47. — Fish in paper bag, ready for the oven.

using a pancake turner; quickly remove the wire rack and bag, and place the fish on the platter.

Fish Steaks Baked in Paper Bags. — Wash the steaks; put butter in bits over the top of the fish, or spread with melted butter. Then add salt, pepper, and lemon juice. Place in an oiled paper bag, seal, and bake in a hot oven for 15 minutes as directed above.

One or two slices of fresh tomatoes or some tomato pulp may be placed on top of each steak instead of lemon juice.

SAUCE FOR FISH

¼ cupful butter	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. 63.) 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 58, p. 150.)

What is the purpose of placing fish on a baking sheet or placing strips of muslin underneath for baking? (See Experiment 59, p. 150.)

How is fish tested for sufficient cooking?

How can the odor be removed from utensils in which fish has been cooked?

Mention several foods which may be cooked satisfactorily in a paper bag.

Mention several foods which cannot be cooked satisfactorily in a paper bag. Explain your answer.

What is the price of paper bags per dozen?

What kind of baking pan or utensil could be used in order to obtain practically the same results as are obtained by the use of a paper bag?

LESSON L

Fish (III)

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. 268.) 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 cornmeal 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 cornmeal-and-flour mixture. (See *Fried Oysters*, p. 80.)

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 usual method of making sauce. Strain and serve.

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 highly seasoned sauces and stuffing with fish. (See *Comparison of Beef with Fish*, p. 150.)

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 LI

Body-Building Vegetables (I)

Legumes. — Most protein foods belong to the animal kingdom. There is, however, one class of plants — the legumes — which contains much protein. 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.

Some of the dried legumes contain more protein than certain cuts of meat. They do not, however, rank equal in food value, for vegetable protein is not as completely assimilated as animal protein. The protein in legumes is called *legumin.*

General Rules for Dried Legumes. — Ripened peas, beans, and lentils are dried for the market. These contain more protein than the green legumes and for this reason are valuable foods if properly cooked. 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 the tough cellulose, and also to develop flavor. A little soda added to the water in which they are cooked also aids in softening the cellulose and neutralizes the vegetable acid found in some of the legumes. During the long heating, dried legumes break up, if not carefully cooked.

Although these foods 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

1 cupful navy beans	1 teaspoonful salt
1 tablespoonful molasses or brown sugar	2 ounces salt pork or bacon
	¼ teaspoonful mustard

Soak the beans overnight as directed in *General Rules for Dried Legumes*, p. 158. 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 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
1 pint water	2 teaspoonfuls butter

Remove the inner skins from the peanuts by placing them in boiling water for three minutes; cover with cold water; and then slip off the skins. Heat the salt and water, and when boiling, add the peanuts. Cook 8 minutes. Drain, rinse off the salt, place in a baking pan, add the butter, and bake until slightly browned, stirring often. Turn from the pan on paper.

One teaspoonful of olive oil may be substituted for the butter.

QUESTIONS

Why should dried vegetables be soaked in water before cooking?

Measure the beans after soaking. How much have they increased in bulk?

How should the water boil to prevent dried legumes from breaking? (See *General Rules for Cooking Vegetables*, p. 60.)

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 31, p. 80.)

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?

REVIEW XI. — MEAL COOKING

Menu

Macaroni and Cheese
Lemon Jelly

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON LII

Body-Building Vegetables (II)

BEAN SOUP

2 cupfuls beans	2 slices onion
3 quarts water	Cayenne
Baking soda	¼ 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

Soak the beans; 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. 69.)

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
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 peas	White pepper
½ teaspoonful sugar	½ teaspoonful salt
1 pint liquid around peas and water	1½ tablespoonfuls butter
	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, or split thick crackers and butter them. Brown in the oven and serve with soup.

QUESTIONS

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?

DIVISION FIVE

BODY-BUILDING AND BODY-REGULATING FOODS: ASH (MINERAL MATTER)

LESSON LIII

Green Vegetables

Ash. — A common constituent of foods is *ash* or *mineral matter.* This term is applied to many different substances. The most common mineral matter is salt; 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. 183) must not be confused with the term "salts"; the latter applies to many mineral substances besides common salt.

Milk, eggs, vegetables — especially green vegetables and cereals — and fruits are valuable food sources of ash.

Use of Ash in the Body. — Ash does not burn, and is, in fact, the only foodstuff, except water, which does not burn in the body. It is therefore considered an incombustible foodstuff. Bones and many other parts of the body contain certain mineral materials. Ash *builds the body.*

Ash exists in the fluids of the body. For example, there is salt in perspiration and in all excretions of the body. This indicates that certain minerals aid in eliminating the wastes of the body. The digestive juices also contain mineral materials. So it would seem that ash aids also in the digestive processes of the body. Scientists have shown that ash *does* participate in the regulation of body processes.

Thus ash has two 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.

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

Green vegetables contain much water, cellulose, and mineral matter, and are especially valuable for the two latter constituents. It was previously mentioned that cellulose furnishes bulk to foods, stimulates activity in the intestines, and thus aids in the digestion of foods and in the elimination of waste material.

Experiment 60: 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 61: 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
1 quart milk	3 teaspoonfuls salt

¼ teaspoonful white pepper

Turn the tomatoes into a saucepan, cover them; cook at simmering temperature for $\frac{1}{2}$ hour. Press through a strainer and add the baking soda. Make a White Sauce of the remaining ingredients; *remove from the fire.* Add the *hot* tomatoes slowly to the White Sauce, stirring constantly. *Do not heat the mixture after combining the tomatoes and White Sauce. Serve at once.*

QUESTIONS

Why cannot ash give heat to the body?

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 60 and 61) explain why soda is added to the tomatoes in Cream of Tomato Soup.

What is the purpose of adding the strained tomatoes *slowly* to the White Sauce?

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?

LESSON LIV

Green Vegetables of Delicate Flavor

Saving the Nutriment and Flavor. — Just as salt dissolves most readily in water, so many of the mineral materials found in green vegetables dissolve in the water in which they are cooked. As has been said, ash (mineral matter) is one of the most valuable parts of green vegetables. It is also one of the substances which give flavor to the vegetables. If so much water is used in cooking these vegetables that it is necessary to drain off most of it after cooking, the loss of nutriment and flavor is evident. All "greens" should be steamed or cooked in such a way that the water will not have to be drained from them after cooking. Many of them contain so much water that no more should be added in cooking. The juices drawn out in cooking should be served as a sauce with the vegetables.

SPINACH

½ peck spinach	½ teaspoonful pepper
1 tablespoonful salt	3 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 or turn into a chopping bowl and cut. Return to the saucepan or casserole, add the butter, and simmer for 5 minutes. Serve at once.

ASPARAGUS

Wash the asparagus and break it into pieces, separating the tough and the tender. Scrape the tough pieces and cook them in a small quantity of boiling salted water for 30 or 40 minutes. Fifteen minutes before removing these from the fire, add the tender pieces. Make a sauce, using the asparagus stock together with milk for the liquid. Serve with or without toast.

The entire asparagus stalks may be cooked in the following manner: Tie the stalks in a bundle and place them upright in a deep kettle. Have enough boiling salted water in the kettle to cover the tough portion of the stalks. Cover the kettle. Cook 30 to 40 minutes or until tender. The tender tips will be cooked sufficiently by the steam.

CREAMED CELERY

Scrub the celery, cut into $\frac{1}{2}$ inch pieces. Place in a granite utensil, cover with boiling water and steam until tender (usually about 45 minutes). Serve with White Sauce. Use the celery stock in making the sauce. (See *General Rules for Cooking Vegetables*, p. 60.)

Celery may also be cooked directly over the flame in a small quantity of boiling salted water.

DRIED CELERY LEAVES

Wash celery leaves and remove the stems. Place the leaves on a platter or granite pan, cover with cheesecloth, 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 peck? How many persons does one peck serve?

What is the price of asparagus per bunch? How many persons does one bunch serve?

What is the price of celery per bunch?

LESSON LV

Green Vegetables of Strong Flavor

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 nutriment is lost. If vegetables are steamed there is little loss of nutriment, but the strong flavor is retained. In the cooking of cabbage, for example, investigation has shown that almost four times as much ash is 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 disagreeable, steam it 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 soaked, with the cut side down, in cold water or cold salt water, — one tablespoonful of salt to a bowl of water. The salt water is to draw out any insects that may be hidden in the leaves. Cook the cabbage uncovered from 15 to 25 minutes in a large quantity of boiling salt 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 out the tough stem and then cut the leaves in the saucepan or place them in a chopping bowl and cut. Mix with White Sauce, using two parts of cabbage to one of White Sauce. Heat and Serve. (See *Creamed and Scalloped Vegetables*, p. 62.)

Scalloped Cabbage may be prepared by placing creamed cabbage in a baking dish, covering with buttered crumbs (see p. 63), and baking until the crumbs are brown.

Instead of using White Sauce with the cabbage, butter, pepper, and more salt (if required) may be added. Use 1 tablespoonful of butter to each pint of cabbage.

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 quart onions	2 tablespoonfuls butter
½ cupful milk	½ teaspoonful salt
White pepper	

Peel the onions under water; 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.

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.

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 X, p. 45.) 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.

QUESTIONS

What is the advantage of cooking in a large quantity of boiling water vegetables that have a strong flavor and odor? What is the disadvantage?

Why should cabbage be soaked in water with the cut side down?

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?

What is the price per quart of onions? How many persons will one quart of onions serve?

REVIEW XII. — MEAL COOKING

Menu

Cream of Tomato Soup
Croutons
Baked Custard

See Review I, p. 41, for suggestions regarding the preparation of the lesson.

LESSON LVI

SALADS (I)

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. — 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, it should be 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 swing them in a cheesecloth 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.

FRENCH DRESSING

Clove of garlic or	¼ teaspoonful paprika
Slice of onion	1 teaspoonful salt
½ teaspoonful celery salt	6 tablespoonfuls olive oil

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.

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.

COLE SLAW

3 cupfuls shredded cabbage	1 teaspoonful sugar
½ teaspoonful salt	1 egg or 2 egg yolks
½ teaspoonful mustard	½ cupful milk
Cayenne	2 teaspoonfuls butter

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 *Directions for Mixing and Cooking Custards*, p. 105.) Add the butter and vinegar, and *at once* strain over the cabbage. Set aside to cool. Serve cold.

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 Cole Slaw? 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?

LESSON LVII

SALADS (II)

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 or ham	6 drops vinegar
	$\frac{1}{8}$ teaspoonful mustard
$\frac{1}{16}$ teaspoonful salt	Cayenne

1 teaspoonful olive 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 ham may be omitted from the egg mixture, or a little chopped pickle or olive may be used instead of the meat. Salad dressing may be served with Stuffed Eggs.

CREAM SALAD DRESSING

2 tablespoonfuls butter	1 teaspoonful salt
3 tablespoonfuls flour	$\frac{1}{2}$ teaspoonful mustard
2 tablespoonfuls sugar	1 cupful milk
Pepper	$\frac{1}{2}$ cupful vinegar

2 eggs

Make a sauce of the butter, 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 *Directions for Mixing and Cooking Custards*, p. 105.) Add the vinegar, strain. Cool before serving.

More butter and less mustard may be used, if desired.

BANANA SALAD

Wipe bananas; peel, and scrape them. Place 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.

QUESTIONS

Give two methods of hard-cooking eggs. (See *Hard-cooked Eggs*, p. 89.)

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?

DIVISION SIX

BODY-REGULATING FOOD: WATER

LESSON LVIII

Beverages

Use of Water in the Body. — Water constitutes the fifth great class of foodstuffs that we are to consider. It is incombustible, so of course it does not produce heat. But it 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*, p. 29.)

(*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.

These functions may be summed up in the terms used concerning mineral matter: *Water aids in regulating body processes.*

A large quantity of water is required to carry on the functions of the body. For most people at least one quart of water, — either as plain water or in beverages, — should be taken each day.

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, and acts as a carrier of flavor as in fruit drinks, tea, coffee.

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 62: 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 63: Simmering and Boiling of Water. — Continue to heat the water of Experiment 62 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?

When bubbling occurs below the surface, water is *simmering*. When the surface is in motion and steam is given off, water is *boiling*. From the results of Experiment 63, determine the simmering and the boiling temperatures of water.

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.

Black and Green Tea. — The chief difference between black and green tea is that black tea leaves are fermented after picking, while green are not. Tea leaves contain a substance called *tannin*, sometimes called tannic acid, which interferes with digestion. 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.

Good black tea is grayish black in color, not dead black.

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. 32.) The ingredient in tea that gives it its odor 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. So *boiling* water should be used for making tea. 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.

Sometimes tea leaves are artificially colored or faced, *i.e.* treated with materials to give them color and gloss. These coloring and facing materials are considered adulterants. "Under the Tea Regulations of March 1, 1911, all teas containing artificial coloring or facing matter are prohibited entry to this country." It has been found that "Japan green teas and Ceylon green teas (uncolored) are generally free from artificial coloring or facing matter, whereas, the China green teas are usually colored or faced."

TEA (proportion for one cupful)

½ 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 Fig. 48) 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.

Courtesy of *Manning, Bowman Co.*

Fig. 48. — Tea-ball teapot.

The quantity of tea to be used varies with the kind. If Ceylon tea is used, ½ teaspoonful to 1 cupful of water is sufficient. 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 7 and 8, pp. 28 and 29) it is desirable to prepare a syrup for sweetening Iced Tea.

Coffee. — 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.

BOILED COFFEE (proportion for one cupful)

1 heaping tablespoonful coarsely ground coffee
1 tablespoonful cold water
1 cup boiling water
Bit of crushed eggshell or a little egg white
1 tablespoonful cold water

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

Into a well-cleaned coffeepot, place the coffee, 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 quantity of cold water. If the spout is not covered, insert a piece of paper 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 the 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

⅔ 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.*

Fig. 49. — 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*. 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.

TOASTED CRACKERS AND CHEESE

Spread crackers with a small quantity of cheese. Season the cheese with a sprinkling of salt and paprika. Brown the crackers in the oven. When the cheese is melted, the crackers 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 and coffee grounds?

How can the extraction of tannic acid be avoided in making both coffee and tea?

Give the reason for using freshly boiled water for tea and filtered coffee. (See Experiments 62 and 63, p. 175.)

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.

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

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 eggshell 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?

LESSON LIX

Classification of the Foodstuffs; Separation of Milk into the Five Foodstuffs

The five foodstuffs may be classified as follows:

$$\left.\begin{array}{l}(a)\ \text{Carbohydrates}\\(b)\ \text{Fat}\\(c)\ \text{Protein}\end{array}\right\}\text{Combustible}$$

$$\left.\begin{array}{l}(d)\ \text{Ash}\\(e)\ \text{Water}\end{array}\right\}\text{Incombustible}$$

The five foodstuffs may also be classified as follows:

$$\left.\begin{array}{l}\text{Carbohydrates}\\\text{Fat}\\\text{Protein}\end{array}\right\}\text{Energy Givers}$$

$$\left.\begin{array}{l}\text{Protein}\\\text{Ash}\end{array}\right\}\text{Body Builders}$$

$$\left.\begin{array}{l}\text{Ash}\\\text{Water}\end{array}\right\}\text{Body Regulators}$$

As was implied on p. 38, *Foodstuffs Defined*, all foods contain one or more of the foodstuffs. Most of the foods contain all the foodstuffs. Milk is a food containing all the foodstuffs. To show the presence of all of the foodstuffs in milk, try the following:

Experiment 64: Separation of Milk into the Five 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 ¼ cupful of the skimmed milk. Heat it to blood temperature (test by dropping the milk on the wrist, see *Junket Custard*, p. 116). Crush ⅛ 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 Experiment 44, p. 115.)

(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 1 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 2 foodstuffs are contained in the residue?

(e) What foodstuff has passed off in the form of vapor during evaporation?

QUESTIONS

Explain why flour is considered a carbohydrate food, although it contains all the foodstuffs.

Explain why meat is considered a protein food, although it does not contain as much protein as it does water.

[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 it.

DIVISION SEVEN

STIMULATING MATERIALS: FOOD ADJUNCTS

LESSON LX

Dishes Containing Food Adjuncts

Food Adjuncts. — Besides the five foodstuffs there is another class of edible substances called *food adjuncts.* These cannot be termed foods, as they do not perform the functions of foods, but if discreetly used, they do have a place in the diet, because they stimulate the digestive organs, and thus aid in the digestion of real foods. For the most part, food adjuncts are contained in two classes of materials, — condiments and beverages.

Condiments. — Spices and flavoring extracts 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. One should train one's self 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. 163.) When used in moderation, it has undoubted value in diet.

Beverages. — The stimulating materials contained in the common beverages, — tea, coffee, cocoa, and chocolate, — are food adjuncts. It is better for some people, and especially children, to use none of these beverages. For others, a moderate use produces no harmful effect. 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. 98.)

CURRY OF KIDNEY BEANS

1 pint kidney beans	1 teaspoonful curry powder
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. 157.) Add the cooked beans to the mixture and cook all together for a few minutes. Serve hot.

SAVORY SALAD

1 quart raw cabbage, chopped	2 cupfuls brown sugar
1 quart cooked beets, cut in dice	1 tablespoonful salt
½ cupful grated horseradish	Vinegar

Mix all the ingredients (except vinegar). Add enough vinegar to cover. Place in a covered jar. Use when desired. Serve on lettuce leaves.

SPICED BAKED APPLES

5 apples	Water
5 tablespoonfuls sugar	1 lemon
Whole cloves	

Wash, core, and pare the apples. Stick 4 or 5 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 in a slow oven until soft. Serve cold.

If the apples are very sour, more sugar should be used.

QUESTIONS

In which ingredients of the Curry of Kidney Beans, Savory Salad, and Spiced Baked Apples are the food adjuncts found?

Of what materials is curry powder made?

Beans contain what ingredients that require long cooking?

What material can be added during cooking that will soften them? (See *General Rules for Dried Legumes*, p. 158.)

What is the purpose of covering apples during baking? Why should they be baked in a slow oven? (See *Suggestions for Cooking Fruits*, p. 32.)

REVIEW XIII. — MEAL COOKING

Menu

Hamburg Steak
Boiled or Steamed Potato
Cole Slaw
Tea

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

DIVISION EIGHT

FROZEN DESSERTS

LESSON LXI

Method of Freezing; Water Ice

Experiment 65: 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?

Usually 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. Hence the use of ice and salt for freezing mixtures.

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.

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.

Preparation of 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. Pack with a mixture of cracked ice and rock salt. The ice and salt mixture should be higher around the can than the level of the mixture inside.

For *freezing* use three parts of cracked ice to one part of rock salt. For packing use four parts of cracked ice to one part of rock salt. For a granular consistency, as in frappé, use equal parts of chopped ice and 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, than 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; cover with carpet, blanket, or newspapers; and allow to stand in a cold place several hours.

Method of Mixing Frozen Foods. — The sugar of a frozen dessert should always be dissolved. To accomplish this a syrup should be made of the sugar and water. (See Experiment 8, p. 29.) For mixtures that contain no eggs, but in which cream or milk is used, the cream or milk should 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 as for a soft custard.

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.

"FIVE THREES"

3 pints water 3¼ cupfuls sugar 3 lemons
3 oranges 3 bananas

Make a syrup 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 *at once* with the syrup. Freeze *at once*.

QUESTIONS

Explain why it is necessary to scald the can, cover, and dasher of an ice cream freezer. (See *Care of Milk*, p. 99.)

What harm sometimes results from ice cream that has been carelessly prepared?

Why should not the salt water be drawn from the freezer during freezing? (See Experiment 65, p. 186.)

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. 45.)

Why should "Five Threes" mixture be frozen *at once* after preparing the fruit?

LESSON LXII

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.

PLAIN ICE CREAM

1 quart cream	$\frac{3}{4}$ cupful sugar	1 tablespoonful vanilla

Prepare as directed in *Method of Mixing Frozen Foods*, p. 188.

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. 98.) 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*, p. 188.

CARAMEL ICE CREAM

1 cupful sugar	1 quart cream
$\frac{1}{4}$ cupful boiling water	$\frac{1}{2}$ cupful sugar

Caramelize 1 cupful of sugar, add the boiling water, and let simmer until the sugar dissolves. Scald the cream, add the syrup and $\frac{1}{2}$ cupful of sugar, and stir until dissolved. Cool and freeze.

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*, p. 188.

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.

COCOANUT WAFERS

1 egg	¼ cupful flour
⅓ cupful sugar	⅔ cupful rolled oats
1 tablespoonful butter, melted	⅓ cupful shredded cocoanut
⅛ teaspoonful salt	¼ teaspoonful vanilla

Mix the ingredients in the order given, beating the eggs and sugar well before adding the other ingredients. Drop by teaspoonfuls on buttered pans, placing the cakes about one inch apart. Bake in a moderate oven until a delicate brown. Remove from the pans at once after baking.

QUESTIONS

Which material, tin or wood, is a better conductor of heat? (See Experiment 5, p. 22.) From this explain why the bucket of a freezer is made of wood, and the can, of tin.

Explain why it is that acid mixtures are not "discolored" by being frozen in a tin can.

For Fruit Ice Cream, why is it necessary to chill the cream before adding the fruit juice or crushed fruit? (See Experiment 60, p. 164.)

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. 106)? 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. 98). 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?

REVIEW XIV. — MEAL COOKING

Menu

Creamed Cabbage
Apricot Dainty
Coffee

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

DIVISION NINE

QUICK BREADS: POUR BATTERS

LESSON LXIII

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 texture and flavor.

To understand some of the principles of mixing and lightening baked flour mixtures, try the following:

Experiment 66: Leavening with Steam and Air.[1] — Mix $\frac{1}{8}$ cupful of flour and $\frac{1}{8}$ 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 67: Comparison of Thick and Thin Quick Breads. — Repeat Experiment 66, using $\frac{1}{2}$ tablespoonful of cold water instead of $\frac{1}{8}$ cupful. After baking, examine and compare with the bread of Experiment 66. 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 66 and 67 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 68: Preparation of Flour for Quick Breads. — Measure ¼ 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 *Bread Flour*, p. 232) 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 Temperatures. — Although temperature is determined usually by a thermometer, the thermometers on ovens do not always indicate temperature accurately. However, a chemical thermometer inserted in an oven is a 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 375° F. (see footnote, p. 357), 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 400° F., 425° F., 450° F., and 455° F. Note the color of each piece of paper. *The temperature for baking* *small cakes, muffins, biscuits, and layer cakes varies from 425° F. to 450° F.; for loaf bread or cake, 375° F. to 400° F.*

Oven temperatures may be estimated also as follows: (*a*) note the number of minutes required to change white 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.

POPOVERS

1/2

1 egg	1 cupful milk
½ teaspoonful salt	1 cupful flour

½ teaspoonful butter (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 30 to 35 minutes in a hot oven, 475° F.; decrease the heat after 10 minutes. Earthen cups 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 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.

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.

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 LXIV

LEAVENING WITH BAKING SODA AND SOUR MILK: 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 69: 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 62, p. 175.) What does this experiment teach with regard to the use of baking soda and sour milk, for lightening a mixture?

Experiment 70: Chemical Change. — Measure ¼ cupful of 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. Dissolve this in 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 dissolved soda. Stir and heat until effervescence (bubbling) has ceased. Test the mixture in the saucepan with blue litmus paper. If the blue litmus

[1] The amount of acid in sour milk varies slightly.

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.

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, two entirely different materials are formed; one is the neutral substance in the pan; the other is the carbon dioxide gas which has escaped. 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 71: Quantity of Baking Soda to Use with Sour Milk. — To the contents of the saucepan of Experiment 70, add ½ 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 your answer.

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 70 and 71 indicate that the *approximate* proportion of baking soda to sour milk is:

½ teaspoonful of baking soda to 1 cupful of sour milk.

The following crude equations indicate the importance of using the proper amount of baking soda to neutralize the acid materials:

1 cupful of sour milk + ½ teaspoonful of baking soda yield carbon dioxide gas + neutral material.

1 cupful of sour milk + 1 teaspoonful of baking soda yield carbon dioxide gas + neutral material + unneutralized soda.

CORN BREAD

1 cupful corn meal	1 teaspoonful salt
1 cupful flour	1½ cupfuls sour milk
⅛ cupful sugar	1 egg
¾ teaspoonful baking soda	2 tablespoonfuls fat

Mix the dry ingredients thoroughly. Beat the eggs; add the sour milk to the beaten eggs. Sift the dry ingredients into the egg mixture. Melt the fat. Add it to the corn-meal mixture. Mix quickly and thoroughly. Turn at once into an oiled pan, and bake in a hot oven until sufficiently baked, usually 25 to 30 minutes. (See tests below.)

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 Fig. 15) 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 Corn Bread to make it light. Explain their action.

Explain why satisfactory results could not be obtained by using 1½ teaspoonfuls of baking soda in this Corn Bread recipe.

What is the price per half-pound of baking soda?

How many persons does this Corn Bread recipe serve?

LESSON LXV

Leavening with Baking Soda, Sour Milk, and Molasses: Gingerbread

Experiment 72: 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 an acid substance? Explain how baking soda and molasses could be used to lighten a quick bread.

Experiment 73: Quantity of Baking Soda to use with Molasses. — Carefully measure $\frac{1}{8}$ cupful of molasses.[1] Dilute it with much water and pour into a saucepan. Carefully measure $\frac{1}{16}$ teaspoonful of baking soda and dissolve it in water. Add about $\frac{1}{4}$ of the soda solution to the molasses. Stir and heat. Test with blue litmus. If it changes color, keep adding the soda solution, until the litmus paper does not change, as in Experiment 70. 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:

$\frac{1}{2}$ teaspoonful of baking soda to 1 cupful of molasses

This "equation" expresses the chemical change in the experiment:

1 cupful molasses + $\frac{1}{2}$ teaspoonful of baking soda yield neutral material + carbon dioxide gas.

GINGERBREAD WITHOUT EGGS

1 cupful sour milk	2 teaspoonfuls ginger
1 cupful molasses	1 teaspoonful baking soda
Salt	$2\frac{1}{2}$ cupfuls flour
1 teaspoonful cinnamon	2 tablespoonfuls fat

Mix all the dry ingredients. Put the sour milk and molasses in a mixing bowl. Add the dry ingredients (through the sifter) to the milk and molasses. Melt the fat; add it to the other materials. Beat thoroughly and turn at once into a shallow oiled pan. Bake in a moderate oven (375° F. to 400° F.) 20 minutes or longer. (See *Tests for Sufficient Baking of Quick Bread*, p. 197.)

[1] The acidity of molasses may be due to fermentation or to the preservatives used in many brands. It varies in quantity.

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 LXVI

Leavening with Baking Powder: Griddle Cakes

Experiment 74: Effect of Cold Water on a Mixture of Cream of Tartar and Baking Soda. — Test a bit of cream of tartar with 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 75: Effect of Hot Water on a Mixture of Cream of Tartar and Baking Soda. — Repeat Experiment 74, 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 76: 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 75. From the comparison of Experiments 74, 75, with Experiment 76, what do you infer is the composition of certain baking powders? From these experiments, what conclusion can be drawn with regard to the haste necessary in mixing baking powder mixtures? After moistening the baking powder, how much time should elapse before placing the mixture in the oven?

Composition of Baking Powder. — Baking powder consists of (*a*) baking soda, (*b*) an acid substance, and (*c*) a starchy material. The acid substance varies in different baking powders. Those in common use contain either cream of tartar, acid phosphate, or alum as the acid material.

The starch is added to keep the other materials dry, and thus prevent the possible formation and consequent loss of carbon dioxide. The proportion (by weight) of cream of tartar and soda in baking powders is approximately two parts cream of tartar to one part of soda. Since cream of tartar is more bulky than soda (one and one fourth parts of cream of tartar are about equal in weight to one part of soda), the proportion (by measure) of cream of tartar and soda is approximately two and one half parts of cream of tartar to one part of baking soda.

The following "equation" represents roughly the action of baking powder when heat and moisture are applied:

1 teaspoonful of baking soda + $2\frac{1}{2}$ teaspoonfuls of cream of tartar yield neutral substance + carbon dioxide gas.

As in the case of baking soda and sour milk, care must be taken in measuring baking soda and cream of tartar. There should not be an excess of either constituent. If the baking powder is prepared in the home, one must remember that the ingredients must be measured, or weighed, and mixed most accurately.

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.

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.

A-S

The consistency of griddle cake batter is most important. As suggested in the recipe below, 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. 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.

⅛ 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 caramel syrup. (For *Caramel Syrup*, see p. 53.)

BREAD GRIDDLE CAKES

1½ cupfuls bread crumbs	2 eggs
1½ cupfuls hot milk	½ cupful flour
3 tablespoonfuls fat	½ 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.

CORN MEAL GRIDDLE CAKES

1 cupful corn meal	1 teaspoonful salt
2 cupfuls water	4 teaspoonfuls baking powder
1¼ cupfuls milk	⅛ cupful sugar
1½ cupfuls flour	2 eggs

3 tablespoonfuls fat

Add the corn meal to the water, mix thoroughly, and cook 5 minutes. Add the milk, the dry ingredients, and the well-beaten eggs. Mix thoroughly. Drop at once on the griddle.

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?

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 LXVII

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 eggs. If no eggs are present, it is often desirable to add leavening materials other than sour milk and baking soda.

From the results of Experiment 71, p. 196, one knows 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 no eggs. This involves a double reaction:

(*a*) Baking soda + sour milk yield neutral material + carbon dioxide gas.

(*b*) Baking powder (moistened and heated) yields neutral material + carbon dioxide gas.

When no eggs are used in sour milk and baking soda mixtures, 1 teaspoonful of baking powder is used with 1 cupful of flour.

SOUR MILK GRIDDLE CAKES (without eggs)

2 cupfuls flour	1 teaspoonful baking soda
½ teaspoonful salt	2 cupfuls sour milk
2 teaspoonfuls baking powder	3 tablespoonfuls fat

Turn the sour milk into a mixing bowl. Add the dry ingredients (through a sifter) to the milk. Melt the fat and add it to the flour mixture. Mix thoroughly. Add more flour if necessary.

Since the quantity of baking soda depends upon the quantity of sour milk, the flour should be the ingredient of variable quantity in recipes containing sour milk. Cook at once.

FRUIT SYRUP

Cook fresh fruit, or dried fruit that has been soaked in water, in a large 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 syrup, 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 ingredient does the quantity of baking powder depend? Explain your answers.

REVIEW XV. — MEAL COOKING

Menu

Cereal Griddle Cakes
Caramel or Fruit Syrup
Coffee

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON LXVIII

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 yield neutral substance + carbon dioxide gas.

(*b*) Baking soda + cream of tartar yield a neutral substance + carbon dioxide gas.

If molasses is used with the sour milk and baking soda, a third reaction occurs:

(*c*) Baking soda + molasses yield neutral substance + carbon dioxide gas.

⅝ teaspoonful of cream of tartar and ¼ teaspoonful of baking soda (in addition to that used to neutralize the sour milk and molasses) *should be used with 1 cupful of flour.*

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 43, p. 100.)

PLAIN BROWN BREAD

2 cupfuls graham flour	$\frac{2}{3}$ teaspoonful salt
$\frac{2}{3}$ cupful white flour	$1\frac{3}{4}$ teaspoonfuls baking soda
$\frac{2}{3}$ cupful brown sugar	$1\frac{2}{3}$ 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

1 cupful rye meal	2 teaspoonfuls baking soda
1 cupful corn meal	2 teaspoonfuls cream of tartar
1 cupful graham flour	2 cupfuls sour milk
$\frac{3}{4}$ teaspoonful salt	$\frac{1}{2}$ cupful molasses

Mix the dry ingredients thoroughly. Turn the molasses 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.

Graham flour may be substituted for the rye meal.

BROWN BREAD WITH RAISINS

2 cupfuls corn meal
2 cupfuls bread crumbs
1 teaspoonful salt
2½ teaspoonfuls baking soda
2½ teaspoonfuls cream of tartar
2 cupfuls sour milk
1 cupful molasses
1 cupful raisins

If dried bread crumbs are used, moisten them with a little cold water before adding to the other ingredients.

Cut the raisins in two and sprinkle flour over them. Mix all the ingredients as directed in the recipes above, adding the raisins last. Steam and dry as in the above recipe.

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 1 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 LXIX

Formulating Recipes; Waffles

Leavening Formulas. — A practical housekeeper needs to be able to formulate fundamental recipes. In preparing quick bread recipes, she must 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 of molasses.

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.

1 teaspoonful of baking powder to 1 cupful of flour when baking soda and sour milk are used.

[1] See footnote, p. 198.

FLOUR, CREAM OF TARTAR, AND BAKING SODA

1¼ teaspoonfuls of cream of tartar and ½ teaspoonful of baking soda to 1 cupful of flour, when no other leavening agents or eggs are used.

⅝ teaspoonful of cream of tartar and ¼ teaspoonful of baking soda (in addition to that used to neutralize the sour milk) to 1 cupful of flour when baking soda is used with sour milk.

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

1 pint flour	2 eggs
3 teaspoonfuls baking powder	1½ cupfuls milk
½ teaspoonful salt	2 tablespoonfuls fat

Mix according to the directions for Plain Griddle Cakes. (See p. 201.) The number of eggs may be increased or decreased; the quantity of baking powder should then be changed. Before using the waffle irons, they should be heated slowly on both sides and oiled thoroughly. Oleomargarine 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 syrup or gravy.

QUESTIONS

Write two recipes for waffles, using sweet milk and baking powder and 1 egg in the one, and 3 eggs in the other.

Write two recipes for waffles, using sour milk and soda and 1 egg in the one, and 2 eggs in the other.

How many waffles does the given recipe make ?

Write a recipe for Corn Bread (see p. 197), using no egg and adding baking powder.

DIVISION TEN

QUICK BREADS: DROP BATTERS

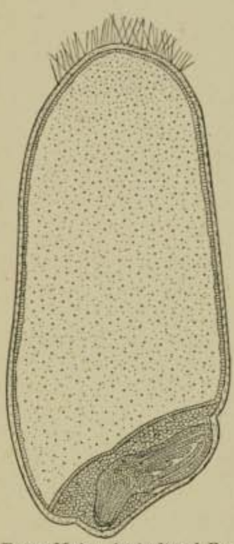
LESSON LXX

Fine and Coarse Flours; Muffins

Differences in 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. 37.) 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 or entire wheat (erroneously named) has part of the outer covering removed. Graham 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 Fig. 50, p. 212.) 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 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.*

Fig. 50. — 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 entire 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. Several authorities say that bread made from entire wheat flour or graham flour does not yield any more nourishment to the body than does ordinary bread flour, if as much. Authorities also differ about the assimilation of the ash of these coarse flours. But some recent experiments show that the bran of these cereals is a valuable source of ash.[1] Doubtless, for people of sedentary habits,

[1] See *Chemistry of Food and Nutrition*, H. C. Sherman, p. 255, "Grain Products," and p. 259.

flour containing bran is valuable, for it gives bulk to foods and hence stimulates digestion. (See *Cellulose*, p. 37.) But when this stimulation is excessive, the coarse food passes through the system rapidly. This is thought to account, in part, for the failure of the coarser flours to furnish as much nourishment as might be expected.

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 entire 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. 194.) 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	½ to 1 tablespoonful sugar
3½ teaspoonfuls baking powder	1 egg
½ teaspoonful salt	1 cupful milk

2 tablespoonfuls fat

Break the egg into a mixing bowl, beat it. Add the milk to it. Mix the dry ingredients thoroughly. Add them (through a sifter) to the egg mixture. Melt the fat, add it to the flour mixture. Mix quickly and thoroughly, and drop into buttered muffin pans. Bake in a hot oven from 25 to 30 minutes.

As in the waffle recipe, the number of eggs may be increased and the quantity of baking powder decreased.

WHOLE WHEAT MUFFINS

1 cupful whole wheat flour	3½ teaspoonfuls baking powder
1 cupful flour	1 egg
⅛ to ¼ cupful sugar	1 cupful milk
½ teaspoonful salt	2 tablespoonfuls fat

Mix and bake as Plain Muffins.

Graham flour may be substituted for whole wheat. Molasses may be substituted for sugar, if graham flour is used.

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 instead of sweet milk.

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 above recipes make?

From U. S. Department of Agriculture, Bulletin No. 28, Revised Edition, *Chemical Composition of American Food Materials*, 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. 212.)

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 entire wheat flour and graham flour usually purchased for home use? What is the price per pound of each?

LESSON LXXI

Composition of Wheat and Other Cereals; Muffins

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?

Rice contains the least ash and protein of all the common cereals. It is also deficient in fat in comparison with the other cereals. For this reason, it is not nearly so well balanced in composition as wheat. The nutrients of rice grains are not so completely assimilated as finely ground cereals.

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 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. Its cellulose, however, is very tough, hence it requires long cooking in order to be digested easily.

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.

Breakfast Cereals. — Cereals are prepared in various ways and sold as breakfast foods. They are often rolled or crushed, and steamed, so that the time of cooking may be lessened. Sugar, glucose, salt, or other materials are added to them to improve the flavor. In the preparation of some cereals, the process of malting takes place. In this process the carbohydrates of the cereal are made partially soluble or are predigested.

Breakfast cereals are inexpensive and nutritious foods. A study of their composition and digestibility should make one appreciate, but not overestimate, their food value. If well cooked, they hold an important place in diet, and should be used often.

CORN MUFFINS

1⅓ cupfuls flour	½ teaspoonful salt
⅔ cupful corn meal	1 egg
3½ teaspoonfuls baking powder	1¼ cupfuls milk
½ to 1 tablespoonful sugar	2 tablespoonfuls fat

Mix as plain muffins, and bake in oiled muffin tins 25 to 30 minutes.

Rye meal may be substituted for corn meal in this recipe.

RICE MUFFINS

1½ cupfuls flour	1 egg
3½ teaspoonfuls baking powder	¾ 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, as for plain muffins.

QUESTIONS

Explain why corn meal is not used alone for corn meal muffins. (See *Wheat Flour, and Corn Meal*, p. 215.)

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 *Percent of Nutrients; Nutritive Values*, p. 213.)

REVIEW XVI. — MEAL COOKING

Menu

Cream of Potato Soup
Lettuce Salad with French Dressing
Muffins

See Review I (p. 41) regarding suggestions for the preparation of the lesson.

LESSON LXXII

Method of Preparing Eggs for Quick Breads; Peach Cup

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 39 and 41 (p. 93) 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. 94), should be used for mixing the egg whites with the other ingredients of a quick bread.

PEACH CUP

8 ripe, or canned, or dried peaches or apricots	1½ cupfuls flour
2 eggs	3 teaspoonfuls baking powder
½ cupful milk	½ teaspoonful salt
	1 tablespoonful butter

Pare the peaches, mash two of them, and add the well-beaten egg yolks. Add the milk; then the dry ingredients (through a sifter). Melt the butter, add it to the flour mixture. Beat well; then cut and fold in the well-beaten whites. Put a layer of the mixture in the bottom of a custard cup, add half a peach or apricot, and cover with batter. Sprinkle granulated sugar over the top, and bake in a moderate oven 20 minutes. Turn from the cups and serve hot with Hard Sauce or with plain or whipped cream.

WHIPPED CREAM SAUCE

1 cupful whipped cream	⅛ 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. 100.) Add the sugar and vanilla.

QUESTIONS

What is the purpose of separating the eggs in Peach Cup?

Why should the mixture be mixed thoroughly before adding the egg white?

Why should the whites of eggs be cut and folded into the mixture?

Note the quantities of flour and milk in Peach Cup. What material furnishes additional moisture to the mixture, so that it may be termed a drop batter?

Account for the quantity of baking powder in this recipe.

If dried fruit is used for this dessert, how should it be prepared before being added to the other ingredients?

Why is it necessary to surround the cream with ice water while whipping it? (See *Cream*, p. 100.)

How many "cups" does this recipe make?

LESSON LXXIII

Method of Preparing Eggs for Quick Breads; Cream Puffs

The Preparation of Eggs for Hollow Breads. — Note the method of adding eggs to the Popover mixture. (See p. 194.) Note the method of preparing eggs in the recipes in Lessons LXIV to LXXII (inclusive).

If a hollow bread is desired, the entire egg is added, unbeaten, to the other ingredients, and then all are beaten vigorously as in Popovers. If a light, even-grained bread is to be made, the eggs are first beaten (separated or whole); then added to the other ingredients.

CREAM PUFFS

1 cupful hot water	1½ cupfuls flour
½ cupful butter	5 eggs

Heat the water and butter until the water boils. Add all of the flour, and mix thoroughly. Cook 5 minutes; when cool, add the eggs, unbeaten, one at a time. Beat until thoroughly mixed. Drop by tablespoonfuls on buttered baking sheets, and bake in a hot oven from 25 to 30 minutes. When cool slit one side open and fill with Cream Filling, Lemon Filling, or Whipped Cream.

Cream Puffs may also be filled with creamed chicken or veal, or a salad mixture.

CREAM FILLING

⅓ cupful flour	½ tablespoonful butter
⅞ cupful sugar	2 eggs
2 cupfuls scalded milk	⅛ teaspoonful salt

1 teaspoonful vanilla

Mix the flour and sugar together. Slowly add the hot milk. Pour the mixture into a double boiler and cook for 20 minutes. Remove from heat. Beat the eggs, add the eggs 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.

QUESTIONS

From the difference in the methods of preparing Cream Puffs and Popovers before baking, explain the difference in the stiffness of the mixtures.

Why is it necessary to cool the Cream Puff mixture before adding the eggs?

Why are not the eggs beaten before being added to the Cream Puff mixture?

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 21, p. 54.)

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?

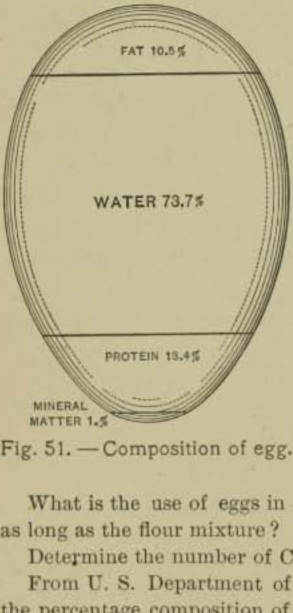


Fig. 51. — Composition of egg.

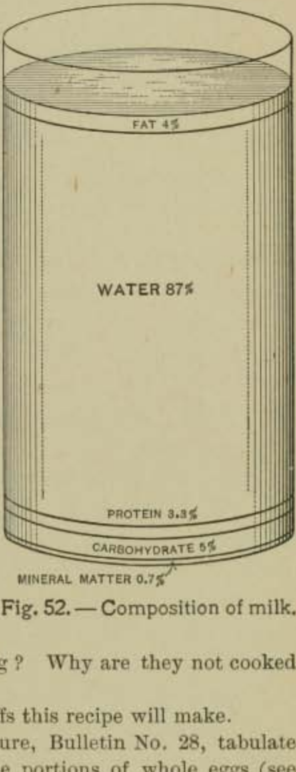


Fig. 52. — Composition of milk.

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 Fig. 51), 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 Fig. 52). Explain why milk is not a perfect food for adults.

DIVISION ELEVEN

QUICK BREADS: SOFT DOUGHS

LESSON LXXIV

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. 226) is a typical soft dough mixture.

DROP BISCUITS

2 cupfuls flour	½ teaspoonful salt
4 teaspoonfuls baking powder	2 tablespoonfuls fat

¾ cupful (?) milk or water

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 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 butter 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.

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. 194, and *Gluten*, p. 232.)

LESSON LXXV

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 31, p. 80.) 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, and (*c*) difference in flavor.

FRUIT SHORT CAKE

Make a biscuit mixture, using butter for the fat, and with 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. Add the remainder of the mixture and bake from 20 to 30 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.

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 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?

REVIEW XVII. — MEAL COOKING

Menu

Rolled Beef Steak
Stuffed Baked Potato
Drop Biscuits

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON LXXVI

"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. Pressure in opposite directions should not be exerted at one stroke of the rolling pin.

BAKING POWDER BISCUITS

2 cupfuls flour	½ teaspoonful salt
4 teaspoonfuls baking powder	2 tablespoonfuls fat

¾ cupful (?) milk or water

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 from 12 to 15 minutes. Serve hot 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 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. 252) may be used for Apple Dumplings. Other fruits may be used instead of apples.

FRUIT ROLLS

Make a biscuit mixture, using 4 tablespoonfuls of butter instead of 2 tablespoonfuls of fat, as given in the recipe for Baking Powder Biscuits. Gently roll to ¼ inch thickness, and spread the following ingredients over it:

1 tablespoonful butter	½ teaspoonful cinnamon
2 tablespoonfuls sugar	Fruit

For the fruit use:

½ cupful dried currants, or
½ 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 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 should biscuits be served on a napkin or doily?

Write a recipe for Baking Powder Biscuits, using $2\frac{3}{4}$ 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.

DIVISION TWELVE

YEAST BREADS: STIFF DOUGHS

LESSON LXXVII

YEAST; LOAF BREAD

Experiment 77: Conditions for Growth of the Yeast Plant. — (*a*) Mix together 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?

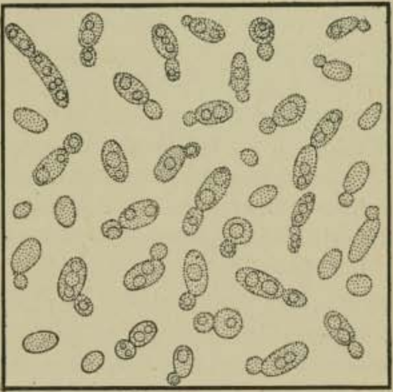
(*d*) Surround the tube marked "*c*" with lukewarm water and stand in a warm place. After 15 minutes examine. Are the yeast plants growing? Does freezing kill yeast plants?

(*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 Fig. 53.) 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*.

Fig. 53. — 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.

General Suggestions for Bread Making. — Use bread flour, or a combination of bread flour with either whole wheat or graham flour 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 it to prevent it from souring. Water should be boiled and then cooled. (See *Why Foods Spoil*, p. 289.) Milk and water are both used lukewarm.

With 1 quart of liquid ½ to 1 cake of yeast should be used. 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 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 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.

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 only applies, however, 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.

BREAD

2 cupfuls milk or water	1 tablespoonful fat
2 teaspoonfuls salt	½ cake compressed yeast
2 teaspoonfuls sugar	½ cupful water

Bread flour

Put the hot liquid, salt, sugar, and fat into a bowl. Stir until the salt and sugar are dissolved, and the fat melted. Mix the yeast with lukewarm water. When the first mixture is of the same temperature, add the yeast mixture to it. Then add flour enough to make it of the proper consistency, 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 Temperatures*, p. 193.)

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?

What is the price and weight of a loaf of baker's bread?

Calculate the cost of a loaf of home-made bread. What is its weight? What is the difference in cost per pound? Compare baker's and home-made bread as to flavor, texture, and color.

LESSON LXXVIII

Bread Flour; Loaf Bread

Experiment 78: Protein in Flour. — Make a stiff dough, using 2 tablespoonfuls of bread flour and about ½ tablespoonful of water. Knead well, and allow to stand for 20 minutes. Then tie the dough in cheesecloth, 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.

Bread 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 Flours*, p. 211), 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.

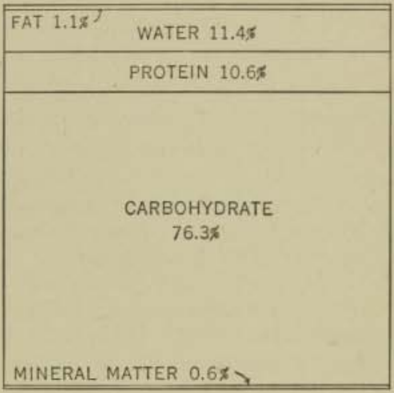


Fig. 54. — Composition of wheat flour (average).

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.

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

ENTIRE WHEAT BREAD

Use one half white bread flour and one half entire wheat flour in the recipe given for white bread in order to make Whole Wheat Bread. Mix and bake as white bread.

[1] "Selection and Preparation of Food," by Bevier and Van Meter, p. 82.

Graham flour may be used instead of entire wheat flour. In using this flour ¼ cupful molasses may be substituted for the sugar.

It has been found that the most desirable Entire Wheat or Graham Bread results when a sponge (see below) is made of the white flour, and the entire wheat or graham flour is added after the sponge has risen.

QUESTIONS

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 most protein; which, the most 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?

REVIEW XVIII. — MEAL COOKING

Menu

Sweet Potato (southern style)
Apple Dumpling (or Fruit Roll)

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON LXXIX

Bread Sponge; Loaf Bread

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 necessary 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 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.

QUESTIONS

From U. S. Department of Agriculture Bulletin No. 28, tabulate the percentage composition of white (see Fig. 55), of graham, and of whole wheat bread.

What is the price per cake of compressed yeast? What is the price per package of dry yeast? How many cakes in a package?

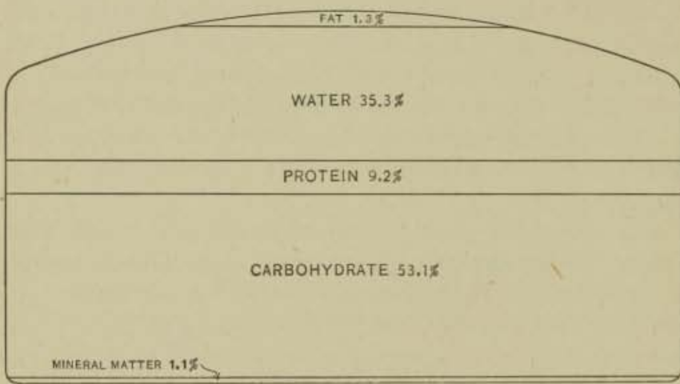


Fig. 55. — Composition of white bread.

Under what conditions would dry yeast be used?

Under what conditions should a sponge be made when compressed yeast is used? (See *Entire Wheat Bread*, p. 233.)

LESSON LXXX

Rolls and Buns

ROLLS OR BISCUITS

For rolls or biscuits use the recipe for white bread, adding twice the quantity of fat, and using milk for 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. Allow them to rise to double their bulk; then bake in a hot oven.

PARKER HOUSE ROLLS

2 cupfuls scalded milk	1 teaspoonful salt
3 tablespoonfuls butter	1 yeast cake
2 tablespoonfuls sugar	¼ 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 ⅓ of an inch in thickness. Cut into rounds with a biscuit cutter; put a bit of butter 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 in a hot oven from 20 to 30 minutes.

The crust may be glazed with a mixture of milk and sugar before removing the biscuits. Use 1 part sugar to 2 parts milk. Diluted egg white also may be used for glazing.

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, 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. 226) 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 about 30 minutes. The buns may be basted with molasses or sugar, or with a milk and sugar mixture. (See *Parker House Rolls,* above.) Add 1 teaspoonful of the basting material to each bun 15 minutes before removing from the oven.

QUESTIONS

Why should a sponge be made when eggs are to be added to the mixture ?

What would be the disadvantage in adding them to a dough, after the dough had stiffened ?

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 ?

DIVISION THIRTEEN

CAKES

LESSON LXXXI

CAKE WITHOUT FAT: SPONGE CAKE

Comparison of Sponge Cake and Popovers. — See the recipe for *Popovers*, p. 194. Compare it with the recipe for *Sponge Cake.*

SPONGE CAKE NO. I

6 egg yolks	Grated rind of ½ lemon
1 cupful sugar	6 egg whites
1 teaspoonful lemon juice	¼ teaspoonful salt
1 cupful flour	

(Instead of 6 eggs, 4 eggs with ¼ cupful of water and 1 teaspoonful of baking powder may be used.)

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?

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 lifting the wire egg beater straight up and down through the mixture. Turn at once into an unoiled pan. Bake in a moderate oven 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 cool 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

3 egg yolks	2 cupfuls flour
1½ cupfuls sugar	¼ teaspoonful salt
1 tablespoonful lemon juice	2 teaspoonfuls baking powder
½ cupful water	3 egg whites

Mix and bake according to the directions given above.

CREAM FILLING

2 cupfuls milk	1/8 teaspoonful salt
5/8 cupful sugar	1/2 tablespoonful butter
1/2 cupful flour	2 eggs

1 teaspoonful flavoring

Mix the sugar and the flour; add the scalded milk; and cook in the top of a double boiler for 20 minutes. Add the salt, eggs, and butter. Cook until the egg has coagulated. Cool; stir in the flavoring. This filling is to be used between the layers of Sponge Cake, or as a filling between split sheets of a loaf 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?

Other than as a flavoring, what is the use of lemon juice in a sponge cake mixture? (See Experiment 38, p. 91.)

What is the effect of too cool an oven on Sponge Cake?

Why is it necessary to cook the milk, sugar, and flour mixture of Cream Filling for 20 minutes? Why are not the eggs cooked for the same length of time? Compare this mixture with the filling for Cream Puffs. (See p. 220.) What ingredients vary in quantity? Give the reasons for these variations in quantity.

LESSON LXXXII

Cake Containing Fat: Plain Cake

Classes of Cakes. — Cakes are commonly divided into two classes: (*a*) Cakes without fat and (*b*) Cakes containing fat. Sponge cake (p. 240) is an example of the first class and the Plain 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 Plain Cake and Muffins. — See the recipe for *Plain Muffins*, p. 213. Compare it with the recipe for *Plain Cake*.

PLAIN CAKE

2 cupfuls flour	2 eggs
2 teaspoonfuls baking powder	⅔ cupful milk or water
1 cupful sugar	1 teaspoonful flavoring

3 to 4 ounces fat

What ingredient does cake contain that is not present in muffins? What two ingredients exist in greater quantity in cake than in muffins? What ingredient exists in a smaller quantity in cake? Account for the difference in the quantity of baking powder in the two mixtures. What are the proportions of fat to flour, milk to flour, and sugar to flour, in this recipe?

Generally, the more fat a quick bread contains, the smaller the quantity of moisture needed. Since cake contains much fat, less moisture is used in cake mixtures than in muffin mixtures. In cake mixtures are used: from one fourth to one third as much fat as flour; from one fourth to one half as much liquid as flour; from one half to two thirds as much sugar as flour.

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.[1] These show that a cake of good quality may be made by following the method of mixing

[1] See the *Journal of Home Economics*, December, 1909, p. 418, "Cake Mixing," by Mabel T. Wellman.

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:

Mix the sugar with the well-beaten eggs. Add the flavoring. Add some of the dry ingredients and part of the milk. Repeat until all the dry ingredients and the milk have been added. Add the melted fat.

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 flavoring, dry ingredients, and moisture are added, then the melted fat is 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.

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 the butter is the predominating flavoring ingredient in cakes containing fat (as in Pound Cake) the best quality of table butter should be used. Oleomargarine, tried-out chicken fat, suet, lard, or vegetable fat, in combination with butter or other fats, may be used for spice cakes or highly flavored cakes. Cake is one of the foods whose ingredients require the greatest accuracy and care in measuring. The fat for cake can be more easily and accurately weighed than measured.

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. 240.) To avoid this, the temperature of 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 15 to 20 minutes for baking and loaf cakes from 40 minutes to 1½ hours. In 1 minute after taking from the oven, cake containing fat should be removed from the pan, and placed on a wire cake cooler until cold. The cake may be placed on a towel or cloth instead of on a cake cooler.

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?

LESSON LXXXIII

Cake Containing Fat: Modifications of Plain Cake, — White Cake

The "Conventional" method of mixing cake is as follows: Cream the butter; 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.

STANDARD CAKE RECIPE

4 to 6 ounces fat	3 cupfuls flour
1 cupful milk or water	4 eggs ½ teaspoonful salt
2 cupfuls sugar	3 teaspoonfuls baking powder

2 teaspoonfuls spice or 1 teaspoonful flavoring

Mix according to general directions. (See *Method of Mixing Cake Containing Fat*, p. 242.)

This is an adaptation of an old cake recipe, — "1, 2, 3, 4 cake."

WHITE CAKE

White cake is made by using egg whites instead of whole eggs. If the egg yolks were omitted from the ingredients of the standard cake recipe, it is evident that additional egg white should be used, or that other stiffening material should be added. The standard cake recipe may be modified for a white cake recipe by omitting the yolks of eggs, increasing the egg whites to 6, or adding $\frac{1}{4}$ cupful more of flour (1 tablespoonful for each egg yolk) and flavoring with vanilla or almond extract.

When only the egg whites are used, the cake is mixed according to the general directions (see p. 242), except, of course, that the egg yolks are omitted.

COCOANUT CAKE

Break open a fresh cocoanut, save the milk of the cocoanut and use it as part of the liquid for a White Cake. Add milk to the milk of cocoanut to make the 1 cupful of liquid in the standard cake recipe. Prepare a White Cake in two layers.

Break the cocoanut into pieces, pare these and put them through a food chopper. Prepare Boiled Frosting. When the frosting is ready to spread on the cake, add about $\frac{3}{4}$ of the chopped cocoanut. Spread the mixture on the cake layers and sprinkle the remainder of the cocoanut over the frosting on the top layer of the cake.

A fresh cocoanut cake will keep moist for a week.

WATER FROSTING

1 cupful confectioner's sugar
1 tablespoonful hot water, milk or cream
1 tablespoonful lemon juice

Stir the hot water into the sugar and add the lemon juice. If too stiff, add a little more boiling water.

$\frac{1}{2}$ ounce of melted chocolate and $\frac{1}{2}$ teaspoonful of vanilla may be used instead of the lemon. 1 tablespoonful of cocoa may be mixed with 2 tablespoonfuls of water, cooked for a few minutes, and used in place of the moisture and flavoring.

EGG FROSTING

1 egg white 1 cupful confectioner's sugar
1 tablespoonful lemon juice

Put the unbeaten egg white into a bowl; add the lemon juice, then the 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 1 tablespoonful lemon juice or vanilla
Confectioner's sugar

Add the flavoring 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

1 cupful sugar $\frac{1}{3}$ cupful water
1 teaspoonful vinegar 1 egg white
1 teaspoonful flavoring

Mix the sugar, water, and vinegar in a saucepan. Cook *gently* until the syrup (when dropped from a spoon) "spins a thread" 3 inches long. Remove from the fire, and gradually pour the syrup over the egg white which has been beaten stiff. Continue to beat the mixture; when it begins to stiffen, add the flavoring, and spread over cooled cake.

QUESTIONS

When egg yolks are omitted from the standard cake recipe, explain the necessity of using additional egg whites or additional flour.

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 8, p. 29.)

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. 315.)

Why should the white of egg be beaten while the hot syrup is being poured over it?

LESSON LXXXIV

CAKE CONTAINING FAT: MODIFICATIONS OF PLAIN CAKE, — CHOCOLATE CAKE, NUT CAKE, CAKE CONTAINING FRUIT

CHOCOLATE CAKE

In changing the standard cake recipe for a chocolate cake recipe, use the smaller quantity of fat; add $\frac{1}{4}$ cupful more of sugar and 3 ounces of chocolate. The chocolate should be added after the egg yolks have been mixed with the sugar. The chocolate may be melted over hot water, or $\frac{1}{3}$ cupful boiling water may be cooked "gently" with it until a smooth paste is formed. (See *Cocoa and Chocolate*, p. 98.) When the latter method is followed, use $\frac{2}{3}$ cupful of liquid instead of 1 cupful. Add $1\frac{1}{2}$ teaspoonfuls more of baking powder. This cake is improved by the addition of 2 more eggs.

NUT CAKE

Use the smaller quantity of fat and add 1 cupful of chopped nuts. Flour the nuts and add last.

CAKE CONTAINING FRUIT

Use 1 cupful of raisins or currants. After cleaning, dry, and flour. Raisins should be chopped, or cut in two pieces. (See *To Prepare Raisins for Cooking*, p. 103.) Citron may also be added. It should be cut in thin slices and sprinkled between layers of the batter. When light brown sugar is used, dates may be used. These should be cleaned, stoned, cut into pieces, and added as were the raisins or currants. Spices give pleasing flavor when dried fruits are used.

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 and for Chocolate Cake.

If cocoa is substituted for chocolate, how much should be used in this recipe?

Why are the dried fruits floured?

Compare cakes made with the least and the greatest quantity of fat. Which is the more tender? Which has the better taste?

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?

Calculate the cost per pound of Sponge Cake (see p. 239). Calculate the cost per pound of cake containing fat (see *Plain Cake*, p. 242).

REVIEW XIX. — MEAL COOKING

Menu

Bread (or Raised Biscuits)
Cranberry Jelly (or Fruit Sauce)

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON LXXXV

Cake Containing Fat: Cookies

SUGAR COOKIES

4 ounces fat	¼ cupful (?) milk or water
1 cupful sugar	2 teaspoonfuls baking powder
1 egg	2 cupfuls flour

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 about 10 minutes.

SOUR CREAM COOKIES

3 ounces fat	1 teaspoonful baking soda
1 cupful sugar	2 teaspoonfuls cream of tartar
1 egg	Nutmeg
½ cupful sour cream	3½ cupfuls flour 4½

Mix and bake as in the previous recipe.

QUESTIONS

Compare the recipe for Sugar Cookies with that for Plain Cake (see p. 242). Account for the difference in the quantity of milk. Explain why the quantity of milk is decreased rather than the quantity of flour increased.

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?

How much baking soda is required to neutralize the acid in the sour milk? What neutralizes the remainder of the baking soda in Sour Cream Cookies?

If sour milk is substituted for sour cream, what ingredient should be increased in quantity?

DIVISION FOURTEEN

PASTRY

LESSON LXXXVI

Pie with Under Crust: Lemon Pie

Pastry. — Good pastry is: (*a*) light, (*b*) flaky, 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. Pastry should be rolled in one direction only and on but one side. 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, the fat 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. The following fats may be used alone or in combination: butter, oleomargarine, lard, vegetable fat, lard substitutes, and beef drippings.

In order 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.

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. The under crust should be baked on the outside of a pie pan; it should be pricked with a fork before baking.

PLAIN PASTRY

1/2

1¼ cupfuls flour	¼ teaspoonful salt
1 teaspoonful baking powder	2 to 4 ounces fat
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. It is well, however, to place it in a hot oven and then lessen the heat after a short time.

LEMON PIE

⅓ cupful flour	Juice and rind of 1 lemon
1 cupful sugar	1 tablespoonful butter
2 cupfuls boiling water	2 egg yolks ¼ teaspoonful salt

MERINGUE

2 egg whites	2 tablespoonfuls powdered sugar

Mix the sugar and flour together, add the boiling water and cook on the back of the range, or over an asbestos mat, for 15 minutes. Add the other ingredients and cook at simmering temperature, until the eggs thicken. Cool and place in a baked crust. Cover with a meringue. Bake until the meringue is a light brown.

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?

How many crusts will the recipe for Plain Pastry make?

Compare the filling for Lemon Pie with that for Cream Puffs.

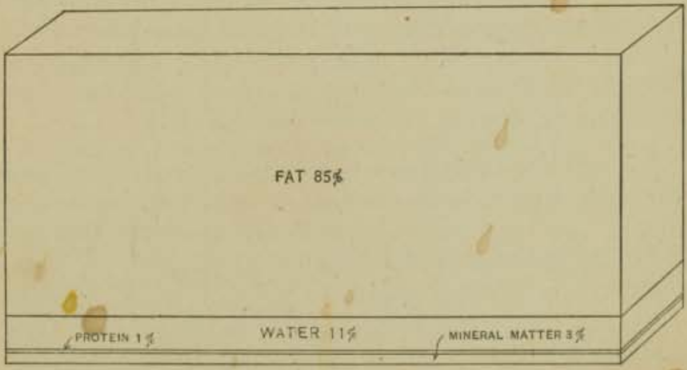


Fig. 56. — Composition of butter.

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 Fig. 56), oleomargarine, lard, and cottolene. What is the price per pound of each?

Which furnishes more fat, — a pound of butter or a pound of lard? If lard or cottolene were substituted for butter in a cake or other quick bread, should the same quantity be used? Explain.

LESSON LXXXVII

Pie with Upper Crust: Fruit Pie

Digestion of Pastry. — When fats are heated to a high temperature, they do not boil, but are decomposed. The products of this decomposition are less readily digested than is fat before it is heated. 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.

Not only the fat of fried foods is indigestible, but the fried food, itself, is difficult of digestion. The fat forms a seal over the food particles, and retards the action of the digestive juices. When fat and flour are combined in making pastry, no digestion of the flour takes place in the mouth, hence more work is placed upon the intestines. A combination of bread and butter is a much better food than a mixture of flour and fat in the form of pastry.

Pie with the Upper Crust. — In the previous lesson (see *Pie with Under Crust*, p. 252), it was mentioned that "pasty" pie crust was not readily digested. For this reason, it is desirable to make fresh fruit pie with an upper crust only. Such pie should be baked in an earthenware or granite pan. 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.

APPLE PIE

Cut 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 lemon juice, cinnamon, or nutmeg. Turn into a deep earthenware or granite pan, add bits of butter, and cover with pastry as directed above. Bake until the apples are soft and the crust is brown.

Apple sauce may be used as a filling for a baked crust. Such a pie is sometimes covered with meringue or strips of pastry.

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 together; beat the egg. Add the rhubarb and flour mixture to the egg. Bake with a top crust as directed in Apple Pie.

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.

Explain why it is that bread and butter are more readily digested than pastry or fried bread and butter.

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 Fig. 60, p. 264.)

LESSON LXXXVIII

Pie with Upper and Under Crusts: Fruit Pie

Two Crusts. — If both upper and lower crusts are used, the lower should be moistened around the edges with cold water; then a half inch strip of pastry should be placed around the edge of the under crust. The strip should be moistened, and the upper crust placed over the pie and pressed around the edges. Then the edges should be trimmed and bound with a strip of muslin. This is especially necessary if a juicy filling is to be used in the pie.

As was mentioned before, upper crusts should always be cut in several places for the escape of steam. When both crusts are used for a fruit pie, paper tubes inserted in the incisions allow the steam to escape readily, and prevent the fruit juice from running out.

FRUIT PIE WITH TWO CRUSTS

2 cupfuls fruit — ½ to 1 cupful sugar
3 tablespoonfuls flour

If the fruit is fresh, wash and drain well. Mix the sugar and flour together. 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 it is that pie with one crust, if properly made, is more readily digested than that with two crusts. (See *Solution and Digestion*, p. 29 and *Pie with Under Crust*, p. 252.)

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, and butter, as to taste, appearance, flakiness, and tenderness.

REVIEW XX.—MEAL COOKING

Menu

Cake (for Cottage Pudding)
Vanilla Sauce
Cocoa

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

DIVISION FIFTEEN

FOOD COMBINATIONS

LESSON LXXXIX

Vegetables with Salad Dressing (I)

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. Butter and other fats make desirable additions to vegetables. Although sugar is usually served with a cereal, such a combination is not advisable. 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. 80), 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 32, p. 81.) Egg is another material which emulsifies fats. This fact is made use of in making Mayonnaise Dressing from olive oil and eggs. If one understands that the olive 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 — drop by drop — and should be beaten while being added. The oil should be cold so that the fat globules will not "run together."

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 intimately mixed with protein as in Mayonnaise Dressing, the digestion of fat is retarded.

MAYONNAISE DRESSING

¼ teaspoonful mustard	2 egg yolks
1 teaspoonful salt	1 cupful olive oil, chilled
Cayenne	3 tablespoonfuls vinegar or lemon juice

Mix the dry ingredients with the egg yolks until well blended. Then add the oil, *drop* by *drop*, beating it constantly. When it begins to thicken, add a little of the vinegar; then the remainder of the oil (in small quantities) and the vinegar, alternately.

If this 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 many persons the flavor of *peanut oil* and of *salad oil* is pleasing. These oils are as nutritious as olive oil. Their use lessens the cost of Mayonnaise Dressing. Salad oil, which is composed almost entirely of cottonseed oil, has a pleasant flavor, if it is sweet. After opening a bottle, it should be kept in a cold place. If it is rancid, it should not be used in salad dressing.

To remedy Mayonnaise Dressing that has curdled, beat the yolk of an egg slightly, then add the dressing to it gradually, beating constantly.

Seasonable Vegetable Salads. — Use seasonable vegetables in salads. Cucumbers, tomatoes, and celery should be used in the fall. Cooked beets and olives may be used in the winter, and head lettuce and radishes in the spring. They should be chilled and cut into desirable shapes. Serve 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. 171).

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*. Just before serving, Cream Salad Dressing or Mayonnaise Dressing (see pp. 172 and 259) may be added to the salad. A salad should be served at once after the dressing is added. If several meats or vegetables are used in the same salad, they should be marinated separately.

QUESTIONS

Explain why it is necessary to add the oil to the egg mixture, drop by drop.

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? What is the price per quart of peanut oil? What is the price per quart of salad oil?

Find the difference in cost between a Mayonnaise Dressing made with salad or peanut oil and one made with olive oil.

From the standpoint of composition, explain why green vegetables and Mayonnaise Dressing make a suitable combination.

How much Mayonnaise Dressing is generally used for one serving? How many will the above recipe serve?

LESSON XC

Vegetables with Salad Dressing (II)

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	2 cupfuls sliced celery
Juice of 1 lemon	1 cupful shredded cabbage
2 cupfuls boiling water	3 pimentos chopped

Prepare all ingredients, except the vegetables, as for a gelatine mixture. (See Lemon Jelly, p. 147.) When the mixture begins to set, stir in the vegetables, and pour into a mold. Serve on lettuce leaves with Mayonnaise Dressing.

QUESTIONS

Mention at least four different kinds of salads, with a suitable garnish for each.

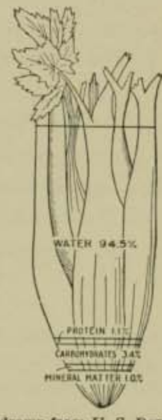
What should be the condition of all green vegetables used in salads?

How should lettuce be kept and prepared for salads?

Explain why Mayonnaise Dressing with wafers or rolls would make a valuable food addition to Perfection Salad.

From U. S. Department of Agriculture Bulletin No. 28, tabulate the percentage composition of tomatoes, cucumbers, spinach, cabbage, lettuce, celery (see Fig. 57), and onions.

Which contains the most water? Which contains the most ash?



Redrawn from *U. S. Department of Agriculture Chart.*

Fig. 57. — Composition of celery.

LESSON XCI

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 pp. 172 and 259.) 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 should 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 butter
3½ teaspoonfuls baking powder	½ cupful milk
½ teaspoonful salt	1 egg

Beat the egg, add the milk to it, and then proceed in mixing as for Baking Powder Biscuits. 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, and sprinkle granulated sugar over it. Bake in a moderate oven.

QUESTIONS

Why is the top of the salad roll mixture brushed with egg? How should the egg be prepared 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 fresh beef, — round (see Fig. 64, p. 269).

LESSON XCII

Two Nutritious Desserts

Food Fruits. — As has been mentioned, some fruits are termed food fruits (see p. 31). Such fruits are not only valuable for flavor, but also for their nutrients, as they contain carbohydrates and valuable ash. Dates, figs, and dried prunes contain calcium, phosphorus, and iron, — three of the most desirable forms of ash occurring in foods.

Nuts are another form of fruit. They are rich in nutritive materials. If they can be digested readily, they make a valuable food. 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.

Very often dried fruits and nuts are used as accessories after a meal. For this reason, they are digested with difficulty by some people, because the meal itself has tired 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 dessert should not be considered one of the nutritious foods of a meal, provided it gives no distress in the digesting.

PRUNE PUDDING

1 cupful cooked prunes, seeded and chopped

¾ cupful sugar	1 tablespoonful butter, melted
1 cupful chopped nuts	3 crackers (½ cupful rolled fine)
½ cupful milk	1 teaspoonful baking powder
1 teaspoonful vanilla	Salt

Mix all the ingredients. Pour into a buttered baking dish. Place the baking dish in a pan of hot water. Bake in a moderate oven for 20 minutes, or until the mixture is firm. Serve hot, with plain or whipped cream.

DATE PUDDING

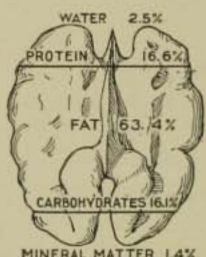
¾ cupful sugar	1 teaspoonful baking powder
2 eggs	Salt
¼ cupful flour	1 cupful dates, seeded, and cut in pieces

1 cupful California walnuts, chopped

Mix the sugar and eggs. Mix the fruit, nuts, and dry ingredients; then add to the first mixture. Mix, and turn into an oiled baking dish or granite pan. Bake and serve as Prune Pudding.

QUESTIONS

How many dry, uncooked prunes are required to make 1 cupful of cooked prunes? (See *Questions*, p. 34.)



Redrawn from *U. S. Department of Agriculture Chart.*

Fig. 58. — Composition of chestnut.

Fig. 59. — Composition of walnut.

Fig. 60. — Composition of apple.

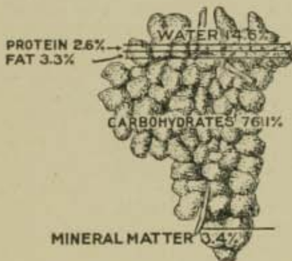
What ingredients in these puddings scorch readily? Why are the puddings surrounded with hot water during baking?

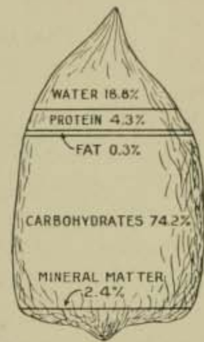
From U. S. Department of Agriculture Bulletin No. 28, tabulate the percentage composition of almonds, Brazil nuts, chestnuts (see Fig. 58), pecans, and walnuts (see Fig. 59). Which contains the most fat; which, the most protein; which, the most carbohydrates?

From U. S. Department of Agriculture Bulletin No. 28, tabulate the percentage composition of apples (see Fig. 60), apricots, peaches, bananas, raisins (see Fig. 61), currants, dates, and figs (see Fig. 62).

Classify these fruits as to nutritive value. (See *Kinds of Fruits*, p. 31.) Give the use in the body of each class.

Give a dietetic reason for combining dried fruits and nuts.





Redrawn from *U. S. Department of Agriculture Chart.*

Fig. 61. — Composition of raisins.

Fig. 62. — Composition of dried fig.

What are the prices per pound of almonds, pecans, and California walnuts?

What are the prices per pound of figs and dates?

How many will the above recipes serve?

REVIEW XXI. — MEAL COOKING

Menu

Seasonable Vegetable Salad
Mayonnaise Dressing
Salad Rolls

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON XCIII

Veal and Potatoes

Muscle of Young Animals. — The muscle of an undeveloped animal is not so nourishing as is the muscle of a mature animal. It is also lacking in extractives, and there is usually 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 FIG. 63.)

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 extractives, 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 very unwholesome; such meat is lacking in color.

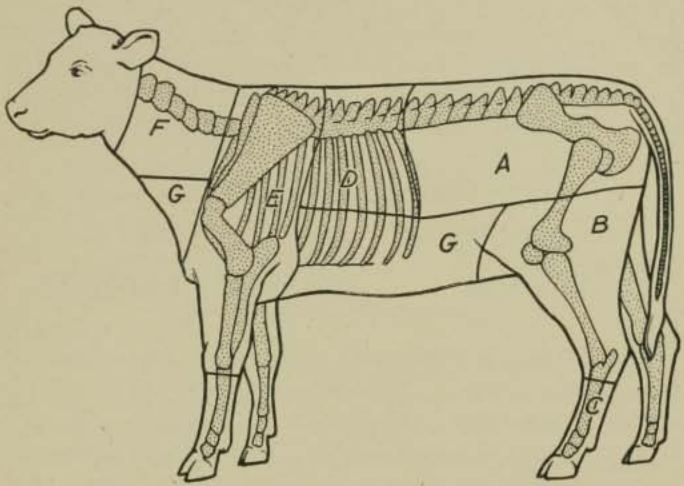


Fig. 63. — Cuts of veal.

The connective tissue in veal is abundant, but it is easily changed to gelatine by cooking. Veal is generally considered difficult of digestion. It is said that this is because:

(*a*) It lacks extractives, which stimulate the flow of digestive juices.[1]

(*b*) The fibers easily elude the teeth on mastication.[1]

(*c*) The fibers are fine and the fat is intimately mingled with the lean.[2]

VEAL CUTLETS (STEAK)

Clean the meat; then remove the bone and tough membranes. Cut the meat into pieces for serving. Cover the

[1] See "Food and Dietetics" by Robert Hutchinson, p. 67.
[2] See "Nutritional Physiology" by Stiles, p. 221.

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	⅛ teaspoonful pepper
¼ cupful flour	2 cupfuls stock or water
½ 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. 130.) 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. If desired, more than 1 teaspoonful of Worcestershire sauce may be added.

Beef may be prepared in the same way.

POTATO PUFF

2 cupfuls mashed potatoes	1 teaspoonful salt
2 tablespoonfuls milk	Pepper
1 tablespoonful butter	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 the egg is cooked and the top brown. 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 ?

Give two reasons for using 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. To what cut of beef does it correspond ?

Fig. 64. — Composition of round (beef).

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 round steak (see Fig. 64).

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.

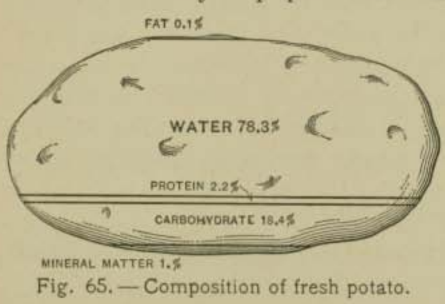


Fig. 65. — Composition of fresh potato.

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 Fig. 65) 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 XCIV

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 two or three weeks before using. It is considered as nutritious as beef. Some say that it is as easily digested as beef; others, that it is more easily digested. Its strong flavor may be destroyed by removing the "pink skin" and much of the fat. The latter is less digestible than is that of beef, and, being of such a strong flavor, cannot be used for cooking. It may be used for soap making.

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 is not as nutritious as mutton, should not be allowed to hang, and is lacking in extractives and fat. Lamb should be well cooked; mutton is sometimes served rare.

STUFFED SHOULDER OF LAMB

4 to 5 pounds shoulder of lamb, boned, cleaned, and stuffed with the following mixture:

4 cupfuls soft bread crumbs	½ teaspoonful thyme
2 teaspoonfuls salt	½ teaspoonful savory
½ teaspoonful marjoram	½ teaspoonful pepper

4 tablespoonfuls butter

Mix the seasoning with the bread crumbs. Melt the butter, and then add the seasoned crumbs. Add the stuffing to the meat; then "lace" (see *Dressing and Cleaning Poultry*, p. 279) or skewer into shape. Season, and dredge with flour. Place drippings or other fat in a frying pan or iron roasting pan, and brown the surface of the meat. Place the lamb on the rack in a roasting pan, add boiling water; cover; and bake in a moderate oven, allowing *one half hour to the pound.*

Shoulder of veal may be prepared and stuffed in the same way.

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
	2 cupfuls peas
Flour	2 teaspoonfuls salt
Fat for browning	Pepper
Water or stock	½ bay leaf

3 allspice berries

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 at simmering temperature for two 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.

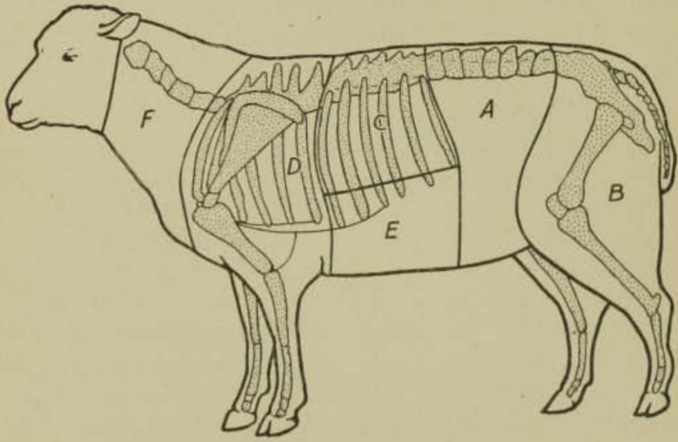
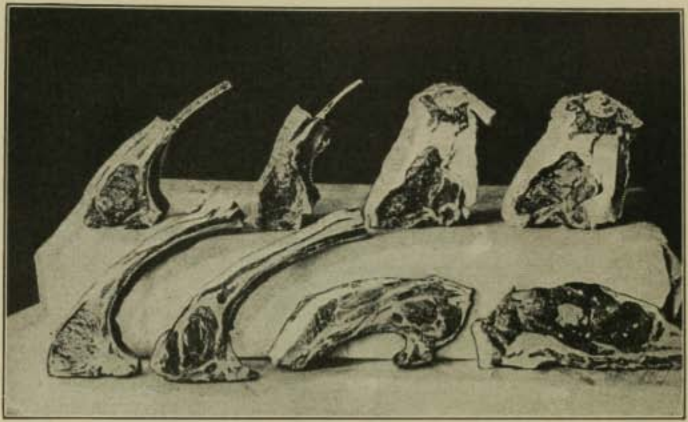


Fig. 66. — Cuts of lamb and mutton.

Cuts of Lamb and Mutton. (See Fig. 66.)

Name of Cut	Form of Cut	Method of Cooking
A. Loin.	Chops — loin chops (see Fig. 67, p. 274). 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 Fig. 67) (when trimmed called "French" chops, see Fig. 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 Fig. 67) and round shoulder chops (see Fig. 67). Thick Pieces. Whole.	Broiling. Braising. Roasting. Stuffing and Roasting.
E. Breast.	Thick Pieces.	Stewing. Broth-making.
F. Neck.	Thick Pieces.	Stewing. Broth-making.



Courtesy of *Bureau of Publications*, Teachers College.

Upper row: Rib chops, — French Loin chops
Lower row: Rib chops Blade shoulder chop Round bone shoulder chop

Fig. 67. — Lamb chops.

QUESTIONS

Tell how lamb can be distinguished from mutton. Give two reasons for adding dried herbs to the stuffing for lamb.

Give a dietetic reason for serving mint sauce with lamb. What is the purpose of first browning the lamb that is to be roasted?

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. 142.)

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 round steak.

Tabulate the percentage composition of beets, carrots, parsnips, and turnips. Which contains the most carbohydrates? Which the most ash?

LESSON XCV

Pork, Potatoes, 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 fiber. Pork, however, contains more fat than does any other meat. The fat is most intimately mingled with the lean. For this reason it is difficult of digestion.[1] 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. Smoked ham and bacon are much more digestible than fresh pork. The fat of bacon is readily digested.

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 on the top shelf of a hot oven, in order to brown the chops. Brown on one 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.

Cover and bake 1 hour, or until the potatoes are tender. Baste the potatoes and meat occasionally.

[1] See "Nutritional Physiology," by Stiles, p. 221.

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. 32.)

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) on a fine wire broiler. Place the broiler in a dripping pan, and bake in a hot oven until brown and crisp, turning once.

When bacon is being cooked, it is almost impossible not to burn the fat. In broiling, the burned fat is drained from the bacon, hence the advantage of broiled over sautéed bacon.

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.

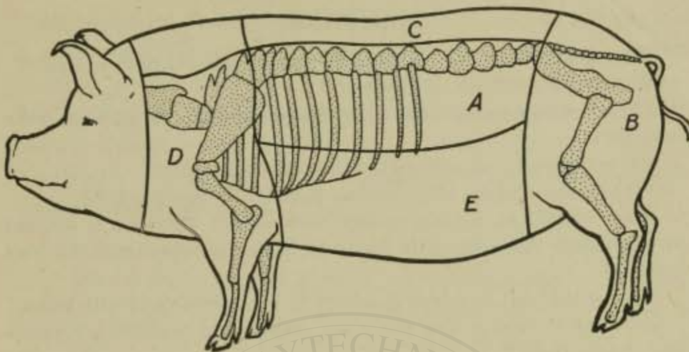


Fig. 68. — Cuts of pork.

CUTS OF PORK. (SEE FIG. 68.)

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.

QUESTIONS

Why should fresh pork be used in winter rather than in summer?

Why is pork difficult of digestion?

Explain why potatoes and Apple Sauce are desirable foods to serve with pork?

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 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 round steak.

Obtain the price per pound of each cut of pork. Arrange in tabulated form and record date.

LESSON XCVI

Chicken and Rice

Poultry. — Poultry includes chicken, fowl, turkey, duck, and goose — domestic birds suitable for food. Pigeon and squab are not considered poultry. Poultry that is one year old or younger is called *chicken;* poultry older than one year is called *fowl.* Chicken that is three or four months old is called *spring chicken.*

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. Fowl 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, hence it is more easily digested.

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 Fig. 69). Remove the pin feathers with the point of a knife or with a strawberry huller. Cut the oil bag from the tail.

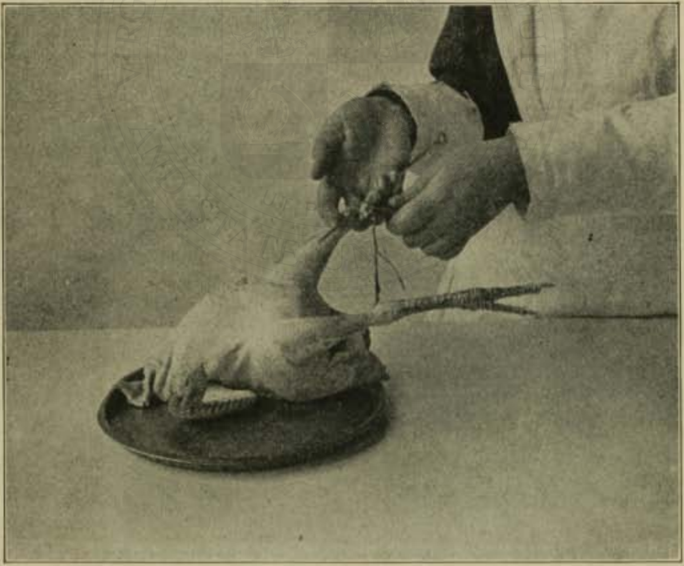


Fig. 69. — Removing tendons from the leg of a fowl.

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 the gizzard. The gizzard, heart, and liver constitute the *giblets* to be used in making gravy. Wash the giblets. Place all of them, 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 follows: Hold the edges of the skin together and thrust toothpicks across the opening, through both edges of the skin. Then fasten the opening by "*lacing*" string around the toothpicks.

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 Figs. 70 and 71.)

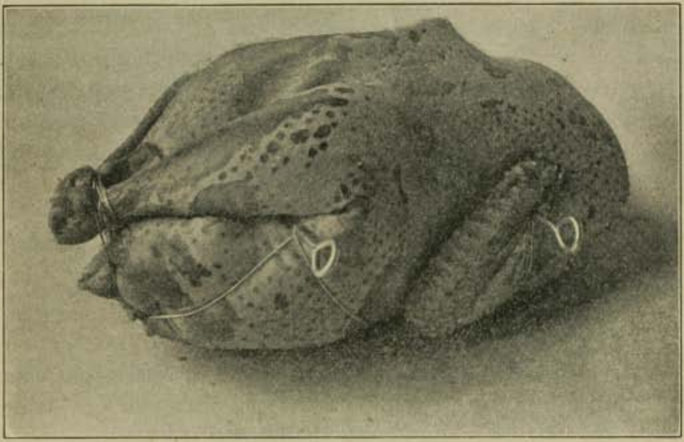


Fig. 70. — Fowl trussed for roasting, — breast view.

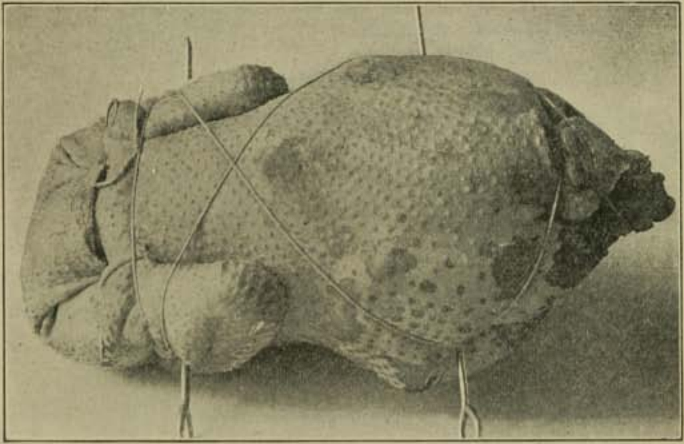


Fig. 71. — Fowl trussed for roasting, — back view.

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 either 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

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.

The chicken may be placed on pieces of *toast* or served in a border of *rice*.

SAUCE FOR CHICKEN

3 tablespoonfuls tried-out chicken fat or butter

¼ cupful of flour	1 pint stock
1 teaspoonful salt	2 egg yolks or 1 egg
2 tablespoonfuls chopped parsley	⅛ teaspoonful pepper

Prepare the sauce in the usual manner, and pour it over the well-beaten eggs, stirring until thoroughly mixed. Cook until the eggs are coagulated. Serve at once over chicken.

QUESTIONS

What pieces of chicken are most readily digested? Why?

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.

REVIEW XXII.—MEAL COOKING

Menu

Lamb (or Mutton) in Casserole
Corn Bread

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

LESSON XCVII

Chicken and Peas

CHICKEN CROQUETTES

2½ cupfuls chopped chicken or fowl	2 tablespoonfuls lemon juice
Onion juice	1 tablespoonful parsley

SAUCE

1 pint cream or milk	1½ teaspoonfuls salt
¼ cupful fat	½ teaspoonful pepper
½ cupful flour	1 teaspoonful celery salt

Chop the chicken very fine; add the seasonings. Make the sauce. (See *Cream Toast*, p. 57.) 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. 80.) 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 14, p. 37.)

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?

LESSON XCVIII

Oyster Dishes

Oysters. — An oyster is an animal covered with shell. The shell, which consists of mineral matter, protects the animal. 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.)

During the summer months oysters spawn and are not suitable for food. They are in season from September until May, or in all the months that have "r" in their names. 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.

Experiment 79: 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 contain 86 per cent water and 6.2 per cent protein. 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 tougher, hence less readily digested; 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 *White Sauce*, p. 68.)

Serve crackers or bread with Oyster Stew.

SCALLOPED OYSTERS

1 pint oysters	3 cupfuls soft bread crumbs
½ teaspoonful salt	3 tablespoonfuls butter
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 moderate oven 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 U. S. Department of Agriculture, Bulletin No. 28, 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 33, p. 87.)

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. 151.) Which fish contains the most protein?

How do fish, shellfish, and beef compare in protein content? Which is the cheapest source of protein?

LESSON XCIX

Meat-substitute Dishes

SCALLOPED EGGS WITH CHEESE

6 hard-cooked eggs
2 cupfuls medium white sauce. (See p. 68)
2 cupfuls buttered soft bread crumbs. (See p. 63)
¾ 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 in a moderate oven until the mixture is heated through and the crumbs are browned. Serve hot in place of meat.

PEANUT ROAST

1½ cupfuls dried bread crumbs
Milk
1½ cupfuls shelled peanuts
4 teaspoonfuls baking powder
1 egg
Salt and pepper

Cover the bread crumbs with milk, and soak them until soft. Chop the peanuts very fine, and mix with the baking powder; beat the egg. Mix thoroughly all the ingredients, and turn into an oiled bread pan. Bake about 45 minutes in a moderate oven. Serve hot with Tomato Sauce (see p. 157).

Commercial salted peanuts may be used for Peanut Roast.

PEANUT BREAD

1 egg
¼ cupful sugar
1¾ cupfuls milk
1 cupful chopped peanuts
8 teaspoonfuls baking powder
1 teaspoonful salt
4 cupfuls flour

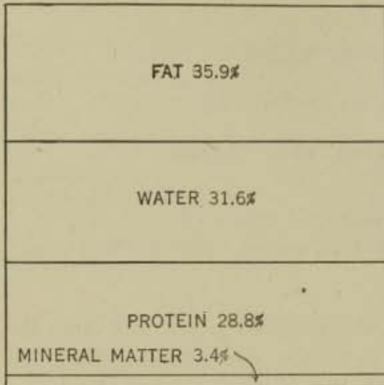


Fig. 72. — Composition of American cheese.

Mix thoroughly the first four ingredients. Add the dry ingredients through a sifter. Mix thoroughly. Turn into two bread pans. Bake from 35 to 45 minutes in a moderate oven. Place paper over the tops of the pans during the first half of the time required for baking.

QUESTIONS

From U. S. Department of Agriculture, Bulletin No. 28, find the per cent of protein in cheese (see Fig. 72), eggs, peanuts (see Fig. 73), 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?

Redrawn from *U. S. Department of Agriculture Chart.*

Fig. 73. — Composition of peanut.

Name other meat-substitute foods and dishes.

REVIEW XXIII. — MEAL COOKING

Menu

Oyster Stew
Peanut Bread
Butter Balls

See Review I (p. 41) for suggestions regarding the preparation of the lesson.

DIVISION SIXTEEN

FOOD PRESERVATION

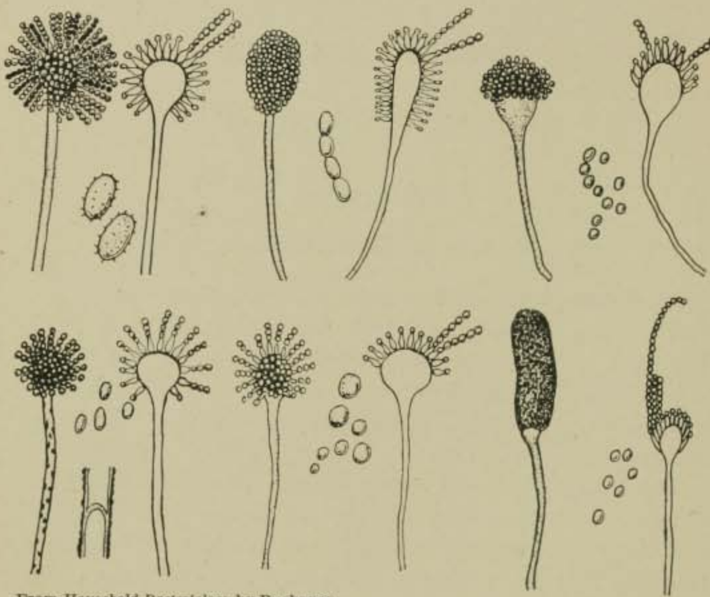
LESSON C

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 Fig. 74) are visible to the naked eye, the yeasts (see Fig. 53) and bacteria (see Fig. 75) 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 of *our* foods are ideal foods for these organisms. It is because these plants exist in and live upon foods 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:



From *Household Bacteriology* by Buchanan.

Fig. 74. — Some species of molds.

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?

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. 72.

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?

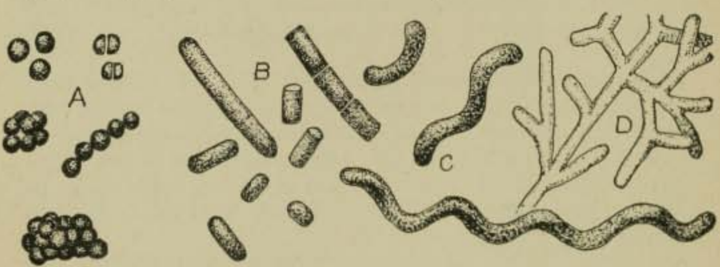
Experiment 85: Growth of Molds upon Whole Fruits. — Place whole fruits, such as apples and lemons, on saucers and cover with glass. After two days examine. Have molds grown upon the whole fruits? If so, how do the molds compare in quantity to those growing on cut fruit? Account for this difference. Apply 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 dishcloths, 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



From *Household Bacteriology* by Buchanan.

Fig. 75. —The four types of bacteria.

A, cocci ; B, bacilli ; C, spirilla ; D, branched filamentous organism.

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 syrup. 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 and vegetables may be done in the home. This process of food preservation is practical only when there is an excessive supply of fruit or vegetables in the orchard or garden. It is usually not economy to buy fruits or vegetables at market for home-drying.

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, 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 car be preserved without the use of harmful preservatives.

The destruction of microörganisms by *heat* is the basic principle of preserving much food, especially fruit. This process is called *sterilization*. In order to preserve fruits it is necessary not only to sterilize them, but to place them in sterilized cans and to seal these 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," some microörganisms either in the fruit, on the can, or on the utensils used in canning, have not been destroyed, or the can has not been securely sealed. *A perfectly sterilized and securely sealed jar of fruit will keep indefinitely.* Slight flaws in the can which were not detected at the time of sealing may cause the spoiling of carefully canned fruit. In the preservation of fruit, one should make every effort to secure sound fruit, perfect jars, and good rubbers, and to have the fruit and utensils perfectly sterilized, and the jars securely sealed. Failure to accomplish these ends may result in much loss of materials and time.

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 CI

STERILIZATION WITH LITTLE OR NO SUGAR: CANNED FRUIT

Jars and Rubbers 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.

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.

Glass jars and rubbers should be *tested* before using: Partly fill the jar with water, adjust the rubber and cover, seal, invert the jar. Examine carefully for leakage.

Sterilizing Fruit Jars and Jelly Glasses. — Fill and surround jars and glasses with cold water. Cover lids and rubbers with cold water. Gradually heat the water and allow it to boil for 10 or 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 silver or wooden spoons, cups, silver knives, skewers, or knitting needles used for testing fruits, in boiling water before using them in contact with the foods. If corks are used for sealing bottles, sterilize them also.

Selection and Preparation of Fruit for Canning. — Select solid, and not overripe, fruit. It is better to have underripe than overripe 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.

If possible, a silver knife should be used for paring fruits. (See *Suggestions for Cooking Fruits*, p. 32.) 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*) Cook the fruit in water or syrup until tender (test with a sterilized knitting needle or skewer).

If small juicy fruits are used, 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 syrup, or first cook them in clear water, add the sugar, and finish cooking.

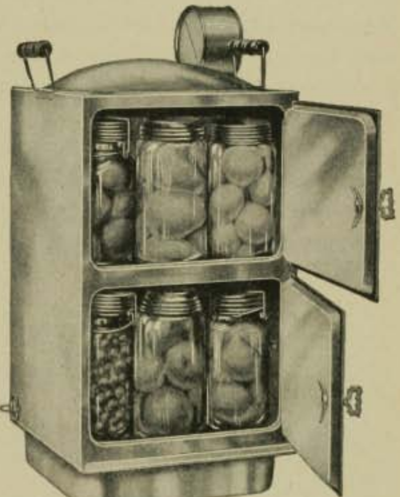
After cooking the fruit, adjust the rubber on the sterilized jar, fill the jar (to overflowing) with the hot fruit and syrup, cover at once and seal. Invert the can and let it stand until cool.

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 syrup. *For each pound of fruit use from $\frac{1}{4}$ to 1 cupful of sugar.*

The quantity of water used with the sugar varies with the juiciness of the fruit. *For each pound of fruit use $\frac{1}{8}$ to 1 cupful of water.*

This method is desirable for small watery fruits, as berries, since evaporation of some of the water takes place.

(*b*) Place the fruit in jars. Make a syrup using from *$\frac{1}{8}$ to $\frac{1}{2}$ cupful of sugar for each pint jar with from 1 to $1\frac{1}{2}$ cupfuls of water.* Adjust the rubber on the jar; fill the jar with the syrup. Place the cover on the jar, but do not seal it. Set the jar in a steam cooker and steam until the fruit is tender (usually from 15 to 60 minutes). If necessary, add more boiling syrup or water. Remove the jars and seal. A large kettle or a clothes boiler may be used instead of a steam cooker. These must be provided, however, with a rack or false bottom. Strips of wood, straw, paper, or wire netting of one-half inch mesh may be



Courtesy of *Toledo Cooker Co.*

Fig. 76. — Canned fruit in steam cooker.

used for this purpose. The latter cut to fit the bottom of the kettle or boiler is most satisfactory. If this device is used, pour enough cold water into the kettle or boiler to cover the jars to a depth of several inches, but not to a height that will allow the boiling water to reach the covers of the jars.

This method of canning is desirable for whole fruits or for fruits in large pieces. The shape of the fruit may be preserved better by this method than by method (*a*). (See Fig. 76.)

(*c*) Place the fruit in jars; add syrup as in method (*b*). Seal at once. Fill the kettle of a fireless cooker half full of boiling water. Place the jar of fruit in the kettle. If necessary, add more boiling water so that the kettle is filled completely. Cover the kettle and close the cooker. Let the jars remain in the cooker overnight or until the water is cold.

This method of canning is desirable for fruits that are easily sterilized, such as peaches and plums.

Canned fruit should not be stored until two or three days after canning. It should be tested for perfect sealing before storing.

QUESTIONS

Why should sterilized 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?

In Lesson X, the statement is made that foods should not be allowed to become cool in the fireless cooker. Jars of canned fruit are left in the cooker until they are cold. Explain the seeming discrepancy.

Compare home-canned and factory-canned fruit. Weigh the contents of a can of each. Compute the difference in cost.

LESSON CII

Sterilization 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. 293.) 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 syrup as in the *Method of Canning* (*a*), p. 296. 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*), p. 296. 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. 299.)

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. 299.) Pour into sterilized glasses. When cool, seal and cover as directed for Jams.

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. Cook until thick. (See *Jams*, p. 299.) 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
½ pound raisins	1½ pounds sugar

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. 299.) Pour into sterilized glasses. When cool, seal and cover as directed for Jams.

GRAPE CONSERVE

½ peck grapes	2 lemons, — juice
2 oranges, — juice	1 cupful chopped nuts
Sugar	

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. Add the lemon and orange juice and cook a few minutes. Measure the mixture. Then add an equal quantity of sugar and the nuts. Continue cooking until thick. (See *Jams*, p. 299.) Pour into sterilized glasses. When cool, seal and cover as directed for Jams.

APRICOT CONSERVE

1 pound dried apricots	2 pineapples
1½ quarts water	Sugar

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 strainer. Shred the pineapple and cook, in as little water as possible, until tender. Combine the cooked fruits and measure. Add ½ as much sugar. Cook until thick. (See *Jams*, p. 299.) 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. 32.) 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 CIII

Sterilization with Much Sugar: Jellies

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.

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 overripe. 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 ten per cent of the fruit which contain much pectin is added to the other frui*, 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 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

[1] See University of Illinois Bulletin, "Principles of Jelly Making," p. 249.

[2] *Idem*, p. 251.

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. 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 as fruit juice* and heat the sugar. Add the hot sugar to the boiling syrup and cook. The following are *tests for sufficient cooking of jelly:*

(*a*) Coats the spoon.

(*b*) Falls from the spoon in heavy drops.

(*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.

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 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 un successful 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.

QUESTIONS

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 CIV

Sterilization 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 "Stimulating 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
¼ ounce ginger root	Whole cloves

Cut the pears in halves, remove the seeds, and pare. Into each piece of pear stick three or four cloves. Make a syrup of the vinegar and sugar. Divide the cinnamon, allspice, and ginger into two parts, tie in cheesecloth bags, and add to the syrup. When the syrup 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 syrup, heat the syrup and evaporate it until there is just enough to cover the fruit. Add the fruit to the hot syrup, 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 syrup, 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
4 green peppers	1 tablespoonful mustard
2 tablespoonfuls salt	1 nutmeg grated
4 tablespoonfuls brown sugar	¾ quart 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

¾ 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.

To Seal Bottles. — Melt together, over hot water, equal parts of shoemaker's wax and resin. When liquefied, dip the corked bottles into it.

Corked bottles may be dipped also in hot paraffin. Dip several times.

QUESTIONS

What is the objection to excessive use of spiced foods?

Name some spiced foods.

Name some substitutes for pickles. Why are pickles objectionable in diet?

LESSON CV

Intermittent Sterilization: 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 microörganisms 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 micro-organisms 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 sterilize (for the reason given above) sterilization should be carried on for three successive days. This is called *intermittent sterilization.*

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 sterilizing at a temperature higher than that of boiling water.

The common vegetables, except tomatoes, need to be sterilized intermittently to insure success. The acid in tomatoes aids in the destruction of microörganisms, hence tomatoes may be canned as fruits.

METHOD OF CANNING VEGETABLES

Place the vegetables in jars, and add salt or sugar to each jar. Use ½ teaspoonful of salt to each pint jar; 1 teaspoonful of sugar to each pint jar. (Sugar may be used for beets and peas.) Fill the jar with cold water; place the rubber on the can. Cover the can, but do not seal it. Then place the jars in a steamer or boiler, as directed in *Method of Canning* (*b*), p. 297. Then cook for 15 minutes. Now seal the can and cook for 45 minutes longer. Remove the cans from the steaming utensil, and set aside in a warm room for 24 hours. Cook without breaking the seal for 60 minutes on two consecutive days. Wash the outside of the can, label, and store.

Any of the methods of canning — (*a*), (*b*), or (*c*) (see p. 296) — can be followed for canning tomatoes.

Use of Canned Vegetables. — Open the can and empty its contents at once. If the vegetable is surrounded by liquid, use the water in cooking the vegetable, as it contains valuable materials. If possible, let the vegetable stand exposed to the air for an hour or longer.

If the vegetable is to be served plain, turn into a saucepan. Cook in its own liquor at simmering temperature, using an asbestos mat over the flame. 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.

Canned vegetables may be heated in a double boiler, cooking them for 30 minutes or longer.

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 advantage of cooking canned vegetables at simmering temperature or in a double boiler?

DIVISION SEVENTEEN

SUPPLEMENTARY

LESSON I

THANKSGIVING SAUCE

CRANBERRY SAUCE

1 quart (1 pound) cranberries — 2 cupfuls water
2 cupfuls sugar

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 stir until dissolved. Set aside to cool.

CRANBERRY "JELLY"

1 quart (1 pound) cranberries — 1 cupful water
2 cupfuls sugar

Prepare and cook the cranberries in water, as for Cranberry Sauce. Press through a strainer, add the sugar, and mix well. Cook until a drop of the mixture does not spread when dropped from a spoon to a plate. Pour into molds which have been rinsed in cold water. Set aside to cool and stiffen.

QUESTIONS

Give a practical method of washing cranberries.

When should sugar be added to cooked fruit? (See *When to add the sugar*, p. 31.) Explain why the adding of the sugar in Cranberry Jelly is an exception to the rule.

LESSON II

Thanksgiving Desserts

PLUM PUDDING

2 cupfuls soft bread crumbs	½ cupful suet
½ teaspoonful baking soda	½ cupful molasses
⅛ teaspoonful cloves	1 egg
½ teaspoonful cinnamon	¾ cupful milk
¼ teaspoonful salt	½ cupful currants

½ 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 page 103, and sprinkled with flour. Mix the ingredients in the order given. Steam in a buttered pudding mold for at least 2 hours. Serve with Hard Sauce, I (see p. 35) or II, Yellow Sauce, or Vanilla Sauce (see p. 112).

HARD SAUCE II

¾ cupful brown sugar	2 tablespoonfuls cream or milk
⅓ cupful butter	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	1 tablespoonful milk or cream
½ cupful powdered sugar	½ teaspoonful vanilla

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. Serve at once over hot puddings.

CRANBERRY FRAPPÉ

1 quart (1 pound) cranberries	4 cupfuls water
$2\frac{1}{2}$ cupfuls sugar	Juice 1 large lemon

Cook the cranberries and water slowly, until soft. Force through a sieve, and add the sugar and lemon juice. When cool, freeze. (See *Preparation of the Freezer* and *Freezing*, p. 187.)

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. 205.) 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?

From U. S. Department of Agriculture, Bulletin No. 28, 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. In this condition, 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.

Candy should never be used to excess. A little eaten at the end of a meal is not harmful to a normal person. At that time the sugar does not come in direct contact with the walls of the alimentary canal, as it would if eaten between meals. From this, and from the fact that peppermint stimulates digestion, one can see a reason for the serving of mints at the end of a meal.

WINTERGREEN AND PEPPERMINT WAFERS

$\frac{1}{4}$ ounce gum tragacanth	Oil of wintergreen or peppermint
$\frac{1}{2}$ cupful cold water	Confectioner's sugar

Soak the gum tragacanth in the water overnight. Then rub it through a fine wire sieve, and add enough confectioner's sugar to knead. Flavor with a few drops of oil of wintergreen or peppermint. Color the wintergreen-flavored mixture with red fruit paste. Roll until very thin on a board dredged with sugar. Shape with a small round cutter, or cut in one-inch squares; cover with a cloth and let stand overnight, or until dry and brittle.

Other flavorings and color pastes may be used in making the wafers.

(These wafers are not ready for use until they are dry and brittle.)

PARISIAN SWEETS

Chop equal parts of figs, dates, 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 PRUNES

Soak large and perfect prunes in cold water for several hours; steam until they are tender and the stones are easily removed. Take out the stones, and fill the open space with a mixture of chopped dates, figs, and candied fruit. Press the prunes into symmetrical shape, then roll in fine granulated sugar. Let stand several days before serving. The Parisian Sweet mixture may be used for stuffing prunes.

QUESTIONS

Explain why Parisian Sweets are a more desirable confection than ordinary 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?

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 syrup, *i.e.* is non-crystalline in form.

In many candies, a creamy consistency is desired. This is not possible, if all of 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 syrup to granulated sugar or to change some of the crystallized sugar to a non-crystallized sugar, such as glucose. This can be accomplished by boiling granulated sugar with acid. (See *When to add the sugar*, p. 31.)

Cooking Syrups. — Sugar and water are boiled to different degrees of temperature for making different kinds of candy. The thicker the syrup, the higher the temperature. **Tests** for syrups of different consistencies are:

(*a*) Thread, — when dropped from a spoon, the syrup forms a thread about two inches long (230° F.).[1]

(*b*) Soft ball, — when dropped into cold water, the syrup forms a soft ball if rolled between the fingers (236° F.).

(*c*) Hard ball, — when dropped into cold water, the syrup forms a firm ball (252° F.).

(*d*) Crack, — when dropped into cold water, the syrup becomes brittle (270° F.).

(*e*) Hard crack, — when dropped into cold water, the syrup 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	2 tablespoonfuls butter
½ cupful corn syrup	1 teaspoonful vanilla

Mix the sugar with the water. Add the chocolate and syrup. Boil *gently* to a "soft ball" stage. Just before removing from the fire, add the butter; then beat the mixture until it thickens. Add the vanilla, and pour into a buttered pan. Cut into squares; when cool the fudge is ready for serving.

PANOCHA

2 cupfuls light brown sugar	⅛ teaspoonful cream of tartar
½ cupful milk	2 tablespoonfuls butter
½ pound nuts	

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. Beat until the mixture

[1] These temperatures apply to syrups made from cane sugar. The addition of glucose to cane sugar lowers the temperatures of the syrups at the various stages. See footnote, page 357, regarding the use of the Fahrenheit scale of temperature.

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 CREAM CANDY

2 cupfuls brown sugar	½ cupful sour milk and
½ cupful sour cream or	2 tablespoonfuls butter
1 teaspoonful vanilla	

Mix the sugar with the sour cream, or milk. Cook to the "soft ball" stage. Proceed as in Fudge.

BUTTERSCOTCH

3 cupfuls light brown sugar	¼ cupful vinegar or
¼ cupful butter	Juice of 1 lemon
½ cupful water	

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 witn a chopping knife. Break into pieces when cold.

QUESTIONS

Explain the use of corn syrup, 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 *Digestion of Pastry*, p. 254.

Why are not the nuts cooked in the Panocha mixture?

Why is butter added to Panocha if milk is substituted for cream?

If a thermometer is used for testing syrups, what precaution should be taken against breaking?

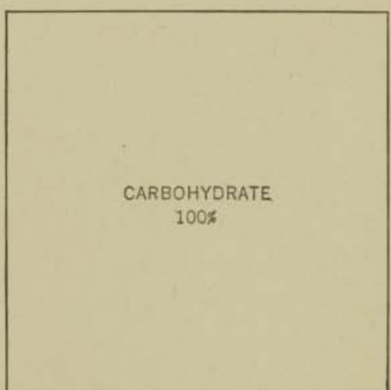


Fig. 77. — Composition of granulated sugar.

From U. S. Department of Agriculture, Bulletin No. 28, tabulate the percentage composition of granulated (see Fig. 77), powdered, coffee, brown, and maple sugars. What is the price per pound of each?

How many cupfuls in a pound of coffee sugar? 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 syrup.

How much fudge, by weight, does 1 pound of sugar make?

What is the cost per pound of home-made fudge?

PART II

THE PLANNING AND SERVING OF MEALS AND THE CALCULATION OF THE FOOD VALUE OF MEALS

THE PLANNING AND SERVING OF MEALS

CHAPTER I

Menu Making

Representation of All Foodstuffs. — All the foodstuffs should be represented in the foods of a meal, or at least in the foods composing a day's diet. The meal should consist of: (*a*) food, in the form of carbohydrates and fat, to supply energy to the body; (*b*) food, in the form of protein and ash, to build the body; (*c*) food, in the form of ash and water, to regulate the processes of the body; and (*d*) food, in the form of cellulose, to give bulk to the diet, and to stimulate digestion. Water is supplied to some extent with all the foods of a meal. The greater quantity, however, should be taken at rising and retiring and "between meals."

From the previous study of the composition of foods and from reference to United States Department of Agriculture, Bulletin Number 28, "The Chemical Composition of American Food Materials," it should be comparatively easy for the pupil to determine what foods contain the different foodstuffs in largest quantity. However, further consideration needs to be given to the *kind* of protein food to be selected in making menus.

In this is involved the question 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. Many find that by using meat once a day their vitality 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. If much meat is eaten, a generous quantity of water and of green vegetables and fruits should be used.

The question of ash in various foods also needs further consideration. The ash constituents existing in the body in largest quantity are:

Sulphur	Chlorine	Calcium	Iron
Sodium	Magnesium	Potassium	Phosphorus

Sulphur is usually found in combination with protein; hence if enough protein is supplied to the diet, sulphur will be present in sufficient quantity. Sodium and chlorine are constituents of common salt. Since salt in sufficient or even excessive quantity is generally used, the ordinary diet contains enough of these elements.

A list of foods containing the remainder of the above elements will be of aid in menu making.

Magnesium (0.2 per cent or more)	Calcium (0.168 per cent or more)	Potassium (1.0 per cent or more)
Almonds	Almonds	Cocoa
Chocolate	Cauliflower	Dried beans
Cocoa	Cheese, hard	Dried lima beans
Dried beans	Cheese, cottage	Dried figs
Dried lima beans	Dried beans	Dried peas
Entire wheat	Dried cowpeas	Dried prunes
Oat meal	Dried figs	Raisins
Peanuts	Egg yolk	
Rye	Milk, cow's	
Walnuts	Olives	
	Rye bran	
	Watercress	

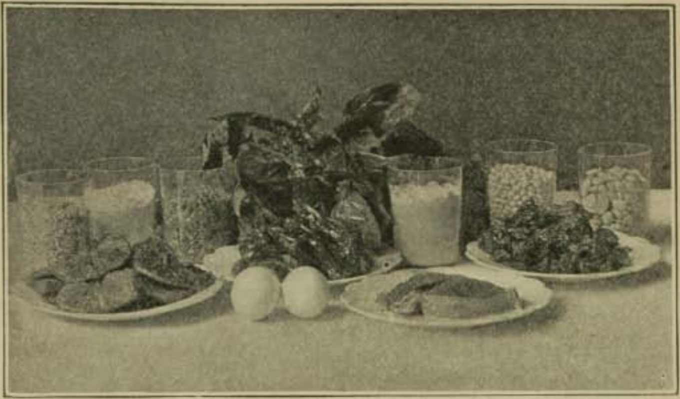
Iron (0.003 per cent or more)	Phosphorus (0.9 per cent or more)
Dried beans	Cheese, hard
Dried lima beans	Cocoa
Dried dates	Chocolate
Dried figs	Dried beans
Dried peas	Dried peas
Eggs	Egg yolk
Entire wheat	Entire wheat
Lean beef	Peanuts
Lentils	Wheat bran
Raisins	
Rye	
Spinach	
Whole barley	

While all of the mineral materials found in the body are necessary for its growth and maintenance, calcium, phosphorus, and iron are considered the most important ash constituents in body building.

The most practical and effective way of obtaining calcium is to use a generous supply of milk.

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 element always found in protein. 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 bran, hence fine white flour is not so rich in ash as entire wheat flour.

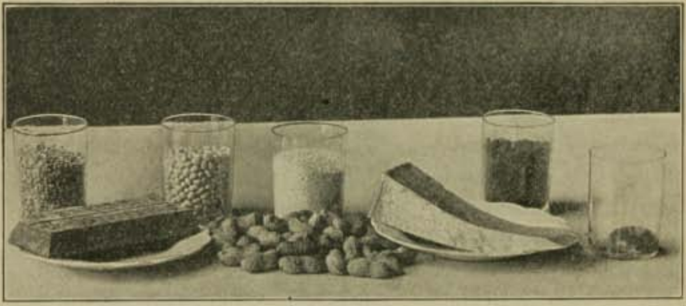
In the formation of blood and in several important processes of digestion and assimilation, iron is needed. For this reason, it is often a constituent of "tonics." If foods rich in iron were more generally used, the body would not be so likely to get into a condition requiring such tonics. *The iron found in eggs, milk, and vegetable foods is thought to be more completely assimilated than that found in meat.*



a b c d e f g h i j k l

Fig. 78. — Foods containing iron.

a, Dried peas; *b*, dried figs; *c*, entire wheat; *d*, lentils; *e*, spinach; *f*, dried dates; *g*, eggs; *h*, rye; *i*, lean beef; *j*, dried beans; *k*, raisins; *l*, dried lima beans.



a b c d e f g h

Fig. 79. — Foods containing phosphorus.

a, Dried peas; *b*, chocolates; *c*, dried beans; *d*, peanuts; *e*, entire wheat; *f*, cheese; *g*, cocoa; *h*, egg yolk.

Spinach and prunes are valuable sources of iron. For this reason they are most desirable foods for children. Milk is not included in the list of foods containing at least 0.003 per cent of iron since it contains but 0.00024 per cent of iron.

Contrast in Flavor of the Foods of Different Courses. — The varied needs of the body demand contrast between foods of the different courses. 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 in every meal.

The first course for each meal should stimulate the appetite and prepare the digestive organs for the digestion of the remainder of the meal. This is especially true of breakfast. Fruit is generally used for the first course of breakfast; it is also frequently used for the first course of luncheon. Soup, having stimulating properties, may be served for the first course of either luncheon or dinner. The next course should consist of a food which has a mild flavor. Contrast in the foods of the courses is thus given. Cereal is used for breakfast, cream soup (if soup has not been used for the first course) for luncheon, and fish for dinner. After a preliminary course or two, the meat or main course follows. This course usually contains body-building food in the form of protein and the rest of the energy-giving food in the form of starch. For luncheon or dinner the salad course follows, furnishing body-building and body-regulating food in the form of ash — and also stimulating material. The meal ends with a dessert and beverage. There is a physiological reason for ending the meal with a dessert, — a pleasant sensation tends to continue digestion.

A breakfast may consist of:

Fruit
Cereal
Meat, egg, or vegetable
Bread
Beverage

A luncheon may consist of:

Fruit
Cream Soup
Meat, fish, or meat substitutes
Vegetables
Bread
Salad
Dessert
Beverage

A dinner may consist of:

Stimulating Soup
Fish
Meat
Vegetables
Bread
Salad
Dessert
Beverage

For everyday living, however, the majority of people omit one or more of the foods mentioned for each meal, or combine them into two or three courses.

Harmony in Flavor of the Foods of the Same Course. — The foods of each course should be harmonious in flavor. To obtain this result, a housekeeper needs to use "imagination." 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.

In addition to the suggestions for making menus given here, a housekeeper should take into consideration the following:

(*a*) Composition of the body.
(*b*) Composition of the foods.
(*c*) Quantity of food required.
(*d*) Cost and season of food.

With this equipment, the housekeeper can prepare menus with ease and satisfaction.

QUESTIONS

Make a list of foods and of dishes rich in protein.

Make a list of foods and of dishes rich in ash.

Make a list of those rich in carbohydrates.

Make a list of those rich in fat.

Mention several combinations of two or more foods that are harmonious in flavor and varied in moisture, dryness, and composition. Give reasons for making the combinations.

CHAPTER II

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 olive 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.

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.

(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. 313.)

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.

CHAPTER III

The Sick-room Tray

Selection of Foods for the Sick. — Methods of preparation of food for the sick differ little from methods of preparation of food for those in health. The greater difference is in the *selection* of the foods to be prepared. To know just what foods to select for patients suffering from different diseases requires a thorough knowledge of the nature of diseases and of the chemistry of nutrition. In severe illness, however, 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. Since digesting is dissolving (see *Solution and Digestion*, p. 29), it follows that liquid foods are digested with the least effort, hence the use of milk, broths, soups, and gruels in sick-room diet. Such semi-solid 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. It might seem that very little if any food would be needed for one at complete rest. But 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. 368.) 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 aid greatly in solving this problem. These questions are discussed in another chapter. (See *Daily Carbohydrate and Fat Requirement*, p. 371.) However, 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. 116), 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 are 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 XXX, p. 104) 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. Cornmeal, 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 given on p. 102 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 rarely used.

(4) *Broth and Meat.* — Although there is little nourishment contained in meat broths (see *Protein in Meat*, p. 131), beef tea is often used as food for the sick, especially when liquid diet is necessary. It is stimulating 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 47, p. 119), 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. 131.) It should be made into balls and pan-broiled. (See *Pan-Broiling*, p. 125.)

Preparing the Tray. — Attractive serving of foods may make a stronger appeal to the appetite than choice selection or skillful 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 tray 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, semi-solid, 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. 321) and in the present chapter, write several menus for an indisposed or convalescent patient.

CHAPTER IV

Dining Room Service

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 occasion, the size of the dining room, the number of guests, and the attendants, all have to be taken into 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 tablecloth should be laid straight and smooth. If a centerpiece is used, it should be placed in the exact center of the table.

Napkins should be folded simply and laid at the left of the plate. A dinner napkin is folded four times; a luncheon napkin is folded twice to form a square or three times to form either a triangle or an oblong. If desired, the tablecloth may be omitted for breakfast or luncheon. Doilies with pads underneath them or table runners may be used instead of the tablecloth. 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 are 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 Fig. 80.)

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, should 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 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 coffee pot, hot-water pitcher, milk and cream pitchers, spoon tray, tray bowl, and cups and saucers may be placed so as to form a semicircle about the hostess's place. The coffee pot should be placed at the right, and the cups and saucers at the left. If tiles or stands for the coffee pot 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 of 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 of the forks that are to be used with knives. Many prefer, however, to place all of 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; however, it is permissible 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.

The silver may be laid at each cover in the order of its use — on the right, that which is to be used first should be placed farthest to the right; while on the left, that first to

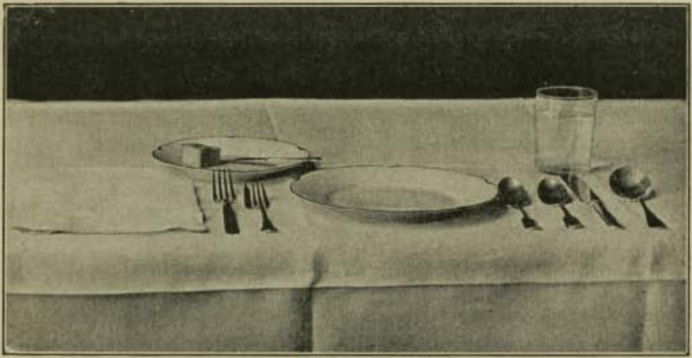


Fig. 80. — Cover of luncheon table laid for informal service.

be used should be placed farthest to the left. 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 should 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. 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.

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 left 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 such dishes as the platters and tureens, then the dishes of each cover, 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 never 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.

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.

Fig. 81. — A wheel tray.

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 Fig. 81) 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.

Serving at the Table. — The English style of serving (see p. 340) 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 over-crowded appearance and the hostess saved many steps. The lower shelf of the serving table is the most desirable place for the soiled dishes.

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 guest may in turn remove the crumbs from his own cover. It is perfectly proper to omit crumbing 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 coffee pot 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 Russian style.

Cream of Tomato Soup Soup Sticks
Veal Cutlets
Rice
Rolls — Butter
Cucumber Salad Wafers
Snow Pudding, Custard Sauce
Cakes — Coffee

CHAPTER V

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 tablecloth, there is no necessity for moving the chair when taking one's seat or when rising. One should stand back of his chair until the hostess moves to seat herself and then move to the left of the chair to seat himself. One should also rise at the left of the chair.

The hostess sits at the foot of the table, the host at the head. 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' chair should be nearest the kitchen door or pantry. A lady guest of honor should sit at the right of the host; a gentleman guest, at the right of the hostess.

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

Fig. 82. — Method of holding knife and fork.

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 Fig. 82.) 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 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

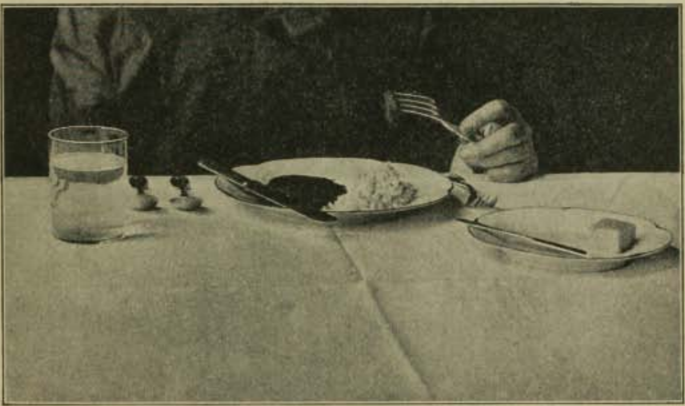


Fig. 83. — Keeping the fork in the left hand to carry food to the mouth.

carry food to the mouth is now accepted. (See Fig. 83.) 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 same 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.

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

Fig. 84. — The teaspoon should be placed in the saucer.

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; for the sake of convenience, the lettuce may be torn into pieces before serving. If the lettuce leaf is served whole it may be folded with the fork before conveying it to the mouth. A salad wafer or a roll may be used to aid the fork either in folding or cutting lettuce.

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 Fig. 84.) 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,

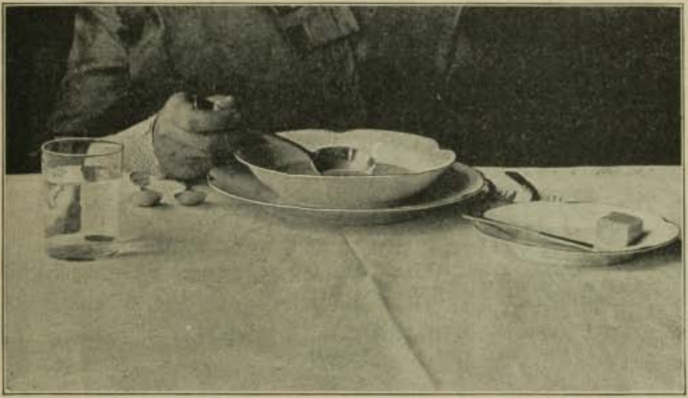


Fig. 85. — Method of holding soup spoon.

there is less danger of spilling the food if the spoon is moved away from, rather than toward, oneself. (See Fig. 85.)

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. Bread should not be cut at the table. It is better to break off a piece of bread and then butter it than it is 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 grape fruit 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 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 one owes himself and his companions. Always refrain from talking during mastication. One cannot eat quietly unless his lips are kept closed while chewing.

CHAPTER VI

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 one purchases eggs.

Cost of Food in Relation to Season. — Most foods are higher in price when out of season. Strawberries may cost fifty cents per quart in February and twelve cents in the spring or summer months. An unseasonable food is invariably expensive.

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 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 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.

QUESTIONS

From United States Department of Agriculture, Bulletin No. 28, find the Calories (see *How Heat or Fuel Value is Measured*, p. 356) yielded by one pound each of butter, whole milk, eggs, cheese, beef, wheat flour, and sugar.

Express graphically the calorific value of the above list of foods. (Allow one eighth inch of space per one hundred Calories.)

How many pounds, or what part of a pound, of each of the above foods can be purchased for twenty-five cents?

[1] United States Department of Agriculture, Farmers' Bulletin 391, "Economical Use of Meat in the Home," p. 43.

Food	Cost per Pound, Quart, etc.	Measure in Cupfuls of Pound, Quart, etc.	Cost per Cupful	Cost per Tablespoonful	Cost per Teaspoonful
Baking powder (see p. 202) .			——	——	
Butter (see p. 254)					
Cocoa (see p. 99)				——	
Coffee (see p. 180)				Heaping tablespoonful	——
Corn meal (see p. 52) . . .				——	——
Corn Starch (see p. 55) . .			——		
Cream of Wheat (see p. 40) .				——	——
Cream (see p. 102)					——
Eggs (see Experiment 39, p. 93)			——	One	——
Flour, white (see p. 215) . .					——
Flour, entire (see p. 215) . .				——	——
Flour, graham (see p. 215) .				——	——
Lard (see p. 254)					——
Meat, chopped (see p. 132) .				——	——
Milk (see p. 99)				——	——
Oil, Salad (see p. 260) . . .					——
Potatoes (see p. 66)		——	One potato	——	——
Rice (see p. 52)				——	——
Rolled Oats (see p. 40) . .				——	——
Salt			——		
Split peas (see p. 162) . . .				——	——
Sugar, brown (see p. 318) . .				——	——
Sugar, granulated (see p. 30) .				——	——
Sugar, loaf			One lump	——	——
Sugar, powdered (see p. 30) .				——	——
Tea (see p. 180)				——	
Vanilla		——	——	——	
Vegetable fat				——	
Wheatena (see p. 40) . . .				——	——

CHAPTER VII

Measurement of the Fuel Value of Foods

How Food is Assimilated. — In Part I, the uses of the foodstuffs, — carbohydrates, fats, protein, ash, and water — were given (see p. 181). 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. 29); they are then absorbed through the walls of the alimentary canal. The blood carries the soluble foodstuffs 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 one of the fuel materials — carbohydrates, fat, or protein — and oxygen. Fuel foods under these conditions produce energy. Other body cells select one 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.

How Heat or Fuel Value is Measured. — It was stated (pp. 28 and 86) that the human body could be compared with a steam engine, *i.e.* the burning of the fuel foods in the body produced the ability to do work. The quantity of heat 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, their nutritive value. *If the quantity of heat that is produced by burning a food is measured, the measurement 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.

[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 $\frac{5}{9}$.

The Calorie,[1] 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

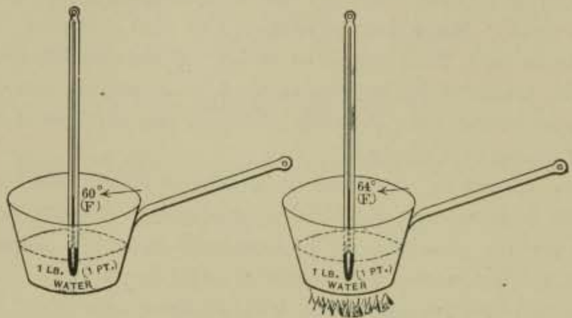


Fig. 86. — Illustrating the amount of heat represented by one Calorie.

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 Fig. 86.)

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.[2]

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

[1] *I.e.* greater Calorie, distinguished from the lesser calorie by the capital C.

[2] See "Chemistry of Foods and Nutrition" by Henry C. Sherman, Ph. D., p. 125, *Physiological Fuel Values.*

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 used.

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 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.

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 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 are ($1.13 + 216.75 =$) 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

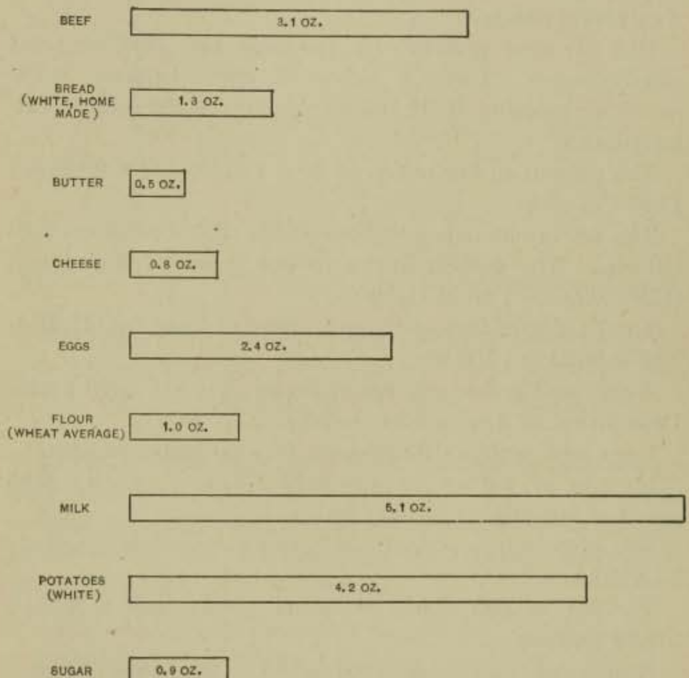
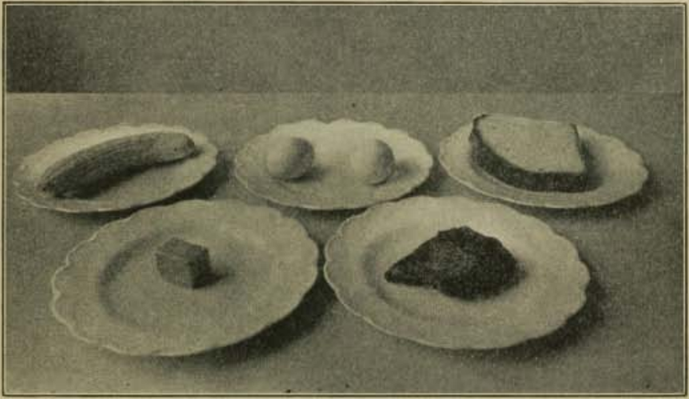


Fig. 87. — Comparative weights of 100-Calorie portions of foods.

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 datum. This weight is termed a *standard portion* or a *100-Calorie portion*. (See Figs. 87 and 88.)

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.



a *b* *c* *d* *e*

Fig. 88. — 100-Calorie portions of foods.

a, banana *b*, butter *c*, eggs *d*, meat *e*, bread

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.

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 Materials 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. 231):

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. 358)

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 (see p. 373) 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 above result in the following manner:

Since 1486.27 Calories are yielded by one loaf of homemade bread, then 100 Calories are yielded by (100 ÷ 1486.27 =) .06 or 6 per cent of a loaf of homemade bread, hence $\frac{1}{16}$ (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. 106.)

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.

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										

Nutrient Ratio ____________________ Weight in ounces of 100-Calorie portion __________ Signature ____________________

Ideal Nutrient Ratio ____________________ Approximate Measure of 100-Calorie portion __________ Date ____________________

Authority ____________________ Cost of 100-Calorie portion ____________________

CHAPTER VIII

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 order 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 coal is used in a steam engine so that there is produced sufficient power to move a train of cars at the desired speed. So sufficient food should be used by the individual that enough energy is 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) season; (2) weight, size, and shape of the individual; (3) occupation; (4) age; (5) sex.

(1) *Relation of Season to Daily Energy Requirement.* — The season should affect the quantity and kind of foods. Usu-

ally less food, especially meat, is needed in summer time. If, however, an individual works indoors in the winter time at about the same temperature as average summer temperature, very little difference should be made in the quantity of food. The amount of perspiration also influences the quantity of food. An indoor worker who perspires freely at his work requires as much food as an outdoor worker doing the same work without profuse perspiration.

(2) *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 sometimes based upon body weight.

(3) *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 working at hard physical work needs more food than the man who sits quietly at his work. Moreover, one working actively out of doors can take foods which are difficult of digestion for the person of sedentary occupation.

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:

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[2] gives these data pertaining to those 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

[1] Atwater and Benedict, United States Department of Agriculture, Yearbook 1904, p. 215.

[2] "Textbook of Physiology," p. 141, Tigerstedt.

(4) *Relation of Age to Daily Energy Requirement.* — Children 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 at different ages for the average man who does no muscular labor:

1 year requires	1000 Calories per day
5 years require	1400 Calories per day
10 years require	1800 Calories per day
15 years require	2800 Calories per day
20 years require	3000 Calories per day
30 years require	2750 Calories per day
40 years require	2500 Calories per day
60 years require	2200 Calories per day
80 years require	1600 Calories per day

(5) *Relation of Sex to Daily Energy Requirement.* — Women do not require as much food as men. Sherman says that the food requirements of men and women of about the same activity are in proportion to their body weights. Women weigh about 0.8 as much as men; hence their food requirement is 0.8 of that of men of the same activity. This table[2] is helpful in determining the energy requirement of boys and girls of normal size, development, and activity:

Boys 14–17 years	2500–3000 Calories per day
Girls 14–17 years	2200–2600 Calories per day

[1] "Chemistry of Food and Nutrition," p. 174, Henry C. Sherman.
[2] *Ibid.*, p. 172, Henry C. Sherman.

Children 10–13 years	1800–2200 Calories per day
Children 6–9 years	1400–2000 Calories per day
Children 2–5 years	1200–1500 Calories per day
Children 1–2 years	900–1200 Calories per day

While these definite statements are made in regard to the quantity of diet for individuals, — they must be modified in certain instances. The personal factor enters into the regulation of the diet. The standards, however, are valuable as guides in determining the daily ration.

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 is a safe guide for daily food requirement. One may be a little over weight or under weight, however, and yet have normal body functions.[1]

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.

Daily Protein Requirement. — If a person's energy requirement were 2500 Calories, sufficient energy might be supplied by using butter or beefsteak for a day's ration. Yet this would be extremely unpalatable and would not meet the needs of the body. Energy should be supplied to the body by *all* the energy-giving foods, — carbohydrates, fat, and protein. Now the question arises, How many of the re-

[1] For tables of weight and height of men and women, see "Chemistry of Food and Nutrition," pp. 216 and 217, Henry C. Sherman. For weight and height of children, see "Laboratory Handbook for Dietetics," pp. 12 and 13, Mary Swartz Rose.

quired Calories shall be supplied by each of the combustible foodstuffs?

Too much or too little protein is often harmful and produces serious results. Beside other harmful effects, too much protein may cause intestinal disturbances, an excess of acid in the body, 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.

Nutritive Ratio. — *The ratio of the fuel value of protein or nitrogenous food to the fuel value of fat and carbohydrates or non-nitrogenous food is termed nutritive ratio.* In formulating diets, it is helpful to have the nutritive ratio given with the total energy requirement. Expressing ratio in the form of a fraction and using 1 as the numerator, the above protein requirement may be expressed as: $\frac{1}{9}$ to $\frac{1}{5.7}$ nutritive ratio, *i.e.* for every Calorie produced by protein nine to five and seven tenths Calories should be produced by fat and carbohydrates.

Daily Carbohydrate and Fat Requirement. — Although protein may furnish the body with energy, its more important function is to 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 building the body. For this reason, carbohydrates and fat are termed *protein-sparing food.* There should always be enough carbohydrates and fat to furnish energy to the body, so that the protein can be used exclusively 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 protein and a generous supply of ash, carbohydrates, and fat.* With such a combination, the protein can be used exclusively 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. Fruits, green vegetables, whole grains, milk, and eggs are common foods which should be used generally. (See lists of foods containing ash, pp. 322 and 323.)

QUESTIONS

Compute (from the table on p. 368) the energy requirement of at least two members of your family. Compute your own energy requirement from this table. Compare it with the table on p. 369.

Compute the nutritive ratio of the energy requirements calculated above.

CHAPTER IX

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 by computing the fuel value of one's daily diet. In Chapter VII, p. 361, 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. 376) 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 one knows one's energy requirement, one 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, it is 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. If one ascertains one's energy requirement and decides 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. 369), her breakfast should 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 above requirement.

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. 376).

The calculation of the protein content of the above luncheon 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 the following page 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. 376 estimate the fuel value of all your meals for several days. Compare the result with the ideal energy requirement obtained above.

For yourself and two members of your family, plan a box luncheon whose fuel value meets the total energy and protein requirements.

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							

Nutritive Ratio: ________________________________

Ideal Nutritive Ratio: ________________________________ Signature: ________________________________

Authority: ________________________________ 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
porterhouse steak .	1 small steak	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
sirloin steak . .	1 average serving	1.4	31.0
Beets, cooked . .	3 servings	8.9	23.2
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
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

[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 page 319 of "Chemistry of Food and Nutrition," by Henry C. Sherman.

Edible Portions	Approximate Measure of 100-Calorie Portion	Weight in Ounces of 100-Calorie Portion	Calories Derived from Protein
Buckwheat flour . .	¼ cupful	1.0	7.4
Butter	1 tablespoonful (ordinary pat)	0.5	0.5
Buttermilk	1¼ cupfuls (1¼ glasses)	9.9	33.6
Cabbage	2 servings	11.2	20.3
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]	1¼ cubic inches	0.8	26.5
American red[1] . .	1¼ cubic inches	0.8	26.0
Cheddar[1] . . .	1¼ cubic inches	0.8	24.4
Cottage	4 cubic inches (½ 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]	1¼ cubic inches	0.8	25.4
Chicken, broilers . .	1 large serving	3.3	79.1
Chocolate	"generous half" square	0.6	8.3
Cocoa	2½ tablespoonfuls	0.7	17.3
Cod, salt		3.4	97.5
Corn, green[1] . . .	1 side dish	3.6	11.4
Corn meal	2 tablespoonfuls	1.0	10.3
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
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

[1] As purchased.

Edible Portions	Approximate Measure of 100-Calorie Portion	Weight in Ounces of 100-Calorie Portion	Calories Derived from Protein
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
Gelatin	4 tablespoonfuls	1.0	98.7
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
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, uncooked .	¼ cupful (4 sticks)	1.0	15.0
Macaroons	2	0.8	6.2
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	1¼ cupfuls (scant)	9.6	37.1
whole	⅝ cupful (generous half glass)	5.1	19.1
Molasses, cane . .	⅛ cupful	1.2	3.4
Muskmelons . . .	½ average serving	8.9	6.0
Mutton, leg	1 average serving	1.8	41.2
Oatmeal, uncooked .	⅓ cupful	0.9	16.1

Edible Portions	Approximate Measure of 100-Calorie Portion	Weight in Ounces of 100-Calorie Portion	Calories Derived from Protein
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
Pea soup, canned .		6.9	28.2
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	⅓ piece	1.3	4.6
custard	⅓ piece	2.0	9.4
lemon	⅓ piece	1.4	5.6
mince	¼ piece	1.2	8.1
squash	⅓ 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, white,			
uncooked . .	1 medium	4.2	10.6
sweet, uncooked .	½ medium	2.9	5.8
Prunes, dried . . .	3 large	1.2	2.8
Raisins	⅛ cupful (packed solid)	1.0	3.0
Rhubarb, uncooked .	3½ cupfuls (scant)	15.3	10.4
Rice, uncooked . .	2 tablespoonfuls	1.0	9.3
Salmon, whole . .	1 small serving	1.7	43.1
Shad, whole . . .	1 average serving	2.2	45.9
Shredded wheat . .	1 biscuit	1.0	11.3
Spinach, fresh[1] . .	3 ordinary servings (after cooking)	14.7	35.0
Succotash, canned .	1 average serving	3.6	14.7

[1] As purchased.

Edible Portions	Approximate Measure of 100-Calorie Portion	Weight in Ounces of 100-Calorie Portion	Calories Derived from Protein
Sugar	3 lumps, 5 teaspoonfuls granulated 6½ teaspoonfuls powdered sugar	0.9	(—)
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
Vegetable soup, canned		25.9	85.3
Walnuts, California	4 whole nuts	0.5	10.3
Wheat, cracked		1.0	12.4
White fish		2.4	61.4
Zwiebach	1 thick slice	0.8	9.4

CHAPTER X

Diet for Children and Infants

Selection of Food for Children (2 to 10 years). — 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. The vitality of the child is less than that of the adult. 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.

(1) *Milk.* — Since milk is the food provided for all 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. It is stated that the average child with good digestion should take from one and one half pints to one quart daily from the fourth to 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 for young children. Cereals should be *cooked* for at least *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 cereals, 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 syrup.

Carefully made toast (see p. 56), zwiebach, 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 must be in an easily digested condition (see *Soft-cooked Eggs*, p. 89). It is well to include one per day in the diet of children. For some children, two per day may be used to advantage after the third year. Egg-white is more easily digested than egg-yolk. Sometimes it is well to give only egg-white to very young 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 are included in children's diet, it is well not to give them meat before eight years. In some diets for infants beef juice and scraped meat are given, while in the diets for children from two to eight years, given on page 385, 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 47, p. 119) and pan-broiled (see *Pan-Broiling*, p. 125), 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. A child under ten years should not eat corn, lima beans, cabbage, or egg-plant.

(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 iron. For older children the cooked food fruit (see *Kinds of Fruits*, p. 31) 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. 313.)

(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, beer, or any fruit or carbonated drinks.

The Importance of Proper Diet for Children cannot be overemphasized. It is a child's right to be "hardy." Good food in proper quantity given at the proper 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. A derogatory suggestion 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 Chapter VIII the energy requirements of children of different ages are given.

(See *Relation of Age to Daily Energy Requirement*, p. 369, and *Relation of Sex to Daily Energy Requirement*, p. 369.) 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. 370.)

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	1½ cupfuls
	Stale Bread	1 slice
	Orange Juice	4 tablespoonfuls
Lunch: 11 A.M.	Milk	1 cupful
	Stale Bread	1 slice
	Butter	1 teaspoonful
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	¾ cupful
	Bread and Butter	1 slice

Fuel Value, 1313 Calories; Calories derived from protein, 191.2; Cost, $0.1377.

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.

[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.)

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	1½ 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; Cost, $0.1496.

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; Cost, $0.1875.

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 ¼ 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	1½ cupfuls
5:30 P.M.	Rice and Prunes	2 tablespoonfuls rice cooked in ½ cupful milk and 5 prunes
	Zwieback	1 slice

Total Calories, 1431; Calories from protein, 207.6; Cost, $0.1570.

FOOD FOR INFANTS

Perfect Food for Infants. — Nature in her unfailing 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.

In case it is necessary to give the infant other food, the greatest care should be taken to provide food similar in composition to mother's milk. Cow's milk is the basis of the food invariably chosen. Comparison of the composition of cow's milk and of human milk shows the need of changing or *modifying* cow's milk when it is to be used as infant's food. The water and fat content of the two are about the same. Human milk contains more sugar than cow's milk, while cow's milk contains more protein and ash than human milk. Cow's milk is acid in reaction, mother's milk is faintly alkaline or neutral. Cow's milk is more or less contaminated with germs; human milk is practically sterile. The fat and protein of cow's milk are more difficult to digest than these constituents of mother's milk.

Modified Milk. — (*a*) *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. 99.) 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 that is heated to 145° F., kept at that temperature for about thirty minutes, and then quickly cooled, is *pasteurized milk*. While pasteurizing kills most of the disease-producing germs, it does not destroy all the spores. (See *Microörganisms in the Spore Form*, p. 308.)

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.

If certified milk cannot be used for infant diet, there is some question whether milk should be pasteurized or sterilized. Most authorities consider that it is made less digestible and more constipating by sterilizing.

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.

(*b*) *Measuring and Mixing Ingredients.* — Utensils for measuring and preparing the ingredients of modified milk should be kept absolutely 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 covered jar containing a solution of boric acid ($\frac{1}{2}$ teaspoonful of boric acid to 1 pint of water). 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. Bacteria cannot pass through cotton, hence it is used for stoppering the filled milk bottles. The cotton should be sterilized by baking in a moderate oven for one hour. (It should be a very light brown when baked.)

To make cow's milk conform with human milk in composition, it is necessary to decrease the protein and ash content. This may be accomplished by *diluting* the milk. But when this is done, the fat content is too small. In order to decrease the protein and fat content and at the same time retain the proper quantity of fat, dilute *top milk*, *i.e.* milk containing more than the average percentage (4%) of fat. Milk containing ten per cent of fat or that containing seven per cent of fat is commonly used for young infants. Whole milk (4% fat) is often used for older infants.

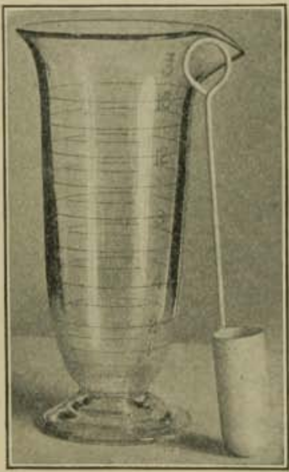


Fig. 89. — Utensils for measuring the ingredients of modified milk.

Seven per cent milk can be approximately obtained as follows: Allow milk of average composition (4% fat) to stand in a quart bottle for at least four hours. (This time is required so that the cream may rise to the top.) Then remove the upper *sixteen ounces* (use a cream dipper of 1 ounce capacity, see Fig. 89). Then stir the milk and measure the desired number of ounces. From milk containing less than the average per cent of fat, remove the upper *eleven ounces* to obtain approximately seven per cent milk. From Jersey milk or milk containing more than the average per cent, remove the upper *twenty-two* ounces. Seven per cent milk can also be obtained approximately by adding *one part* of sixteen per cent cream to *three parts* of average milk.

Ten per cent milk can be approximately obtained by removing the upper eleven ounces from a quart of milk of average composition.

Ten per cent milk contains about *three times as much fat as protein.* Seven per cent milk contains about *twice as much fat as protein.* Whole milk contains about *equal quantities of fat and protein.* When modifying milk according to certain formulas, note the proportion of fat to protein in the formula and then choose milk — top or whole — that contains the desired proportion of fat and protein. For example: For a given formula requiring milk containing 2.5 per cent fat and 0.83 per cent protein, use ten per cent milk. For a formula requiring 2.5 per cent fat and 1.25 per cent protein, use seven per cent milk.

Formulas are written for *twenty ounces* of food. Usually enough food for a day's feeding is prepared at one time.

To increase the sugar content it is necessary to add *milk sugar* (this can be obtained at a drug store). Use 1 ounce of milk sugar to 20 ounces of food; $1\frac{1}{2}$ dipperfuls (see Fig. 89) of milk sugar weigh 1 ounce. Measure the water (boiled) for diluting the milk and dissolve the milk sugar in it. If, after dissolving the sugar, there is a sediment in the bottom of the utensil, the solution may be filtered through absorbent cotton (line the inside of a funnel with a layer of cotton).

To neutralize the acidity of cow's milk, add *lime water,* — 1 ounce for 20 ounces of food.

Mix the ingredients together in a pitcher and pour into sterilized bottles, stopper with baked cotton, and 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.

(*c*) *Pasteurizing Milk.* — Place the bottles of milk on a rack in a kettle. (A shallow cake tin with holes cut in it to fit the bottles and supported on a rack makes a good device.) Insert a clean thermometer through the stopper of one of the bottles. Pour water in the kettle so that the water is as high outside of the bottles as the milk is inside. Heat the water until the thermometer registers 145° F. Place the kettle on the back of the range or arrange the heat so that this temperature can be maintained for 30 minutes. Remove the thermometer from the bottle and stopper it. *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 at once in a clean refrigerator.

If milk is to be pasteurized for infant feeding, the process of heating should take place in the home. One cannot always be sure that clean milk is used when milk is pasteurized in large quantities at a milk dealer's.

(*d*) *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. 116, for testing the temperature of the milk. Shake the bottle before feeding.

In addition to milk, boiled water should be given to infants.

Other Foods Given to Infants. — Gruels are often advised for the latter part of the first year. (For the preparation of gruels, see p. 334.) A few other foods — egg-white, orange juice, and beef juice — may often be given during the first year. If the latter is used (see *Broth and Meat*, p. 335) it should be diluted with an equal quantity of water and should not be given before the infant is ten or eleven months old. Half an egg-white may commonly be given to a baby of six months. When a little older the entire egg-white may be given. Orange juice (strained through muslin) may usually be given at five or six months of age. Give two or three teaspoonfuls a day, one hour before feeding. Increase the quantity gradually. About three times the quantity can be given at the end of the first year.

QUESTIONS

Give at least three reasons why young children should have different food from adults.

Why are not ready-to-serve cereals suitable 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 meat not a desirable food for most young children?

Why are fresh vegetables and fruits such necessary foods for children?

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 *top* milk generally used? Why is milk diluted? Why are sugar and limewater added?

What is the price per quart of certified milk?

APPENDIX

BOOKS FOR REFERENCE

Part I

Bailey: The Source, Chemistry, and Use of Food Products.
Barrows: Principles of Cookery.
Bevier and Van Meter: Selection and Preparation of Food.
Blanchard: Household Chemistry.
Brownlee and Others: Chemistry of Common Things.
Buchanan: Household Bacteriology.
Conn: Bacteria, Yeasts, and Molds in the Home.
Cornell Reading Course for the Farm Home: Bulletins.
Flour and Bread.
The Preservation of Food, Part I, Part II, and Part III.
Department of Household Science, University of Illinois: Bulletin, Principles of Jelly-making.
Farmer: The Boston Cooking School Cook Book.
Hill: Cooking for Two.
Lincoln and Barrows: Home Science Cook Book.
Lynde: Physics of the Household.
Mitchell, Margaret J.: Fireless Cook Book.
Olsen: Pure Foods.
Sherman: Food Products.
Snell: Elementary Household Chemistry.
U. S. Department of Agriculture: Bulletins.
Van Arsdale: Technique of Cookery.
Vulté: Household Chemistry.
Vulté and Vanderbilt: Food Industries.

Part II

American Medical Association: Save the Babies, Pamphlet No. 7.

Cornell Reading Course for the Farm Home: Bulletins, Human Nutrition, Part I and Part II.
The Box Luncheon.

Farmer: Food and Cookery for the Sick and Convalescent.

Hill: The Up-To-Date Waitress.

Holt: The Care and Feeding of Children.

Howell: Textbook of Physiology.

Kansas Agricultural College: Bulletin, Table Etiquette and Table Service.

Larned: Hostess of To-Day.

Lusk: Science of Nutrition.

Pattee: Practical Dietetics.

Richards, Ellen H.: The Cost of Food.

Rose, Mary S.: Laboratory Handbook for Dietetics.

Sherman: Chemistry of Food and Nutrition.

Stiles: Nutritional Physiology.

Tigerstedt: Textbook of Physiology.

U. S. Department of Agriculture: Bulletins.

SUGGESTIONS FOR TEACHING

Parts I and II of this text furnish 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 in Part I may be omitted or assigned for home work or lessons may be combined. For work given to first-year high school pupils, the study of energy requirement and the calculation of the fuel values of foods may be omitted or deferred until the third or fourth year. With such an arrangement, lessons on the cooking and serving of entire meals may be introduced among the "regular" cooking lessons of Part I.

If the teacher wishes to correlate this work with some other subject — physiology, chemistry, physics, etc. — the time may be extended or the order of work may be changed to fit the particular requirement. It will be noted that the foods treated in the first portion of Part I (Lesson V to Lesson LX) are classified according to their physiological functions, special emphasis being placed — in the theoretical part of the test — upon the use of the foods in the body. The material in this part of the text may be correlated most aptly with physiology. In the second portion of Part I (Lesson LXIII to Lesson XCIX) special emphasis is placed upon food composition. This work may be most satisfactorily correlated with chemistry.

For some courses of study, logical development must be sacrificed for the sake of economy. The practical teacher uses only seasonable foods.

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. The relation of one recipe to another 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 teacher may have the pupils record the answers to the "Questions" in notebooks; she may find it desirable to have them recite occasionally on the "Questions." By the latter method, an opportunity is afforded to teach pupils *how* to study.

SUGGESTIVE OUTLINE FOR THE PRACTICAL WORK OF LESSONS IN THE COOKING OF FOOD

The author assumes that these outlines will serve merely as *suggestions*. This selection of foods may need to be modified to suit local conditions.

Lesson	III	Broiled Tomato or Baked Squash (individual).
Lesson	IV	Scalloped (or Stuffed) Tomato or Scalloped Corn (individual).
Lesson	V	Peanut (or Cocoanut or Puffed Cereal) Candy (individual).
Lesson	VI	Stewed Fruit and Fruit Sauce (individual); Stewed Dried Fruit (group).
Lesson	VII	Scalloped Fruit and Hard Sauce (individual).
Lesson	VIII	Cereal (individual).
Lesson	IX	Rice (cooked over boiling water); Rice (boiled); Tomato (or Cheese) Sauce (made with rice water); (individual).

Mold the Rice (cooked over boiling water); serve the Boiled Rice around it; pour Sauce over both.

Lesson	X	Corn Meal Mush for Frying; Rice and Tomatoes; (group).
Lesson	XI	"Fried" Corn Meal Mush; French Toast; Caramel Syrup; (individual).
Lesson	XII	Blanc Mange or Chocolate Corn Starch Pudding (individual).
Lesson	XIII	Cream Toast (individual).

Lesson XIV Creamed (or Scalloped) Potatoes or Carrots (individual). (See *Note to the Teacher* in the text.)

Lesson XV Sweet Potatoes; Green Corn or Beets; (individual).

Lesson XVI Fruit Tapioca; Lemon Sauce; (individual).

Lesson XVII Potato Soup; Croutons; (individual).

Lesson XVIII Corn Soup; Soup Sticks; Dried Bread Crumbs; (individual).

Lesson XIX Stuffed Baked Potato; Popcorn; (individual).

Lesson XX "Tried-out" Suet; Fried Oysters; (individual).

Lesson XXI Fish Balls (individual).

Lesson XXII Potato (or Rice) Croquette (individual).

Lesson XXIII Soft-cooked Egg alternating with Hard-cooked Egg (individual).

Reserve Hard-cooked Eggs for Goldenrod Eggs.

Lesson XXIV Poached Egg on Toast; Goldenrod Eggs; (individual).

Lesson XXV Scrambled Egg; Foamy Omelet; (individual).

Lesson XXVI White Sauce Omelet (individual).

Lesson XXVII Cocoa; Chocolate; (individual).

Lesson XXVIII Rice Dainty (individual); Cream of Rice Pudding (group).

Lesson XXIX Rice Pudding; Caramel Sauce; (individual).

Lesson XXX Steamed (or Baked) Custard; Soft Custard; (individual).

Serve Soft Custard over banana or cake.

Lesson XXXI Floating Island (individual).

Lesson XXXII Apricot (or Prune) Dainty; Custard Sauce; (individual).

Lesson XXXIII Cream of Potato Soup; Caramel Tapioca; (individual).

Lesson XXXIV Corn Custard; Cheese Pudding; (individual).

Lesson XXXV Bread Pudding; Vanilla Sauce; (individual).

Lesson XXXVI Chocolate Bread Pudding alternating with Bread Pudding with Prunes; Lemon Sauce; (individual).

Lesson XXXVII Junket "Custard" (individual); Cottage Cheese; (group).

Lesson XXXVIII Macaroni (or Rice) with Cheese (individual).

Lesson XXXIX Pan-broiled Steak (individual).

Lesson XL Cannelon of Beef; Brown Sauce; (individual).

Lesson XLI Hamburg (or Salisbury) Steak (individual).

Lesson XLII Beef Stock (group).

Lesson XLIII Vegetable Soup; Baked Hash; (individual).

Prepare this soup and hash from the meat and stock of the previous lesson.

Lesson XLIV Rolled Beef Steak or Beef Stew (individual); Pot Roast or Stuffed Flank Steak (group).

Lesson XLV Scalloped Meat alternating with Cottage Pie (individual).

Prepare these meat dishes from the Pot Roast of the previous lesson.

Lesson XLVI Lemon Jelly (individual).

Add bananas or other fruit to Lemon Jelly.

Lesson	XLVII	Gelatine Pudding (individual).
Lesson	XLVIII	Salmon Timbale; White Sauce; (individual).
Lesson	XLIX	Stuffing for Fish (individual); Baked Fish (group).
Lesson	L	Planked Fish (or Sautéed Fish); Tomato Sauce; (individual).
Lesson	LI	Boston Baked Beans; Salted Peanuts; (individual).
Lesson	LII	Bean Soup alternating with Split Pea Soup; Crisp Crackers; (individual).
Lesson	LIII	Cream of Tomato Soup (individual).
Lesson	LIV	Spinach; Creamed Asparagus (or Celery); (individual).
Lesson	LV	Creamed Cabbage; Plain (or Scalloped) Onions; (individual).
Lesson	LVI	Lettuce Salad (French Dressing); Cole Slaw; (individual).
Lesson	LVII	Stuffed Egg; Banana Salad (Cream Dressing); (individual).
Lesson	LVIII	Tea; Boiled (or Drip) Coffee; Toasted Crackers with Cheese; (individual).
Lesson	LX	Curry of Kidney Beans or Savory Salad; Spiced Baked Apple; (individual).
Lesson	LXI	"Five Threes" (group).
Lesson	LXII	Plain Ice Cream alternating with French Ice Cream; Cocoanut Wafers; (individual).
Lesson	LXIII	Popover (individual).
Lesson	LXIV	Corn Bread (individual).
Lesson	LXV	Gingerbread (individual).
Lesson	LXVI	Plain Griddle Cakes; Bread (or Corn Meal) Griddle Cakes; (individual).
Lesson	LXVII	Sour Milk Griddle Cakes; Fruit Syrup; (individual).

Lesson	LXVIII	Steamed Brown Bread; Butter Balls; (individual).
Lesson	LXIX	Waffles (individual).
Lesson	LXX	Plain Muffins alternating with Whole Wheat (or graham) Muffins (individual).
Lesson	LXXI	Corn Muffins alternating with Rice Muffins (individual).
Lesson	LXXII	Peach Cup; Whipped Cream Sauce; (individual).
Lesson	LXXIII	Cream Puff; Cream Filling; (individual).
Lesson	LXXIV	Drop Biscuit; Fruit Pudding; (individual).
Lesson	LXXV	Fruit Short Cake; Sauce; (individual).
Lesson	LXXVI	Baking Powder Biscuit; Apple Dumpling (or Fruit Rolls); (individual).
Lesson	LXXVII	Loaf of Bread (individual).

By using $\frac{1}{2}$ cake of compressed yeast with $\frac{1}{4}$ cupful of liquid, it is possible to mix, raise (once only), and bake bread in 90 minutes. To accomplish this the dough is mixed, kneaded, shaped into a loaf, and placed at once into an oiled pan. It is then put in a slightly warmed gas oven to rise. When doubled in bulk, it is baked for 20 minutes in a hot oven.

Where it is possible to arrange for bread lessons of longer duration, it is desirable to make larger loaves — using at least $\frac{1}{3}$ cupful of liquid — and to allow two risings of the dough.

Lesson	LXXVIII	Loaf of Entire Wheat (or graham) Bread (individual).
Lesson	LXXIX	Loaf of Bread (made from sponge) (individual).
Lesson	LXXX	Parker House Rolls; Cinnamon Buns; (individual).
Lesson	LXXXI	Sponge Cake; Custard Filling; (individual).
Lesson	LXXXII	Plain Cake (individual).

Lesson	LXXXIII	White Cake; Gold Frosting; (individual).
Lesson	LXXXIV	Chocolate (or Nut, Spice, etc.) Cake; Frosting; (individual).
Lesson	LXXXV	Sugar (or Sour Cream) Cookies (individual).
Lesson	LXXXVI	Lemon Pie (individual).
Lesson	LXXXVII	Fruit Pie (with upper crust) (individual).
Lesson	LXXXVIII	Fruit Pie (with upper and under crusts) (individual).
Lesson	LXXXIX	Vegetable Salad (Mayonnaise Dressing) (individual).

Reserve half of the dressing for Perfection Salad (Lesson XC).

Lesson	XC	Perfection Salad (Mayonnaise Dressing) (individual).
Lesson	XCI	Fish Salad; Salad Rolls; (individual).
Lesson	XCII	Prune Pudding alternating with Date Pudding (individual).
Lesson	XCIII	Veal Cutlet; Potato Puff; (individual).
Lesson	XCIV	Stuffed Shoulder of Lamb; Mint Sauce; (group); or Mutton in the Casserole (individual).
Lesson	XCV	Pork Chops with Sweet Potato; Scalloped Potatoes with Bacon; (individual); Broiled Ham; Apple Sauce; (group).
Lesson	XCVI	Fowl, dressed, trussed, and cut into pieces; Stewed Fowl; (group).
Lesson	XCVII	Chicken Croquette with Peas (individual).

Prepare Chicken Croquettes from the Stewed Fowl of the previous lesson.

Lesson	XCVIII	Oyster Stew; Scalloped Oysters; (individual).
Lesson	XCIX	Scalloped Egg with Cheese; Peanut Roast alternating with Peanut Bread; (individual).
Lesson	CI	Canned Fruit (individual).
Lesson	CII	Jam, or Conserve, or Marmalade (individual).
Lesson	CIII	Jelly (individual).
Lesson	CIV	Catsup, or Celery Sauce, or Spiced Fruit (individual).
Lesson	CV	Canned Vegetable; Dried Vegetable or Fruit; (individual).

SUGGESTIVE OUTLINE OF LESSONS IN THE PLANNING AND SERVING OF MEALS AND THE CALCULATION OF THE FOOD VALUES OF MEALS

Theory	Laboratory Work
I. Menu Making. A. Representation of all Food Stuffs. B. Contrast in Flavors of the Foods of Different Courses. C. Harmony in Flavor of the Foods of the Same Course.	Plan a breakfast. Aim: seasonable foods varied in composition.
II. The Luncheon Box. A. Menu Making for the Luncheon Box. B. Foods for the Luncheon Box. 1. Sandwiches. 2. Relishes. 3. Desserts. C. Packing the Luncheon Box.	Plan box luncheons. Make sandwiches and other foods for the luncheon box. Fill one or more luncheon boxes according to plans.
III. The Sick-room Tray. A. Selection of Foods for the Sick. B. Selection of Foods for the Convalescent. C. Review of the Preparation of Easily-digested Foods.	Prepare special foods for the sick and for the convalescent. Prepare a tray.

D. Preparation of Special Foods for the Sick and for the Convalescent.
   1. Milk.
   2. Eggs.
   3. Gruels.
   4. Broth and Meat.

E. Preparing the Tray.

IV. Dining Room Service.

Cook and serve the breakfast (planned in I) — English style with maid.

A. Table.
   1. Table Linen.
   2. China and Glassware.
   3. Silver.
   4. Table Accessories.

B. Style of Serving.
   English.

C. Methods of Serving with a Maid.
   1. Established Rules for Serving.
   2. Use of Buffet and Serving Table.
   3. Use of Serving Tray.
   4. Crumbing the Table.
   5. Use of the Finger Bowls.

Dining Room Courtesy.

A. The Value of Good Table Manners.

B. Suggestions concerning Table Manners.
   1. The Chair.
   2. The Knife and Fork.
   3. The Fork and Spoon.
   4. The Fingers.
   5. The Napkins.
   6. Quiet Eating.

V. Cost of food. A. Cost of Food in Relation to Nutritive Value. B. Cost of Food in Relation to Refuse. C. Cost of Food in Relation to Season. D. Calculation of the Cost of Food.	Plan a breakfast. Aim: seasonable foods, varied in composition; fifteen cents per plate. Cook and serve the breakfast — English style with maid.
VI. Methods of Serving without a Maid. A. Preparation before Announcing the Meal. B. Serving at the Table.	Plan a luncheon. Aim: seasonable foods, varied in composition; fifteen cents per plate; service without a maid. Cook and serve the luncheon — English style without maid.
VII. Measurement of the Fuel Value of Foods. A. How Food is Assimilated. B. How Heat or Fuel Value is Measured. 1. How the Fuel Value of a Food is Measured.	Calculation of the fuel value of one or more foods. Plan a luncheon. Aim: seasonable foods, varied in composition; service without a maid. Cook and serve the luncheon — English style without a maid.
VIII. 2. How the Weight of Food Materials Producing 100 Calories is Measured (continued from VII).	Calculation of the weight of food materials producing 100 Calories. Plan a luncheon. Aim: seasonable foods, varied in composition; service without a maid. Cook and serve the luncheon — English style without a maid.
IX. 3. How the Fuel Value of a Combination of Food Materials is Measured (continued from VIII).	Calculation of the fuel value of a combination of food materials. Plan a plain dinner. Aim: seasonable foods, varied in composition; service without a maid. Cook and serve the dinner — English style without a maid.

X. Food Requirement.
  - A. Daily Energy Requirement.
    1. Relation of Season to Daily Energy Requirement.
    2. Relation of Weight, Size, and Shape to Daily Energy Requirement.
    3. Relation of Occupation.
    4. Relation of Age to Daily Energy Requirement.
    5. Relation of Sex to Daily Energy Requirement.

Compute the energy requirement of at least two members of your family. Compute your own energy requirement. Plan a plain dinner. Aim: seasonable foods, varied in composition; service without a maid. Cook and serve the dinner — English style without a maid.

XI. A. Daily Protein Requirement; Nutritive Ratio.
  - B. Daily Carbohydrate and Fat Requirement.
  - C. Daily Ash Requirement.

Compute the nutritive ratio of the energy requirements calculated in X. Plan a dinner. Aim: seasonable foods; use of a meat substitute. Cook and serve the dinner — English style without a maid.

XII. Measurement of the Fuel Value of Foods Applied to Daily Food Requirement.
  - A. Practical Method of Diet Calculation.
  - B. Table of 100 Calorie Portions.

Calculate your own breakfast, luncheon, and dinner energy requirements. From the table of 100-Calorie portions, estimate the fuel value of all your meals for several days.

Styles of Serving (continued from IV).
  1. Russian.
  2. Compromise.

Plan a dinner. Aim: to meet the total energy and protein requirement of an average man or woman. Cook and serve the dinner — Russian or Compromise style with a maid.

XIII. Review.

For several members of your family, make menus which meet the total energy and protein requirement. Plan a dinner. Aim: to cost twenty cents per plate; to meet the total energy and protein requirement of an average man or woman. Cook and serve the dinner — Russian or Compromise style with a maid.

XIV. Diet for Children.

- A. Difference in the Food Requirements of Adults and Children.
- B. Selection of Food for Children (2 to 10 years).
  1. Milk.
  2. Cereals and Breads.
  3. Eggs.
  4. Broth and Meat.
  5. Fresh Vegetables.
  6. Fruits and Sugar.
  7. Desserts.
  8. Water and other Beverages.
- C. Importance of Proper Diet for Children.
- D. Energy Requirements of Children of Different Ages.

Plan a day's feeding for a child of five years, meeting the total energy and the protein requirements. Prepare these foods.

XV. Diets for Infants.

- A. Perfect Food for Infants.
- B. Modified Milk.
  1. Selection of Milk.
  2. Measuring and Mixing Ingredients.
  3. Pasteurizing Milk.
  4. Preparation of Milk before Feeding.
- C. Other Foods for Infants.

Modify cow's milk according to a prescription for infant diet. Pasteurize milk. Prepare gruels for infant feeding.

XVI. Review and Summary.

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Abreviations

tbs. = tablespoon
ts. = teaspoon
ss. = saltspoon
spk. = speck
c. = cup
qt. = quart
pt. = pint
oz. = ounze
lb. = pound
h. = hour
m. = minute

Measurments

4 ss. = 1 ts.
3 ts. = 1 tbs.
4 tbs. = 1/4 c.
16 tbs. = 1 c.
4 c. = 1 qt.
2 tbs. butter = 1 oz.
4 tbs. flour = 1 oz.
2 c. meat = 1 lb.
2 c. granulated sugar = 1 lb
2 c. butter = 1 lb.
4 c. flour = 1 lb.
9 large eggs = 1 lb.