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FOODS PROJECT, COURSE NO. 2.

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THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 309

LECTURE NOTES

BY

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1963

These notes were prepared for the course in Quantum Mechanics  
taught by Professor Robert H. Cohen in the Physics Department  
of the University of Chicago during the fall semester of 1963.

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## CIRCULAR NO. 135

### FOODS PROJECT, COURSE NO. 2.

#### FOOD AND ITS USES IN THE BODY

Food is needed by the body to build and repair tissue, to produce heat and energy, to regulate the body processes and to supply substances which cause growth and help to preserve health. Food substances are divided into six groups; protein which builds or repairs muscle, fat which may be used to supply heat and energy or to build fatty tissue, carbohydrates (sugars and starches) which may be used like fat by the body, water, mineral substances and vitamins, the last three being necessary to keep the body in a healthy, normal condition.

The table on the next page lists the most important foods in each group.

For ease in selecting foods suitable to combine for a meal they may be classed in the following groups:\*

Group I. Fruits and vegetables

Group II. Meat and meat substitutes

Group III. Starchy foods, cereals and their products, flour, meal, potatoes, etc.

Group IV. Sugar, syrups, honey

Group V. Fats

#### REASONS FOR COOKING FOOD

Foods are cooked:

- a. To develop or change the flavor.
- b. To make the foods easier to chew or to improve the texture.
- c. To make them easier to digest.
- d. To make them more attractive.
- e. To increase variety in ways of serving.
- f. To destroy disease germs which may be present.
- g. To prevent some foods from spoiling quickly.

\*Adapted from "How to Select Foods"—Farmers' Bulletin 808, U. S. Department of Agriculture, Washington, D. C.



**GENERAL DIRECTIONS FOR WORK**

Plan to wear a clean wash dress or waist, if possible.

Have fire ready for use when needed.

Pin or tie the hair back or cover it with a cap.

Remove any rings or bracelets.

Put on a clean apron large enough to cover the dress

Keep a hand towel near and always wipe the hands on it.

Have a holder at hand for lifting hot utensils and always use it for that purpose instead of towel or dishcloth.

Wash the hands thoroly and clean the nails.

Read the recipe thru carefully and plan necessary utensils, ingredients and order of work.

Collect utensils and materials needed before starting to work, with as few trips around the room as possible. "Let your head save your heels."

Keep the table neat as you work, piling soiled dishes together at one side, avoiding spilling materials and putting unused food materials away as soon as work is finished.

When testing food always put a little into another spoon with the mixing spoon.

Avoid waste of material by scraping mixing bowl, spoon and cooking utensils with knife or spoon.

*Fire Building.* To have fire we must have some fuel, a plentiful supply of oxygen, and something to heat the fuel to its kindling point, the point at which it begins to burn. The oxygen is supplied by the air, but to secure enough the fire must constantly have a fresh supply of air. Before laying a fire, remove all ashes from the grate in the fire-box. Lay in it crumpled paper first, then some small pine wood or other kindling, placing it crosswise so as not to fit close together, but let the air pass thru easily. Finally place on top larger sticks of pine or hard wood or a little coal. Open the drafts below the fire-box and the draft into the chimney, apply a match to the paper under the fire and place the covers on the stove.

When the fuel is well kindled, add coal or wood to fill the fire-box and when this is burning well close the draft into the

chimney and at least partly close the other drafts. To cool the stove quickly and to check the fire, open the dampers letting cold air on top of the fire.

*Care of Kerosene Stoves.* To avoid an unpleasant odor when in use the kerosene stove should be wiped off frequently to keep it free from oil. Unless a wickless stove is used, the wicks should be wiped every day or two so that the flame will be clear and hot. As the method of lighting varies with the different kinds of stoves, the directions which come with the stove should be followed.

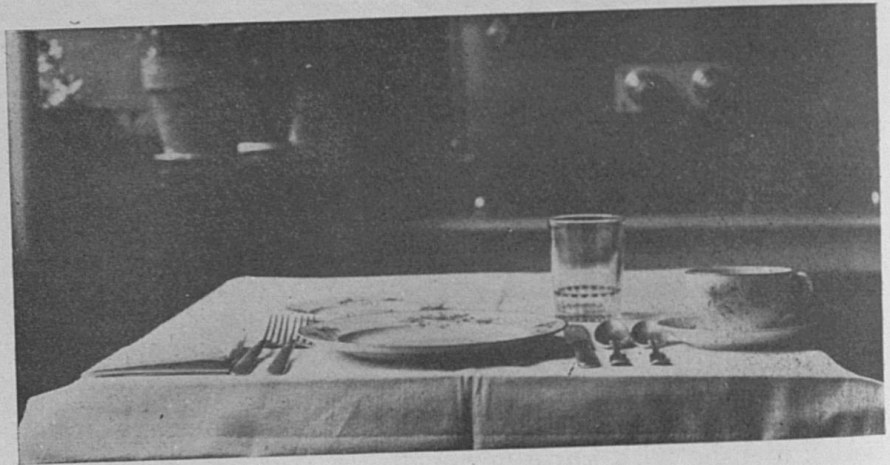


Fig. 1. Table Setting.

*Simple Rules for Table Setting.* Before setting the table see that the dining room is clean and a comfortable temperature. A pad of heavy cloth, very little larger than the table, placed under the tablecloth lessens noise and gives a better appearance. Spread the tablecloth smoothly and evenly, with the central crease at the center of the table. A centerpiece of fresh flowers, arranged in a low vase or bowl so as not to obstruct the view across the table, will add much to its attractiveness. Place all silver with lower end one inch from the edge of the table. Knives should be on the right of the plate, with sharp edge turned toward it. Spoons are on the right of the knives. Forks are placed at the left of the plate, with the tines up. The napkin may be placed at the left of the forks, with the open corner to-

ward the lower end of the fork, or it may be in the center of the place, if plates are piled before the one who will serve. The water glass should be at the tip of the knife. If bread-and-butter plates are used, they should be put at the left of the plate, beyond the end of the fork. See Fig. 1.

Cups and saucers may be piled in twos if necessary because of lack of space. Arrange all dishes and platters so as to make the table look orderly and to avoid crowding.

*Table Service.* When waiting on the table always do so as quietly and quickly as possible. Just before the meal is served the glasses should be filled  $\frac{3}{4}$  full with fresh, cold water and the butter, bread, cream, etc., placed on the table. When waiting on the table, pass to the left any dish from which each helps himself, holding it low and so it can be easily reached. Plates and other dishes may be placed from the left with the left hand. The table may be kept more attractive and less crowded if the first course is removed before the next is served. Take off first the platters and large dishes and then the plates and smaller dishes.

*Dishwashing.* Scrape food from all dishes and pile them according to kind. Rinse in cold water dishes which have been used for milk, eggs, or starchy food. Soak sticky dishes in hot water and wipe greasy dishes out well with paper before washing. Prepare a dish pan with hot, soapy water and a rinsing pan with hot, clear water. Wash glassware first, then silver and then other dishes according to their cleanliness, washing the cooking utensils last. After drying all the dishes, wash the dish towels and cloths, rinse well and hang straight and even to dry in the sun, if possible.

*Table Customs.* Hands should always be well washed and the hair made neat just before going to the table. The chair should be placed so that one can comfortably sit up straight at the table. All unnecessary noise in eating and handling the dishes at the table and in the kitchen should be avoided. The knife should be used only for cutting food and the fork or spoon for carrying it to the mouth. When not in use the knife and fork should be beside each other across the plate a little one side of the middle, with the tines of the fork up. The spoon should

be placed in the saucer when not in use. A fork or spoon should be provided for serving each food and should always be used instead of one's own fork or spoon.

**DIRECTIONS FOR MEASURING**

The success of a recipe often depends upon accuracy in measurement. For dry materials, fill measure to overflowing, then level off with the straight edge of knife. Pack butter and other solid fats and brown sugar. For liquids just fill the measure. Flour should be sifted once before measuring and put lightly into the measure. To get one-half a spoonful, fill, level off and divide in half lengthwise of the spoon. Fig. 4 shows how to measure  $\frac{1}{4}$  teaspoonful.

**TABLE OF ABBREVIATIONS**

|          |            |          |       |
|----------|------------|----------|-------|
| t. ....  | teaspoon   | pt. .... | pint  |
| tb. .... | tablespoon | qt. .... | quart |
| c. ....  | cup        | lb. .... | pound |
| hr. .... | hour       | oz. .... | ounce |

**TABLE OF MEASUREMENTS**

|             |       |                                     |       |
|-------------|-------|-------------------------------------|-------|
| 3 t. ....   | 1 tb. | 2 c. water or other liquid.....     | 1 lb. |
| 16 tb. .... | 1 c.  | 2 c. sugar .....                    | 1 lb. |
| 2 c. ....   | 1 pt. | 2 c. butter or other solid fat..... | 1 lb. |
| 2 pt. ....  | 1 qt. | 4 c. flour .....                    | 1 lb. |



Fig. 2. Measuring No. 1.





Fig. 3. Measuring No. 2.



Fig. 4. Measuring No. 3.

### LESSON I. CREAMED AND ESCALLOPED VEGETABLES

*Preparation of Vegetables.* Select fresh, undamaged vegetables of medium size rather than large ones.

If wilted, allow the vegetable to soak in cold water till freshened.

Before preparing, wash the vegetable in cold water.

If vegetables are to be boiled, the water should be boiling before they are added.

Because much of their mineral substances are just under the skin, either leave skins on the vegetables or remove only a very thin paring.

Vegetables should be cooked in as little water as possible to avoid loss of mineral substances and of delicate flavors. The water which is left should be saved for use in soups, sauces, etc., if it cannot be served with the vegetable.

Cook only until tender enough to serve. Overcooking spoils the flavor and color of many vegetables or gives them an unpleasant texture.

Let the water boil gently around them.

As soon as a vegetable is cooked, remove it from the water.

#### Creamed Carrots

3 medium-sized carrots                      2 c. medium white sauce

Wash and scrape the carrots and remove the tops. Cut into  $\frac{1}{2}$  inch cubes and cook till tender, in enough boiling salted water to cover. Drain and add to the white sauce. Water in which the carrots were cooked may be used in place of part of the milk in the white sauce.

#### Escalloped Cabbage

$\frac{1}{2}$  medium head cabbage                       $\frac{1}{4}$  c. buttered crumbs  
2 c. medium white sauce

Remove outer leaves of cabbage and wash. Boil until tender. Cut fine and put into a buttered baking dish. Pour white sauce over it, add pepper, and cover with buttered crumbs, using  $\frac{1}{8}$  as much melted butter as dry crumbs. Bake in a moderate oven 10 minutes or till crumbs are brown.

*Reference.* Preparation of Vegetables for the Table, Farmers' Bulletin 256.

## LESSON II. STUFFED TOMATOES AND PEPPERS

Vegetables form a large part of our food, either in the form in which they grow or as the source of other foods. Corn gives us not only the vegetable we eat from the cob, but also corn-meal, cornstarch, corn syrup, corn oil and a large variety of breakfast foods, as well as hominy, grits and lye hominy. But when we speak of a vegetable we usually mean some part of a plant which may be served with meats. The food value of a vegetable is decided largely by the part of the plant which is used, as is shown by the following table.

| Part of Plant               | Vegetable                                                    | Chief Value in Body                          |
|-----------------------------|--------------------------------------------------------------|----------------------------------------------|
| 1. Root and Tuber           | Potates<br>Carrots<br>Turnips<br>Beets, etc.                 | Starch and sugar                             |
| 2. Stem                     | Celery<br>Asparagus<br>Rhubarb                               | Mineral Substances<br>Cellulose              |
| 3. Leaf                     | Spinach<br>Cabbage<br>Lettuce<br>Turnip greens<br>Kale, etc. | Mineral Substances<br>Cellulose<br>Vitamines |
| 4. Bulb or underground leaf | Onions<br>Garlic                                             | Mineral Substances                           |
| 5. Blossom                  | Cauliflower                                                  | Mineral Substances                           |
| 6. Fruit                    | Tomatoes<br>Squash<br>Pumpkin<br>Cucumber<br>Okra, etc.      | Mineral Substances<br>Flavor<br>Some sugar   |
| 7. Seed                     | Corn<br>Beans<br>Peas                                        | Starch<br>Protein                            |

Vegetables are also valuable in giving bulk to the food because of the large amount of cellulose which they contain. This is useful in increasing the activity of the digestive system, helping to digest the foods and remove the waste.

#### Stuffed Peppers

|                      |                                |
|----------------------|--------------------------------|
| 6 green peppers      | 3 tb. crumbs                   |
| 1 onion              | ½ c. chopped ham or other meat |
| 2 tb. butter         | Salt                           |
| 1/3 c. milk or water |                                |

Cut slice from stem end of peppers or cut peppers lengthwise. Remove seeds. Parboil 10 minutes. Do not leave them in the water. Cut onion in small pieces and brown in butter. Add liquid, meat and bread crumbs. Sprinkle with pepper and salt. Fill peppers with mixture. Cover with buttered crumbs and bake about ten minutes in hot oven.

#### Stuffed Tomatoes

|                            |                                                   |
|----------------------------|---------------------------------------------------|
| 6 medium sized tomatoes    | ½ tb. finely chopped cooked chicken or other meat |
| 2 tb. butter               | ½ c. bread crumbs                                 |
| ½ tb. finely chopped onion | Salt and pepper                                   |
| 1 egg                      |                                                   |

Wipe and remove thin slices from stem end of the tomatoes, take out seeds and pulp. Cook butter with finely chopped onion about 5 minutes. Add chicken or other meats, bread crumbs, tomato pulp, and salt and pepper to taste. Add 1 egg slightly beaten and fill tomatoes with mixture. Place in buttered pans. Sprinkle with buttered cracker crumbs and bake about 20 minutes in hot oven.

*Reference.* Fresh Fruits and Vegetables as Conservers of Other Staple Foods, Farmers' Bulletin 871.

### LESSON III. LETTUCE AND CABBAGE SALAD

*General Rules for Salad Making.* Salad greens should be washed carefully and crisped if necessary. Lettuce may be kept crisp by washing and keeping in a tin bucket or jar with tightly fitting cover. Cooked vegetables, fruits, or meats should be cut in small pieces of uniform size and shape. All materials except greens should be mixed with a little highly seasoned salad

dressing and allowed to stand till seasoned. This process is called marinating and the mixture for seasoning ingredients is called a marinade. Great care should be taken with the seasoning of salads and the selection of suitable combinations. Salads should be cold when served. The salad should look fresh and attractive in color and arrangement.

*Value of Salads.* Salads are useful in giving a variety, supplying a keen flavor and because of their attractive appearance. Their food value depends upon the materials of which they are made, but all should contain green vegetables, as lettuce, cabbage, etc., which are especially valuable for vitamins and mineral substances, such as iron, needed to keep the blood healthy. Salads provide a good way to use, in combinations, small amounts of vegetables, meats, fish or fruits which might not be used otherwise.

#### Cooked Salad Dressing

|                    |                      |
|--------------------|----------------------|
| ½ t. salt          | ½ tb. flour          |
| ¼ t. mustard       | Yolks 2 eggs         |
| 1½ tb. sugar       | 1½ tb. melted butter |
| Few grains cayenne | ¾ c. milk            |
| ¼ c. vinegar       |                      |

Mix dry ingredients, add yolks of eggs slightly beaten, butter, milk and vinegar very slowly. Cook over boiling water until mixture thickens, strain if necessary and cool.

#### Lettuce Salad

Arrange fresh, clean lettuce leaves which have been chilled, and just before serving, place salad dressing in the center of the plate or platter. Slices of hard-boiled eggs may be used for a garnish.

#### Cabbage Salad

Shred cabbage very fine or chop it and mix with dressing. This may be garnished with small pieces of red or green peppers.

#### Cheese Crackers

|                     |             |
|---------------------|-------------|
| 6 crackers          | ¼ t. salt   |
| 3 tb. grated cheese | Dash pepper |

Spread ½ tb. cheese on each cracker, sprinkle with salt and pepper and toast in a moderate oven till cheese is well melted.

*Reference.* Preparation and Use of Food, Bulletin 35, Federal Board for Vocational Education, Washington, D. C., pp. 96, 97. Price 20 cents.

#### LESSON IV. POTATO SALAD, VEGETABLE SALAD

*Storage of Vegetables.* Winter vegetables may be kept for a long time if carefully stored. Irish potatoes, turnips, beets, carrots, etc., when taken from the earth, should be brushed lightly and piled in a dark, dry place, cool enough to prevent spoiling without danger of freezing. Squash and pumpkins should be spread instead of piled. Dried beans, peas and corn should be kept protected from dirt and dust, and from rats.

##### Potato Salad

|                      |                                             |
|----------------------|---------------------------------------------|
| 2 c. potato cubes    | 1/8 t. pepper                               |
| 1 tb. minced parsley | 1/4 c. chopped red or green peppers or both |
| 1/4 t. onion juice   |                                             |
| 1/4 t. salt          |                                             |

Cut cold, boiled potatoes into half-inch cubes. Mix with seasoning and 1 1/2 tb. dressing mixed with 1 t. vinegar and let marinate. Add more dressing just before serving. Serve on lettuce or cabbage leaves. Hard-boiled egg may be cut and added to this.

##### Vegetable Salad.

Marinate separately cold, cooked vegetables, cut into small cubes if necessary, using peas, beets, beans, asparagus, tomato, etc. Just before serving mix with boiled or mayonnaise dressing and arrange on lettuce or cabbage leaves. Care should be taken to combine colors and flavors which blend well.

#### LESSON V. PLAIN AND FOAMY OMLET, RICE MUFFINS

*Preservation of Eggs.* When eggs are to be kept for some time in large quantities they are put into cold storage, a place where they can be kept continuously at a temperature a little above freezing. This prevents their spoiling because the cold slows down the growth of the bacteria that cause decay. After the eggs are taken out of cold storage, they must be used soon because they spoil quite rapidly. Eggs may be preserved in the

home by packing or coating with some substance which will protect them from the air. The substance which has been found the most satisfactory is a solution of "water glass." Lime water also is good. To use water glass, add 9 parts boiled and cooled water to 1 part concentrated water glass and put into a clean crock or stone jar. Put the clean, fresh eggs to be preserved into this. Cover the jar to protect from dust. When eggs are taken out for use, wash them carefully and if they are to be boiled, first prick the shell at the large end.

#### Plain Omelet

|                     |                         |
|---------------------|-------------------------|
| 4 eggs              | $\frac{1}{2}$ t. salt   |
| 4 tb. milk or water | $\frac{1}{8}$ t. pepper |
| 2 tb. butter        |                         |

Beat eggs slightly to blend yolks and whites. Add milk and seasoning. Put butter into hot frying pan. When melted, turn in the mixture. As it cooks prick bubbles with fork till it has reached a creamy consistency. Place on hotter part of range that it may brown quickly underneath. Fold and turn on hot platter. Before rolling this may be spread with grated cheese, jelly, jam or fresh fruit sauce, or chopped meat or vegetables may be added before cooking.

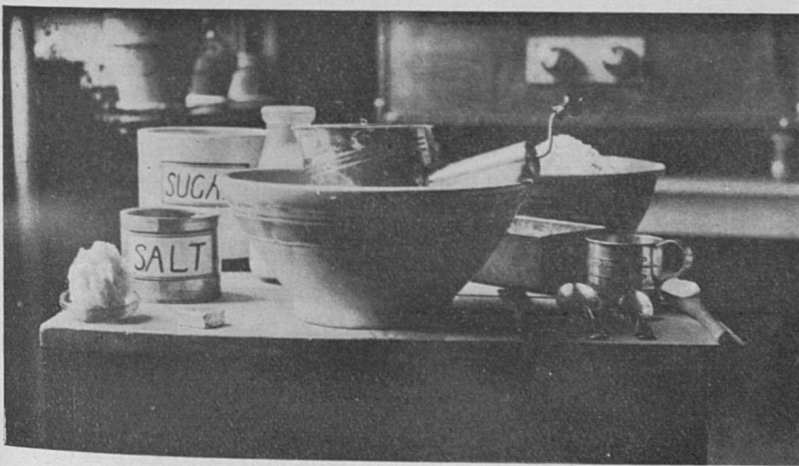


Fig. 5. Supplies and utensils for bread making.

## Foamy Omelet

4 eggs  
 ½ t. salt  
 ⅛ t. pepper

2 tb. butter  
 2 tb. flour  
 1 c. milk

Beat yolks of eggs until light and creamy; add white sauce made of the butter, flour and milk. Beat the whites until stiff, but not dry and cut into yolk mixture. Heat a frying pan slightly buttered, pour in the mixture lightly and spread it evenly on the pan. Cook over a low flame. When set, put into hot oven for a few minutes to dry on top.

## Rice Muffins

1½ c. flour  
 ¾ c. cooked rice  
 3 t. baking powder  
 2 tb. sugar

1 c. milk  
 1 egg  
 1 tb. melted fat  
 ½ t. salt

Mix and sift flour, sugar, salt and baking powder. Add half the milk and the egg, well beaten, the remainder of the milk, mixed with rice, and mix thoroly; then add fat. Bake in slightly greased muffin pans.

*Reference.* Eggs and their Use as Food, Farmers' Bulletin 471.

## LESSON VI. SPONGE CAKE

*Leavening Agents.* Any substance used to make a food mixture light is called a leavening agent. They may be classed as follows:

1. Gas producing:
  - a. Soda and an acid.
    - (1) sour milk (buttermilk)—½ t. soda to 1 c. sour milk.
    - (2) Molasses—½ t. soda to 1 c. molasses.
    - (3) Cream of tartar—½ t. soda to 1 t. cream of tartar.
  - b. Baking powder, which is a commercial preparation of soda and some acid with a little starch to keep it dry.
  - c. Yeast.



2. Steam.
3. Air—beaten into eggs or into a batter.  
Suggest foods you have made using some of these.

#### Sponge Cake

|            |                     |
|------------|---------------------|
| 4 eggs     | 1 tb. lemon juice   |
| 1 c. sugar | ½ lemon rind grated |
| 1 c. flour |                     |

Beat yolks until thick, add sugar gradually, add lemon juice and rind. Cut and fold lightly into this mixture the whites which have been beaten stiff. Sift flour in slowly mixing lightly. Bake in slow oven about ½ hour.

How could a similar cake be made using less egg?

#### LESSON VII. SERVE SUPPER

*Reference.* How to Select Foods, What the Body Needs, Farmers' Bulletin 808.

A Week's Food for an Average Family, Farmers' Bulletin 1228.

#### LESSON VIII. BEEF OR LAMB STEW

*Cooking Meats.* Meats are cooked to improve the flavor, to change the texture and to kill any bacteria which may be present. In cooking meat we may have one of three objects in view: (1) to draw out the juices and flavor, as in making soups, (2) to keep in the juices and flavor, as in roasts or steak, (3) to draw out part of the juices, as in stew and pot roast.

To keep the juices in, the meat should be first seared. Searing is accomplished by rapidly heating meat so as to close surface pores. If the juices are to be drawn out, it should be cut into small pieces and cooked gently in water.

#### Beef or Lamb Stew

|                                 |              |
|---------------------------------|--------------|
| 3 lbs. round of beef or<br>lamb | 3 carrots    |
| Water to cover                  | 1 onion      |
| 6 potatoes                      | ½ t. salt    |
| Flour (4 tb. to 1 qt. liquid)   | ¼ tb. pepper |

Cut meat in pieces, cover with water, bring to boiling point and simmer 3 hours or until meat is tender. Add diced vegetables  $\frac{1}{2}$  hour before meat is done. Remove vegetables and meat, thicken the liquid by adding flour mixed to a paste with a little cold water. Boil 5 minutes and return meat and vegetables to the pan.

*Reference.* Economical Use of Meat in the Home, Farmers' Bulletin 391.

#### LESSON IX. LIVER AND BACON, MASHED POTATO

*Ways of Serving Potatoes.* Irish potatoes can be obtained thruout the year, and form a staple food to serve with meat. Some one has said that they can be served a new way every day in the year, but no one would want to do this. However, it is well to vary the ways of serving them occasionally. Baked potatoes may be served without further preparation or may be cut open, the pulp taken out, mashed and seasoned, put back into the skins and baked till brown on top.

Boiled potatoes may be served plain, may be cut and served in white sauce, or mashed. Left-over boiled potatoes may be sliced, floured and browned in a little fat, or chopped with left-over meat or fish for hash, or they may be sliced in a baking dish, covered with white sauce, then with buttered crumbs or cheese and baked till brown on top. Cold mashed potato may be sliced or shaped into round, flat cakes, floured and browned on each side in a little fat, or it may be mixed with meat or fish to make croquettes.

##### Liver and Bacon

Cover with boiling water slices of liver cut  $\frac{1}{2}$  inch thick, let stand 5 minutes to draw out the blood, drain, wipe and remove the thin outside skin and veins. Sprinkle with salt and pepper, dredge with flour and fry in bacon fat. Serve with bacon.

##### Mashed Potato

2 c. boiled potato  
2 t. butter

1 t. salt  
2 tb. hot milk or cream

Dash white pepper

Force the boiled potatoes thru a ricer or mash them with a fork or masher. Stir in the butter, milk and seasoning. Beat till light and serve hot.

*Reference.* The Economical Use of Meat in the Home, Farmers' Bulletin 391.

#### LESSON X. FRUIT JELLY, TEACAKES

*Gelatin.* Gelatin is a substance extracted from bones, cartilage and other hard animal tissues. Well-made gelatin is tasteless, colorless and clear. It can be bought ready for use in a sheet, in long shreds, or as a coarse powder. The last form is the best because it does not need long soaking and because it can be measured accurately. Altho it is an animal food, it is an "incomplete protein," or one which cannot be used alone to build tissue.

Many gelatins may now be bought colored and flavored so that they may be prepared by simply adding hot water and chilling. As these usually need some addition of flavoring to make them as good as the home-made jellies, they save little trouble, if any. Compare their cost with that of jelly made in this lesson.

##### Fruit Jelly

|                          |                         |
|--------------------------|-------------------------|
| 2 tb. granulated gelatin | ½ c. lemon juice (about |
| ½ c. cold water          | 2 lemons)               |
| 2 c. boiling water       | 1 lemon rind            |
| 1 c. sugar               |                         |

Soak gelatin in cold water a few minutes. Dissolve in boiling water. Add sugar and fruit juices, strain, and put in cool place to solidify. If more gelatin is used it takes less time to harden, but must be served as soon as sufficiently firm or it will become too stiff. Rinse molds with cold water before pouring in gelatin. Peaches, bananas, oranges, berries, canned pineapple or other fruits may be added when jelly has begun to get firm.

## Teacakes

½ c. butter  
1 c. sugar  
1 egg  
¼ c. milk

2¼ c. flour  
2 t. baking powder  
½ t. salt  
1/3 t. vanilla

Cream the butter, add sugar, egg well beaten, milk and vanilla. Sift dry ingredients, add gradually to first mixture. Toss on floured board, roll 1/8 inch thick, cut, and bake in moderate oven.

*Reference.* Use and Preparation of Food, Bulletin 35, Federal Board for Vocational Education, Washington, D. C. Price 20 cents. Pp. 160, 182.

## LESSON XI. SNOW PUDDING, SPANISH CREAM

Gelatin may be used in making many desserts. Combined with the juice from one or more fruits, or with coffee, it makes a clear jelly. After it begins to harden, it may be whipped till foamy, added to beaten white of egg or whipped cream and made into a sponge or charlotte. Or it may be put into a custard mixture to make a Spanish cream. It is sometimes used to give ice-cream or sherbets a smoother texture.

*General Rules for Preparation of Gelatin.* Soak a few minutes in cold water, or till soft. Dissolve by adding boiling water and stirring. Wet the mold in cold water before pouring jelly into it. Keep in a cold place to make it firm. If the weather is very hot and damp, add a little more gelatin or reduce the water slightly. If the jelly sticks to the mold, wrap a cloth wrung out of hot water around the outside of it. To make a jelly which will just hold shape after chilling, use 1tb. gelatin to each pint of liquid.

## Snow Pudding

¼ box gelatin or  
1 tb. granulated gelatin  
¼ c. water (cold)  
1 c. boiling water

1 c. sugar  
¼ c. lemon juice  
Whites of 3 eggs

Soak gelatin in cold water, dissolve in boiling water, add sugar and lemon juice, strain, set in cool place. When thick enough to drop from a spoon beat with egg-beater until frothy;

add whites of eggs beaten stiff, and continue beating until stiff enough to hold its shape. Mold, or pile by spoonfuls on glass dish. Serve cold with soft custard.

#### Spanish Cream

|                              |                                  |
|------------------------------|----------------------------------|
| $\frac{1}{4}$ box gelatin or | $\frac{1}{3}$ c. sugar           |
| 1 tb. granulated gelatin     | $\frac{1}{4}$ t. salt            |
| 3 c. milk                    | $\frac{1}{3}$ t. vanilla or      |
| 3 eggs                       | $\frac{3}{4}$ tb. orange extract |

Add gelatin to milk and scald. Add sugar and pour slowly on slightly beaten yolks of eggs. Return to double boiler and cook until thickened, stirring constantly; remove from range, add salt, flavoring, and stiffly beaten whites of eggs. Turn into individual molds first dipped in cold water, and chill; serve with cream.

*Reference.* Use and Preparation of Food, Bulletin 35, Federal Board for Vocational Education, Washington, D. C. Price 20 cents. Pp. 200, 205.

#### LESSON XII. SERVE A DINNER

*Reference.* Use and Preparation of Food, Bulletin 35, Federal Board for Vocational Education, Washington, D. C. Pp. 205, 211.

#### LESSON XIII. YEAST BREAD

*Yeast.* Yeast is an almost invisible little plant which is found floating in the air and on everything coming into contact with the air. It is caught and used for breadmaking in potato yeast or other homemade liquid yeast. Preparations of it may be bought in little cakes either in the form of a putty-like paste, or dried. It grows and multiplies very rapidly under the right conditions, and produces a gas which makes the dough rise. For rapid growth it must have sugar or starchy material from which it can make sugar, moisture and warmth. Cold retards its growth, and too high heat kills the plant so that it can never grow. Beside producing gas, yeast produces alcohol, and is the substance which causes the fermentation of fruit juices, or preserves which have spoiled.

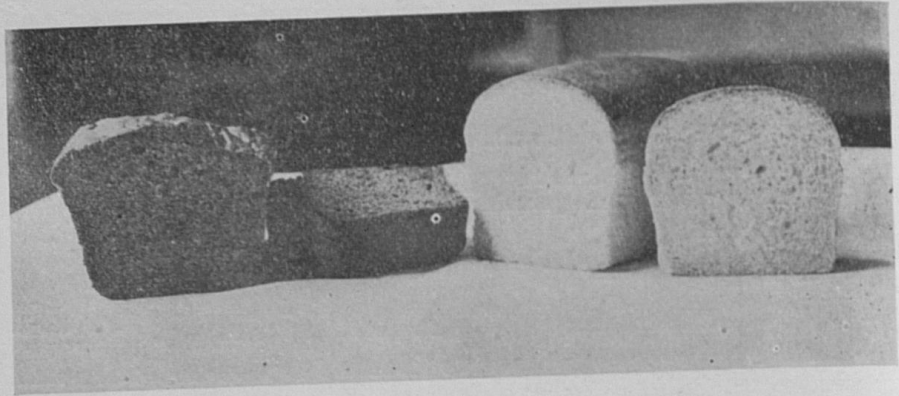


Fig. 6. Bread should be even in texture.

*Directions for Making Bread.* The pans in which bread is to be baked should not be less than twice as long as they are wide and the right size for only one loaf of bread, so that the heat may reach the center of the loaf more easily and make sure of baking it thoroly. The oven should be hot when the bread is put in, but should be cooled gradually after 15 minutes. The bread should continue to rise for 15 minutes and then begin to brown very slowly. Small loaves should be baked 45 minutes and large ones for 1 hour or more. The crust should be an even golden brown on all sides, and the center of the loaf soft but not moist. To keep the loaf an even shape it should be turned at the end of the first 5 minutes and again 5 minutes later. When baked the bread should be turned at once from the pan and stood in a clean place to cool so that the air can reach it on all sides, then kept in a tin box or large jar.

#### White Bread

2 c. milk  
2 t. salt  
2 t. sugar

1 tb. shortening  
 $\frac{1}{4}$  yeast cake  
6 or 7 c. flour

Scald milk, pour it over sugar, salt and shortening in mixing bowl and allow to cool till lukewarm. Put 1 tb. of the lukewarm liquid into a cup and mix yeast smooth in it. Add this to mixture in the bowl, sift in half the flour and beat till smooth. Add remaining flour till dough is stiff enough to knead. Turn on floured board and knead till smooth underneath and uniform

in texture, using as little flour as possible. Return dough to the bowl, cover well and set to rise in a warm place over night, or for 8 hours or more. When well risen, or double its bulk, knead the dough again on a lightly floured board till no large bubbles are left. Shape into 2 loaves and put into well greased pans to rise. When again double in bulk, bake.

*Reference.* Bread and Bread-Making in the Home, Farmers' Bulletin 807.

#### LESSON XIV. YEAST BREAD (2)

*Objects of Baking Bread.* Bread is baked so as to prevent further fermentation and souring by killing the yeast and bacteria, to drive off the alcohol and gas produced by the yeast, to change the sticky dough to a firm, dry texture and to make it more digestible.

*Reasons for Kneading Bread.* After all the materials have been added, the dough is kneaded for some minutes to mix them thoroly, to develop an elastic substance called gluten which helps to prevent the escape of the gas when it is formed, and to add some air. When the dough has risen so that it has doubled its size, it is kneaded again to break up the large gas bubbles and to distribute the gas evenly thru the dough so as to make the bread of fine, even texture.

##### Oatmeal Bread

|                    |                 |
|--------------------|-----------------|
| 2 c. rolled oats   | 1/3 yeast cake  |
| 1 tb. salt         | 2/3 c. molasses |
| 1 tb. shortening   | 6-8 c. flour    |
| 4 c. boiling water |                 |

Pour boiling water on first three ingredients, add molasses and let stand until lukewarm. Mix yeast to a smooth paste with 1 tb. of lukewarm liquid and add to mixture. Add flour until the dough is as stiff as can be stirred with a spoon. Cover and let rise in warm place eight hours or over night. Beat thoroly, put into well greased loaf bread pans and let rise. When double in bulk bake about 1 hour in a moderate oven.

*Reference.* Use and Preparation of Food, Bulletin 35. Federal Board for Vocational Education, Washington, D. C. Price 20 cents. Pp. 136, 143.  
Baking in the Home, Farmers' Bulletin 1136.

#### LESSON XV. FRUIT SHORTCAKE

*Substitution of Soda and Sour Milk for Baking Powder.* In making batters and doughs it is always possible to use baking powder and sweet milk in the place of soda and sour milk, or vice versa, if one knows a few simple facts. A teaspoon of baking powder contains approximately  $\frac{1}{4}$  t. soda, so when changing to sweet milk instead of sour, as many teaspoons of baking powder should be used as there are  $\frac{1}{4}$  t. soda in the recipe. When substituting soda in a recipe calling for baking powder, use  $\frac{1}{4}$  t. soda for each teaspoon of baking powder given and 1 c. sour milk to each  $\frac{1}{2}$  t. soda. If the mixture will not allow the use of sufficient milk for all the soda, use enough baking powder to make up the difference, in place of the extra soda.

##### Shortcake

|                       |                       |
|-----------------------|-----------------------|
| 2 c. flour            | $\frac{1}{2}$ t. salt |
| $\frac{2}{3}$ c. milk | 4 tb. shortening      |
|                       | 3 t. baking powder    |

Rub shortening into dry ingredients sifted together and add milk. Bake in two sheets or spread half in a pan, grease top with melted butter and lay other half on it. Bake in a hot oven. Fill between layers with raspberries, strawberries or other fresh or canned fruits which have been warmed over hot water if so desired. Serve with cream.

*Reference.* Use and Preparation of Food, Bulletin 35, Federal Board for Vocational Education, Washington, D. C. Price 20 cents. Pp. 136, 138.

#### LESSON XVI. PASTRY

*General Directions for Pastry Making.* Good pastry should be light, flaky, crisp, but not tough, and a light golden brown in color. The lightness is due to a high temperature in baking, and sometimes to baking powder which may be added. Flakiness results when the fat is left in small particles in the dough,



and the crispness is produced by baking in a hot oven till quite firm. To keep the fat in small particles instead of entirely mixed in the flour, it must be cold when used, must be cut into the flour with knives instead of mixed with a spoon, and the dough must be rolled lightly and handled as little as possible.

Use very little flour in rolling and cutting pastry. Cut the top crust first and set in a cool place till the rest of the pie is ready. Avoid stretching the pastry in the pan and fit the bottom crust in closely without any air spaces under it. Prick the top crust in a number of places to allow the escape of steam when cooking. Moisten the edge of the under crust and press the upper crust well down on it with a floured fork. To prevent the loss of juice from berry or other juicy pies, wet a strip of clean cloth  $1\frac{1}{2}$  inches wide and long enough to go around the pie about  $1\frac{1}{2}$  times and stretch tightly around the edge of the pie.

#### Plain Pastry

|                             |                       |
|-----------------------------|-----------------------|
| 1 c. flour                  | 2 tb. lard or crisco  |
| 2 tb. butter                | $\frac{1}{4}$ t. salt |
| $\frac{1}{4}$ c. cold water |                       |

Sift flour and salt and with two knives cut shortening into this till in small particles. Add water slowly by cutting with a knife, not stirring, and use only enough to hold the dough well together. Roll lightly on a slightly floured board, and cut  $\frac{1}{4}$  inch larger than the pie plate to allow for shrinking in baking.

#### Apple Pie

|                                         |                           |
|-----------------------------------------|---------------------------|
| 6-10 apples (according to size)         | 4 tb. butter              |
| $1\frac{1}{3}$ - $\frac{1}{2}$ c. sugar | $\frac{1}{4}$ t. cinnamon |
| Few gratings nutmeg                     |                           |

Pare and cut apples into slices lengthwise and place in the pan lined with under crust. Add sugar, butter and spice then upper crust. Bake in a rather quick oven about half an hour, or till the apples are soft.

**Peach Pie**

|                                  |                   |
|----------------------------------|-------------------|
| 8-12 peaches (according to size) | 2 tb. butter      |
| 1/3-1/2 c. sugar                 | 1 tb. lemon juice |

Prepare and bake like apple pie.

*Reference.* Use and Preparation of Food, Bulletin 35, Federal Board for Vocational Education, Washington, D. C. Price 20 cents. Pp. 89, 91.

**LESSON XVII. PASTRY (2)**

*Shortening for Pastry.* Butter gives a good flavor but is rather soft for pastry. Lard gives a good color but lacks flavor. A mixture of half lard or lard substitute and half butter gives a good pastry.

Purified beef suet or chicken fat may be used for making good pastry.

*Food Value.* Because there is so much fat in pastry, it is rather hard to digest and should not be eaten in large amounts or very frequently by most people. Poor pastry is very indigestible. It usually is best to use simple filling for pie instead of ones like mince or raisin pie.

**Custard Pie**

|                     |               |
|---------------------|---------------|
| 2 eggs              | 1/8 t. salt   |
| 3 tb. sugar         | 1 1/2 c. milk |
| Few gratings nutmeg |               |

Beat eggs slightly, add sugar, salt and milk. Line plate with pastry and build up fluted rim. Strain mixture on it and sprinkle with nutmeg. Bake in quick oven at first to set rim. Decrease heat afterward. Bake till custard is firm.

**Pumpkin Pie**

|                                       |               |
|---------------------------------------|---------------|
| 1 1/2 c. steamed and strained pumpkin | 2 eggs        |
| 2/3 c. brown sugar                    | 1 1/2 c. milk |
| 1 t. cinnamon                         | 1/2 c. cream  |
| 1/2 t. nutmeg                         |               |

Mix ingredients in order given and bake in one crust. Two c. milk may be used in place of milk and cream.

**Sweet Potato Pie**

Make like pumpkin pie using cooked and mashed sweet potato in the place of pumpkin.

**LESSON XVIII. SERVE DINNER**

*Reference.* Use and Preparation of Food, Bulletin 35, Federal Board for Vocational Education, Washington, D. C. Price 20 cents. Pp. 202, 209.

1000 Pacific Coast No. 1

Sweet Potato Pie

Take the pumpkin pie filling and of well washed sweet potato in the place of pumpkin.

LEWIS XVIII. SWEET POTATO

Report of the Department of the Interior, Bureau of Plant Industry, Washington, D. C. June 20, 1914.



by  
with  
of

