# DOMESTIC SCIENCE
## FOR
# SCHOOLS AND HOMES

JOHNSON

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teaspoon celery salt, one-eighth teaspoon pepper, a few grains of cayenne, one teaspoon chopped parsley. Cook potatoes in boiling salted water; rub them through a strainer. Scald milk with onion, remove onion, and stir the milk slowly into the potatoes, Melt half the butter, add dry ingredients, stir until well mixed, then stir into the boiling soup. Cook one minute, strain, add remaining butter, and sprinkle with the parsley.

## Lesson 18.

**Bread** is the most important article of food. Considering its great value, it seems a great wrong to place poor bread before the hungry. Wheat, rye, barley, and Indian corn are the principal cereals used for bread.

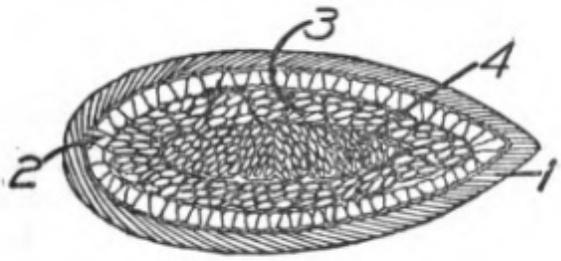


Fig. 12.

**A Grain of Wheat.**

1. Cuticle.
2. Bran cells.
3. Gluten cells.
4. Starch cells.

A grain of wheat consists of a centre of starch, which forms the largest part of the grain; a layer of gluten, which consists of proteid and fat; a layer of bran, which contains mineral matter; and an outer covering called the hull, which is removed before milling. For the conversion of any grain into finished flour, three processes are necessary; cleansing, grinding, and bolting. Entire wheat flour is made by grinding all but the outer hull. Graham flour, frequently confounded with entire wheat flour, is often an inferior flour mixed with coarse bran.

**Leavening** is the process of making batters and doughs "light," by producing in them a gas, which is expanded by

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1 teaspoonful vanilla. Beat eggs until very light, add sugar gradually, and continue beating; add flavoring.

## Lesson 4.

Fruits, Mineral Matter, Acids. Review of lessons fourth, fourteenth, fifteenth, and sixteenth, seventh year.

Apple Sauce No. 1: Wipe, pare, quarter, and core eight medium sized sour apples. Make a syrup of 1 cup sugar, 1 cup water, 1 tablespoon lemon juice, boiling 7 minutes. Drop into the syrup enough apples to cover the bottom of the saucepan. Watch carefully, and remove the quarters as soon as they are soft. When all are removed, pour the syrup from the saucepan over them. Serve warm or cold.

### Comparative Value of Five Common Fruits.

| | Refuse | Water | Indigestible | DIGESTIBLE | | | | Fuel Value, per lb., in Calories. |
|---|---|---|---|---|---|---|---|---|
| | | | | Protein | Fat | Carbohydrates | Ash | |
| Apples | 25 | 63.3 | 1.2 | 1.3 | .3 | 9.7 | .2 | 190 |
| Bananas | 35 | 48.9 | 1.6 | .7 | .4 | 12.9 | .5 | 200 |
| Grapes | 25 | 58 | 1.7 | .9 | 1.1 | 13.0 | .3 | 295 |
| Oranges | 27 | 63.4 | 1.0 | .5 | .1 | 7.7 | .3 | 150 |
| Strawberries | 5 | 85.9 | 1.0 | .8 | .5 | 6.3 | .5 | 150 |

U. S. Bulletin.

This table shows that, of these five fruits, the apple ranks highest as a tissue builder, while the grape ranks highest as a heat and energy producer; the orange standing lowest in both muscle-building and fuel values.

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COMPOSITION OF BEEF FROM DIFFERENT PARTS OF A VERY FAT OX.

| Parts | Water | Proteids | Fat |
|---|---|---|---|
| Neck, | 73.50 | 19.50 | 5.80 |
| Loin, | 63.40 | 18.80 | 16.70 |
| Shoulder, | 50.50 | 14.50 | 34.00 |
| Hind-Quarter, Lean, | 55.01 | 20.81 | 23.32 |
| Hind-Quarter, Streaky, | 47.99 | 15.93 | 35.33 |
| Fore-Quarter, Lean, | 65.45 | 19,94 | 19.97 |
| Fore-Quarter, Streaky, | 32.49 | 10.87 | 56.11 |

Analysis by *Knight.*

Placing the meat directly in boiling water, to cook, makes a coating of the albumen in the meat, through which the juices of the meat cannot pass. This method should be used when the meat, itself, is to be eaten.

The fibres of meat are softened and loosened by soaking in cold water, and the juice of the meat is readily extracted by cold water; therefore, the meat intended for soup should be placed in cold water, and cooked at a low temperature.

BEEF STEW WITH VEGETABLES: 2 lbs. neck of beef, 1 carrot, 3 tbsp. flour, 4 potatoes, 2 onions, sliced, 1 turnip, water, salt, and pepper.

Wipe meat with damp cloth, cut into two-inch cubes or smaller. Remove all extra fat. Place the pieces of meat in a kettle, cover with cold water, and heat to boiling point. Heat the fat in a frying pan until smoking hot. Roll the more choice pieces of meat in flour, put them into the hot fat, and turn them until the surface is slightly browned. Brown the onions, also, and put into the frying pan the rest of the flour, if any remains after the meat has been rolled. When the water reaches the boiling point, put the

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requiring a very high degree of heat; this is true of peas, beans, and tomatoes, also.

Common liquids, boiled in open vessels, cannot be heated above 212 degrees, Fahr; but can be raised to a much higher temperature in a closed vessel, tight enough to prevent the escape of the steam, and strong enough to prevent

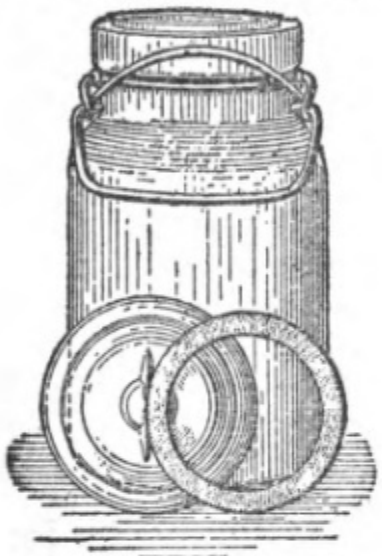

Fig. 22—Spring-top jar.

Fig. 23—Position of spring during sterilizing.

Fig. 24—Position of spring after sterilizing.

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each of these elements, so that the Carbon, alone, is left to do its normal work; that of producing heat and energy.

The following tables show the average per cents. of the different Salts or Mineral Matters, found in the solid tissues and in the fluids of the body.

| TABLE A. | Solid Tissues. | | | | | |
|---|---|---|---|---|---|---|
| | Bone. | Muscle. | Brain. | Liver. | Lungs. | Spleen. |
| Percentage of Salts. | | | | | | |
| Sodium Chloride, | | 10.59 | 4.74 | | 13.00 | |
| Potassium, | | | | | | |
| Soda, | | 2.35 | 10.69 | 14.51 | 19.50 | 44.33 |
| Potash, | | 34.40 | 34.42 | 25.23 | 1.30 | 9.60 |
| Lime, | 37.58 | 1.99 | 0.77 | 3.61 | 1.90 | 7.48 |
| Magnesia, | 1.22 | 1.45 | 1.22 | 0.20 | 1.90 | 0.49 |
| Iron Oxide, | | | | 2.74 | 3.20 | 7.28 |
| Chlorine, | | | | 2.58 | | |
| Fluorine, | 1.66 | | | | | |
| Phosphoric Acid (free), | | | 9.15 | | | |
| " combined, | 53.31 | 48.13 | 39.02 | 50.18 | 48.50 | 27.10 |
| Sulphuric Acid, | | | 0.75 | 0.92 | 1.4 | 2.54 |
| Carbonic Acid, | 5.47 | | | | | |
| Silicic Acid, | | 0.81 | 0.12 | 0.27 | | 0.17 |
| Phosphate of Iron, | | | 1.23 | | | |

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## C.

## Digestion, and the Digestibility of Foods.

The Digestive Processes begin in the mouth; where the foods are masticated by the teeth and mixed with the fluids from the *Salivary Glands* and from the mucuous lining of the mouth.

Fig. 28.

THE SALIVARY GLANDS.

*a.* The right sublingual gland.
*b.* The right submaxillary gland.
*c.* The right parotid gland.

The ducts leading from these glands to the mouth are also shown.

The Salivary Glands are placed in pairs, one of each pair being situated on each side of the mouth. The fluid from these glands is called *Saliva*; and it is this fluid that performs the chemical changes on the foods, which are a part of the process of digestion. The fluid from the mucuous lining of the mouth performs no chemical changes in the foods; its work is to moisten the mouth and throat, to assist in mixing the saliva thoroughly with the food, and to soften starch grains so that they will burst and permit of

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ticle of incipid, tasteless, or disagreeable food touches the tongue, the *lingual* nerves send electric currents along their entire length to the brain; which sends a reflex current to the nerves controlling the little mouths of the digestive glands of the mouth and the stomach, and those nerves, in sympathy with the tongue, draw together the little mouths of the digestive glands, and too small a quantity of digestive fluids flow to mix with the food taken; and the food lies, a heavy weight in the stomach for some time, waiting for a

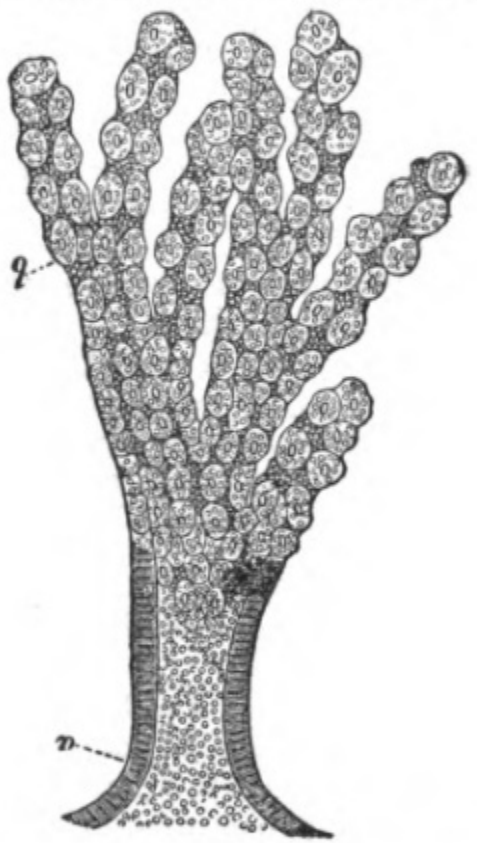

Fig. 29.

ONE OF THE GASTRIC GLANDS; HIGHLY MAGNIFIED.

sufficient quantity of the fluids; but when a morsel of agreeable food touches the tongue, the lingual nerves flash the message, "Welcome!" to the digestive glands, and the strings

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the chemical action of the saliva is upon carbo-hydrates, only; and the chemical action of the gastric juice is upon proteids, only.

The *bile* also enters the *duodenum*, and plays a prominent part in the processes of digestion, especially in its action upon fats and oils, of which it is a powerful solvent.

And yet the processes of digestion are not complete. From the *duodenum* (about 10 inches of the *small* intestine)

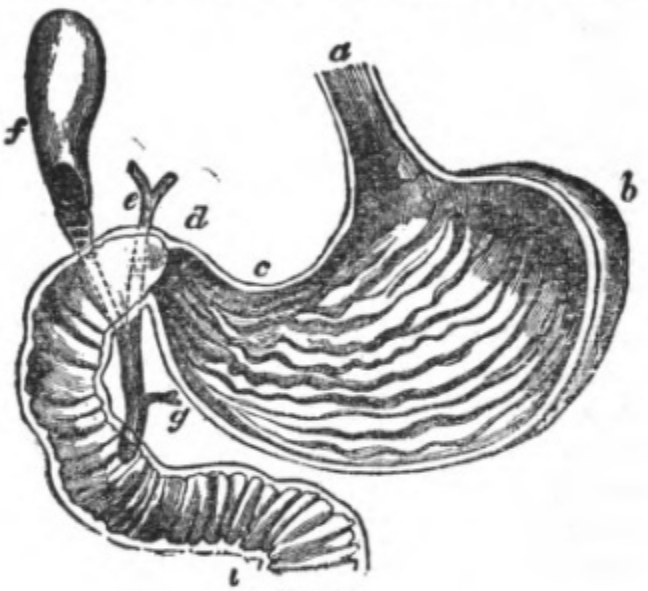


Fig. 30.

THE STOMACH, LAID OPEN.

*a.* The oesophagus.
*b.* The cardiac dilatation.
*c.* The lesser curvature,
*d.* The pylorus.
*e.* The biliary duct.
*f.* The gall bladder.
*g.* The pancreatic duct.
*i.* The duodenum.

the masses of partly digested food pass into the small intestine, where they are subject to the action of digestive fluids from the digestive glands of the walls of the intestine, itself; and it is here that the chief work of digestion and absorption is performed. In the large *Intestine*, the nature of digestive action is *putrefactive fermentation*; caused by *organized ferments*, rather than the *soluble* ferments of the other

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## Summary of the Digestive Organs and Their Action.

| Organs: | Digestive Fluids. | Nature of Ferment. | Character of Action. |
|---|---|---|---|
| **Mouth** (Salivary Glands) | Saliva | Alkaline | Converts starch into dextrin and maltose. |
| **Stomach** | Gastric Juice | Acid | Curdles Milk.<br>Converts proteids into peptones.<br>Converts cane sugar into glucose. |
| **Pancreas** | Pancreatic Juice | Alkaline | Converts starch into maltose.<br>Converts proteids into peptones.<br>Decomposes fats.<br>Curdles milk. |
| **Liver** | Bile | Neutral | Saponifies and emulsifies fats.<br>Arrests putrefaction.<br>Converts starch into dextrin and maltose. |
| **Intestines** | Intestinal Juice | Alkaline-acid | Converts proteids into peptones.<br>Converts starches into dextrose.<br>Converts sugars into dextrose. |

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From all parts of the body the blood comes pouring in dark red floods into the heart, which acts as a double force-pump, driving the blood to the lungs and over the body with each rythmic dilation and contraction.

When the dark red blood, sent to the heart by vessels called *veins*, is pumped to the lungs, it does not freely enter the tiny air cells which compose the lungs; but it is forced into the net-work of hair-like vessels, called *capillaries*, which

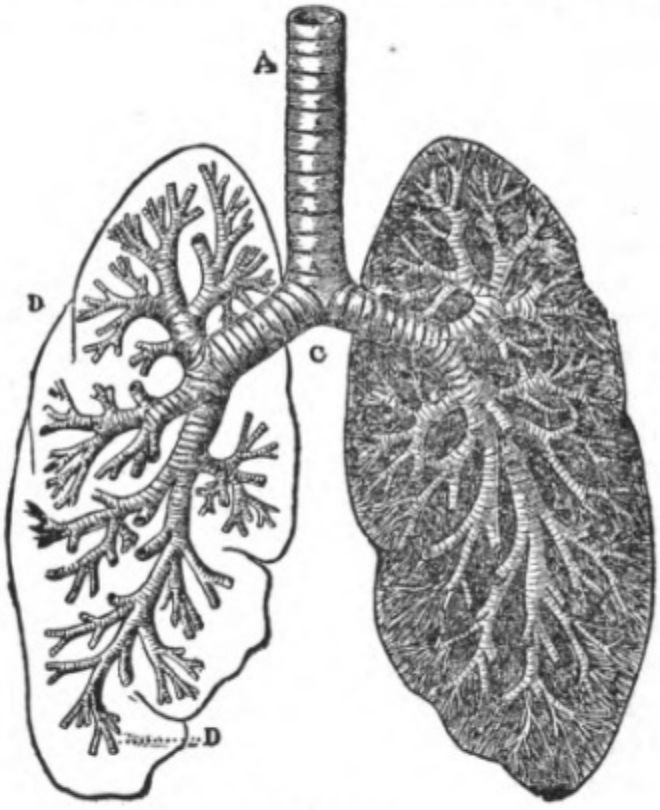


Fig. 31.

THE LUNGS.

A. Trachea (windpipe). C. D. Bronchial Tubes.

lie on the mucuous membrane *lining* the air cells. The walls of the capillaries are so thin that the gases pass through them readily; the oxygen of the air in the air cells entering the capillaries, and combining with the carbon in the

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GRANDMOTHER'S SPINNING WHEEL.

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