



## CHAPTER VI

### OTHER FACTS ABOUT FOOD

#### LESSON 28

##### A STUDY OF 100-CALORIE PORTIONS

How may we know just how much food to give to the family every day, and how can we measure it?

One rainy Saturday when Marjorie Allen was looking over her notebook of lessons on foods, sanitation, and cookery, and putting together in one place everything that she had studied and learned about meals from her teacher and from her mother, she found that there were facts enough to fill several pages.

If you yourself will review the lessons in the five chapters of this book and recall the talks at school with your teacher, you will find that you have learned quite a little about the three meals a day and your own school luncheon.

### OTHER FACTS ABOUT FOOD

When Marjorie had finished this task, however, she sat quietly a few minutes, looking rather puzzled; and then she asked the question at the beginning of this lesson.

Mrs. Allen replied that she herself had learned by experience, and that in a large family the left-overs can always be used in some good way. But Marjorie had in mind something more exact than this, as a result of the talks at school about food for body building and energy; and she already had grasped the idea that different people require not only different kinds of food, but different quantities.

"It seems to me," said Marjorie, "that there must be some way to measure just the amount for Grandmother, for you and Father, and for all of us children."

"Why don't you ask Miss James?" said her mother.

"I am so glad you wanted to ask that question," remarked Miss James, when Marjorie brought this thought to the class.

**How is temperature measured by a thermometer?**

"How would you explain the use of the thermometer to some one who did not understand?" was Miss James' first question.

We learned long ago that the amount of heat in things around us changes from time to time, sometimes very quickly. Take water, for instance: how rapidly it heats and begins to boil over a good fire, and how soon it freezes when the weather is cold. The words in common use for the different degrees of heat are cold,

cool, hot, warm, tepid, lukewarm, and so on. These words are not exact, however; and people found it necessary to measure heat in some definite way. Mercury and alcohol are substances that change very rapidly with only a slight increase or decrease in temperature. They change in bulk and expand or shrink. Look at a thermometer, and see that the mercury is inclosed in a bulb and a tube, fastened upon a scale. Who made the scale? Several people, and so we have thermometers (heat measures) of more than one kind. The Centigrade is the best because it is the simplest. The freezing point of water is called zero; and the boiling point of water, 100; and there are one hundred steps (Centigrade) between, which we call degrees. Scientists prefer to use Centigrade. We should become familiar with the Centigrade thermometer in daily life. In America, however, we are slow to change in matters of measure and weight. The French, who planned the decimal system of weights and measures, and who use them in buying and selling, are much more sensible than we. In America and England, the Fahrenheit is used. This scale was made and used by Gabriel Daniel Fahrenheit. The freezing point is at  $32^{\circ}$  above the zero of this scale, and the boiling point at  $212^{\circ}$  above; and there are 180 degrees (Fahrenheit) between. So you see, one degree Fahrenheit is equal to  $\frac{9}{5}$  degrees Centigrade.

Here is the picture (Fig. 119) of a thermometer with both Fahrenheit and Centigrade scales. You should

learn to use the latter just as soon as possible. Do you not consider decimals easier and more convenient than common fractions?

The degree on the scale of a thermometer is one kind of heat measure. We have another measure for the needs of our bodies and the energy contained in our foods; for we calculate the amount of food

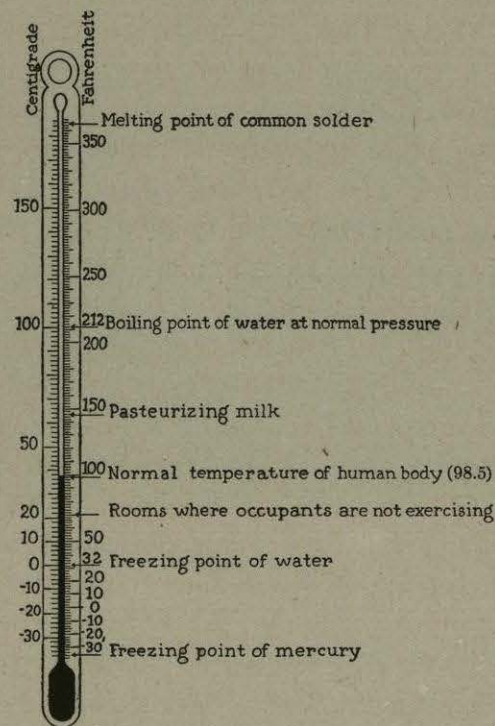
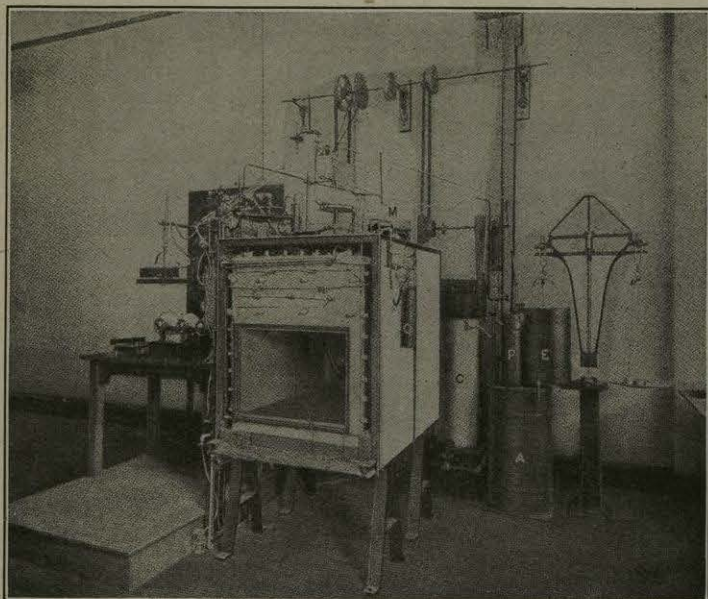


FIG. 119.—Two common temperature scales, viz. Fahrenheit and Centigrade. On the Centigrade scale the freezing point and normal boiling point of water are, respectively,  $0^{\circ}$  and  $100^{\circ}$ ; on the Fahrenheit scale these points are  $32^{\circ}$  and  $212^{\circ}$ ; thus  $1^{\circ}$  Centigrade is equal to  $1.8^{\circ}$  Fahrenheit.

we need by the amount of energy it will furnish the body.

What is a calorimeter? Scientists have learned to measure heat given off by shutting up some person, or



Courtesy of Professor Graham Lusk.

FIG. 120. — Respiration calorimeter, open. From the "Journal of Biological Chemistry."

lower animal, in a machine where he has air and is quite comfortable for a time. Here is a picture (Fig. 120) of one machine called a calorimeter (heat measure) for a small animal. You can see how elaborate and delicate a machine it is, and it does exactly record the

heat coming from the body of the animal shut into this cage. When you are in high school or college, you can understand the workings of the calorimeter. But we will now accept the fact that the scientist can measure in a calorimeter the energy of our bodies and the amount of energy given off a day.

Then, too, the scientist finds the energy in the food, by burning it in another kind of machine which also measures the amount of heat in some one kind of food. This has been done with all the common materials.

What is a calorie? The scientist can now say of a given person that he needs so much energy daily, and that a certain amount of a certain food will give so much energy. But what words can he use to tell you and me? The degree Centigrade will not measure this. So the scientist says, "I must have a *heat unit*, something like the degree of a thermometer scale, or the inch on a yardstick. I will take for my heat unit the amount of heat required to make one pound of water warmer by four degrees Fahrenheit; that is, the amount that will raise its temperature four degrees, or a gram of water one degree Centigrade. This unit I will call a *calorie* from the Latin word for heat, 'calor.'"

Miss Travers explained the calorie quite simply one day at the Mothers' Club; but one of the mothers said that her husband and sons were six feet tall, weighed about one hundred eighty pounds each, and were all satisfied with the good square meals she gave them,

and that she shouldn't bother with this kind of thing. Mrs. Allen said very quietly that her husband found it



Drawn by Miss Florence Hunt.

FIG. 121. — Improper weight.

convenient to study calories in feeding his pigs, and that she herself thought it might be well to try this method with her family! So Mrs. Allen and Marjorie had many pleasant evenings studying this way of planning meals.

Of course, no busy mother will stop to calculate calories for every meal every day, but a little study will check up her daily practice. Mrs. Allen had been worried about her second little girl, who was under weight, and growing thinner. She studied the question of 100-

calorie portions and found that the child was short some four hundred calories. Alice seemed not to be able to eat much more in bulk at one meal, but Mrs. Allen persuaded her to take more butter and cream, and also two or three eggs daily for their body-building quality. Alice had not enough building material or energy in her food before this to keep up the growth in height, and also in weight. On the other hand, Mr. Allen had



Drawn by Miss Florence Hunt.

FIG. 122. — Proper weight.

been troubled at the increase in his weight, which seemed to be in the form of unnecessary fat, in spite of his exercise. So Mrs. Allen planned for him food that contained a lower number of calories but still had bulk enough to satisfy his appetite.

What did Miss Travers mean by a 100-calorie portion? The amount of food that would give one calorie is so small that it is more practical to measure portions giving one hundred calories.

Study this picture first, for here are several of our common foods in amounts yielding energy equal to 100 calories. The egg is the exception, the energy being only 75 calories. Notice (Fig. 123) first that there is a great difference in the bulk of the different foods. Look at the

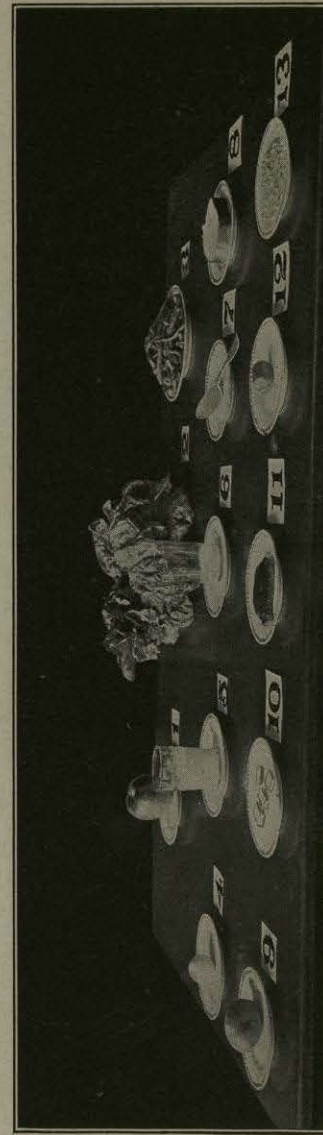


FIG. 123. — 100-calorie portions. 1, apple; 2, lettuce; 3, string beans; 4, egg; 5, whole milk; 6, cream; 7, butter; 8, white bread; 9, potato; 10, sugar; 11, beef; 12, sausage; 13, oatmeal, uncooked.

Courtesy of Department of Nutrition, Teachers College, Columbia University.

lettuce, and at the half tablespoonful of butter and lumps of sugar. We could not live on a bulky food like the lettuce, or a condensed food like the butter; but we must have a mixed diet to furnish all the energy we need.

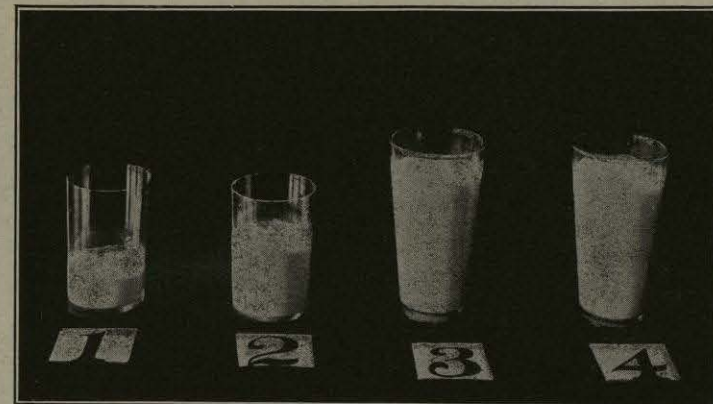
Here is a table that states what some people should have. Remember that this is an average. Have you studied averages in arithmetic?

FOOD REQUIREMENTS FOR A DAY

MEMBERS OF FAMILY	AGE	WEIGHT, POUNDS	TOTAL CALORIES
Man . . . . .	40	154	2,680
Woman . . . . .	38	120	2,160
Girl . . . . .	16	110	2,200
Boy . . . . .	12	75	2,250
Boy . . . . .	6	40	1,600
Total requirements . . . . .			10,890

**Using cream and butter.** Mrs. Allen gives an extra amount of cream and butter to the little girl who is under weight. She makes the cream so appetizing by whipping it and sweetening it with a little honey that Alice eats a few spoonfuls gladly with a piece of bread for her dessert. Do you think that it is extravagant to use these materials? On the farm, if you sell dairy products, you have a way of disposing of both the cream and butter at a good price. If, however, the milk of one cow is kept for home use, part of the milk

can be set for cream to be used on the morning cereal or with some dessert. The skimmed milk can be used for cooking, and, if need be, beef fat or even chicken fat added, when these have been nicely tried out. Cream is a digestible form of fat for children and for older people who cannot eat fat pork. You can see that cream



A. Fowler, Photographer.

FIG. 124. — 100-calorie portions of milk and cream.

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

is cheaper than butter, because the butter requires labor; and you must never make the mistake of thinking that a woman's time does not count. It is sometimes a high price to pay.

**More about the cost of food.** It is very difficult when we use food raised on our own place to calculate how much it costs. There are some facts about food

economy that we all ought to learn, because it is true that some kinds of food are always cheaper than others. Bread and cereals give us more nutriment for the money than meat, because the supply is larger and less labor is used in producing them. Here is a table that shows you the relation of money and food value received in a few common foods:

AMOUNTS OF PROTEIN AND ENERGY OBTAINED FOR 10 CENTS EXPENDED FOR BREAD AND OTHER FOODS AT CERTAIN ASSUMED PRICES PER POUND<sup>1</sup>

FOOD MATERIALS	PRICE	10 CENTS WILL BUY	10 CENTS' WORTH WILL CONTAIN	
			PROTEIN	A FUEL VALUE OF
		Ounces	Ounces	Calories
Wheat bread . . . . .	5 cents per lb.	32.0	2.9	2400
Cheese . . . . .	22 cents per lb.	7.3	1.9	886
Beef, average . . . . .	20 cents per lb.	8.0	1.2	467
Porterhouse steak . . . . .	25 cents per lb.	6.4	1.3	444
Dried beef . . . . .	25 cents per lb.	6.4	.1	315
Eggs . . . . .	24 cents per lb.	10.0	1.3	198
Milk . . . . .	9 cents per qt.	38.3	1.2	736
Potatoes . . . . .	60 cents per bu.	160.0	—	2950
Apples . . . . .	1½ cents per lb.	106.7	—	1270

In a general way we can say that the more labor needed, the more the food costs. If there is a small supply of some food material and many people want it, then the price is high; and when the season is bad or some dis-

<sup>1</sup> U. S. Department of Agriculture, Farmers' Bulletin 487.

ease attacks the food, the supply becomes short and the price goes up.

Here is another table that shows how the calories may be divided among the foods served at the three meals:

FOOD	100-CALORIE PORTIONS
Milk	20 (6 for each child, the rest for the adults)
Cereal	5
Eggs (for children)	2 (counting $\frac{2}{3}$ portion per egg)
Fruit	5
Green vegetables	2
Meat or meat substitute	5
Bread	15
Butter	15

Suppose now that each one of you study her own family. Take the three meals a day that you are likely to have, using very simple dishes. From the tables given, see if you can decide if your family is having about the right amount.

This is a hard problem indeed, but your teacher may use it for an arithmetic lesson just as Miss James did.<sup>1</sup>

#### EXERCISES AND PROBLEMS

1. Explain the meaning of the word "calorie" to some one who has never heard the word before.
2. Explain why it is important to think about calories in planning food for a meal.

<sup>1</sup> For further work of this kind, see *Foods and Household Management*, Kinne-Cooley, and *Laboratory Handbook for Dietetics*, and *Food for the Family*, Mary Swartz Rose, The Macmillan Co.

3. Why is the 100-calorie portion of lettuce so much larger than the 100-calorie portion of meat, butter, and sugar?
4. Can you decide what kind of meals Mrs. Allen gave to her husband that would lower the number of calories?
5. Why did Mr. Allen need fewer calories in his diet?

## LESSON 29

## BUYING AND SELLING FOODS

On the farm we raise much of our own food, but there are some things that we must buy. What ought we to learn about buying food? What can a girl do about selling food products?

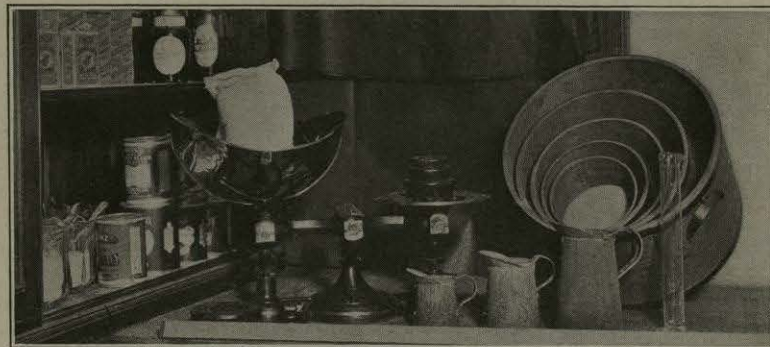
It is very easy for people living in the country to buy many articles by mail, for there are large firms that send out catalogues of everything that is needed about the house and farm. Miss Travers from the State College said that we should be careful to send our orders to firms that are known to be good. It is possible that some things are made under conditions that are bad for the workers, and the goods be thus made unsanitary for the buyers.

Miss Travers told the club that her college had studied carefully the question of buying by mail, and had found that, when the women bought in the nearest town, they did quite as well in regard to price, and had the advantage of seeing what they were purchasing. On the other hand, Miss Travers appreciated the fact that, in winter weather and when work at home is heavy, ordering by mail is much more convenient.

In buying food it is an economy, when there is storage

room, to order large quantities from a wholesale dealer, — as sugar and flour, by the barrel.

**Honest weights and measures.** When we buy food in packages, in cans or bottles, we want to be sure that we are given the correct weight or measure. Is it not a good thing that our Government at Washington is helping us in this way? On May 11, 1914, at Washington,

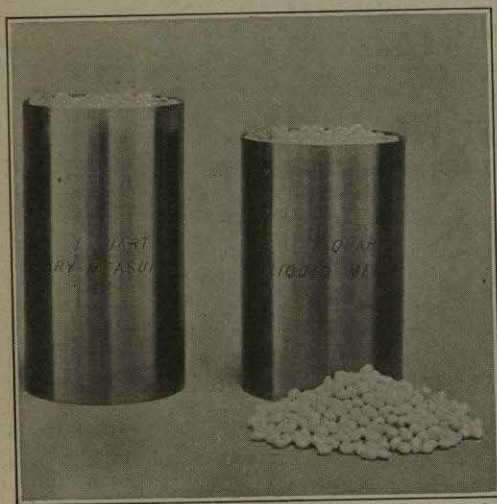


*United States Department of Commerce, Circular of the Bureau of Standards, No. 55.*

FIG. 125. — Weights and measures that all housekeepers are advised to use.

D.C., the regulations were signed which make the manufacturers tell the weight, volume, and contents clearly on their packages of food. This applies to the whole country. The law itself was passed in 1913, but no one was made to pay the penalty for disobedience until September, 1914. Some states and cities have laws of this kind. The Bureau of Commerce has also published a pamphlet telling about household weights and measures. Here is a picture (Fig. 125) of the weights and measures that all housekeepers are advised to use. For

there is only one way that you can be absolutely sure; that is, to measure and weigh what you have bought. One of the business men of Pleasant Valley was so interested in this pamphlet that he bought a set of scales and measures for the school, that the pupils might learn how to weigh and measure accurately, and to test pack-



United States Department of Commerce, Circular of the Bureau of Standards, No. 55.

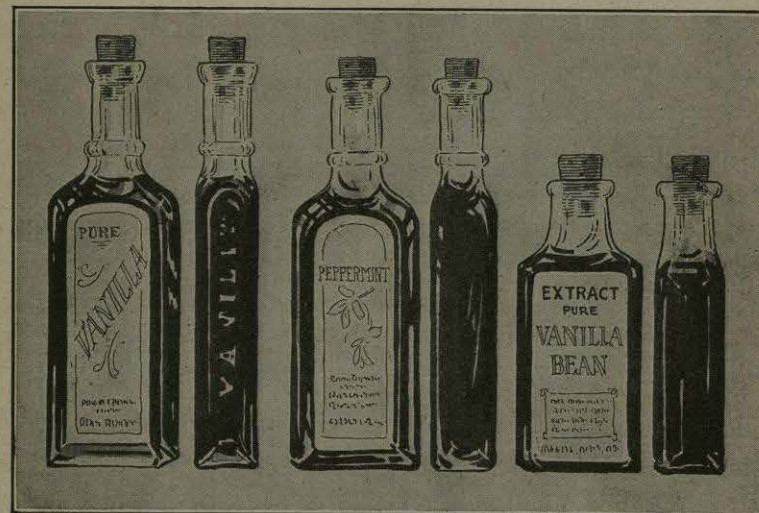
FIG. 126.— See what a difference it makes to use liquid instead of dry measure for beans.

Is it not strange that the bottle that looks the smallest holds the most? Miss James said, "If you are tempted to buy some flavoring that seems to be cheaper than another, you had better find out whether you are really getting as much for your money."

Cheap brands of food are often made of poor material. Ask the Woman's Club to write to the State University

for advice in regard to reliable dealers. We have pure food laws in our country, but we must learn to obey and enforce them.

**Clean food, again.** It is important in buying foods to consider cleanliness as well as the exact measure or



United States Department of Commerce, Circular of the Bureau of Standards, No. 55.

FIG. 127.— Three bottles of extract (front and side views). This shows the impossibility of correctly estimating the quantity of contents from apparent size of the container. The bottle which is apparently smallest holds the most, and *vice versa*.

weight. Clean milk and meat we have already talked about. It is not wise to buy salted almonds or any nut meats taken out of the shell, because sometimes these are prepared in uncleanly places. Crack your own nuts with a hammer, and take out the meats with clean hands and a nutpick. Fruits that come from