CHAPTER XV.

CALCULATING FOOD VALUES—THE OLD SYSTEM AND THE NEW.

BEFORE we can probe into details of food standards, or consider matters of food economy, it is necessary that we have some standard, other than market prices, by which to compare the real values of foods. Indeed, if actual values of foods were directly proportional to their market prices there would be no problem of food economy to solve, for there would be no opportunity to cut down the cost of living without cutting down the nutritive quality and impairing the efficiency of the diet.

BY BULK OR BY WEIGHT.—It may help in the understanding of why a scientific system of food measurement is necessary, if we first consider the measuring of foods by bulk and by weight. Part of the trickery of food manufacturers consists in making foods bulk up more. Some of the feathery breakfast foods come in this class. Imagine the foods with which you are familiar all being sold by the quart, and prices established on that basis. Then suppose a rival grocer should start selling all food by the pound. Immediately the price of lettuce would go up and the price of molasses would come down.

The difference in the actual specific gravity of foods is slight, with the exception of molasses, not amounting to more than ten per cent, oils being about that much lighter than watery foods. It is therefore easy for us to understand that "a pint's a pound the world around," except when the pint contains air. But as a pint of all dry granular foods contains air in varying amounts, weighing is obviously more accurate than measuring.

Whereas the amount of air changes the quantity of actual food when measured, so the amount of water present changes the actual food quantity when weighed. Watered milk, watered vinegar or watered oysters are obviously dishonest, because the water was added thereto by the hand of man. But

if a dairyman could devise a method of feeding cows so that they would give milk containing twice as much water, the product would not be so patently dishonest.

Food weights are meaningless unless we take into consideration the amount of water contained.

Besides these differences in the air or water content, the chief fact that makes one food more concentrated per pound than another is the percentage of fat. There is no such thing as the artificial concentration of food beyond the extraction of the water. One might as well try to concentrate iron or gold. But fat is a substance which is a sort of naturally condensed food, being equivalent in fuel value pound for pound to two and one-fourth times as much as any other food substance.

As the percentage of water and the proportion of fats are the chief reasons why the nutritive value varies for a given weight, it follows that the most variable forms of food are the meats which contain widely varying percentages of both water and fat.

Combine both water and fat variation and the possibilities of variation in nutritive values is very great, as shown by the fact that a pound of oil contains fifty times as much fuel value as a pound of cucumbers.

But before explaining the unit of food values, let us see what we are to measure. If cotton-seed oil has fifty times the nutriment of cucumbers, and cucumbers are worth ten cents per pound, the cotton-seed oil should be worth five dollars a pound. Yet cucumbers may sell for as much as cotton-seed oil. This may be due to the fact that cucumbers taste good, or that people think cucumbers are good for them—though it may develop that cucumbers are bad for them. In short, there are many attributes that may affect the values of foods, other than the common quality by which we can measure them.

Of the functions that foods perform for the human body, the one that demands the greatest *quantity* of food is the supplying of the elements for oxidation, or as we commonly say, for heat and energy. It would be far better if the idea of heat were left out entirely, for heat is produced in the body as a

by-product of the expenditure of muscular energy. Moreover, heat to the average mind means temperature, and the control of bodily temperature is a matter not greatly affected by the nature or quantity of food eaten, and hence the measure of food in heat units is misleading. In fact, in so far as the nature of food does affect body temperature, it has recently been found that protein (lean meat) increases it, whereas fat has hitherto been supposed to be a "heating" food, merely because one pound of it will last longer in supplying normal body heat without increasing body temperature at all. If any difference between lean and fat meat is to be observed, we should eat fat meat in summer and lean meat in the winter.

HEAT AND ENERGY VALUE.—Though the terms "heat" or "energy" are misleading if taken literally, yet the comparison of the total heat and energy value of foods is the fairest basis on which the cost of nutrition can be measured. Foods serve many and varied purposes in the body; certain food elements are needed to keep our teeth sound, others to keep the bowels active, yet all such important physiological needs may be met with a small but properly selected diet, and yet starvation occurs from sheer lack of sufficient quantity of foods. But all foods—at least all natural foods—whatever else may be their special contribution to the body's needs, add to the supply of substance to be oxidized or burned up in the muscles to furnish energy and the resulting heat that keeps up body temperature. This use is common in all foods; it is the use that necessitates the most food, and, as it is a factor that can be scientifically measured, it has been chosen by all scientists as the logical measurement of food quantity and as a basis for comparing food costs.

The unit used by food chemists is known as the calorie. It was a laboratory unit, and was determined by burning food in a special apparatus to measure the amount of heat produced. The number of calories so yielded per pound are given in the tables of analysis as published by the government. For the significance of the items of protein, carbohydrates and fat, see Chapter XVI. The ash content given in this table is the total

of all mineral elements remaining when a sample of the food is burned. For a detailed discussion of the mineral elements, see Chapter XVII.

STANDARD GOVERNMENT TABLE OF FOOD ANALYSIS.

Composition of common food products.

FOOD MATERIALS (as purchased)	Refuse.	Water.	Protein.	Fat.	Carbo-hy-drates.	Ash.	Fuel value per pound.
ANIMAL FOOD.							
Beef, fresh:	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories.*
Chuck ribs	16.3	52.6	15.5	15.0	.....	0.8	910
Flank	10.2	54.0	17.0	19.0	.....	.7	1,105
Loin	13.3	52.5	16.1	17.5	.....	.9	1,025
Porterhouse steak	12.7	52.4	19.1	17.9	.....	.8	1,100
Sirloin steak	12.8	54.0	16 5	16.1	.....	.9	975
Neck	27.6	45.9	14.5	11.9	.....	.7	1,165
Ribs	20.8	43.8	13 9	21.2	.....	.7	1,135
Rib rolls	.....	63.9	19.3	16.7	.....	.9	1,055
Round	7.2	60 7	19.0	12.8	.....	1.0	890
Rump	20.7	45 0	13.8	20.2	.....	.7	1,090
Shank, fore	36.9	42 9	12 8	7.3	.....	.6	545
Shoulder and clod	16.4	56.8	16 4	9.8	.....	.9	715
Fore quarter	18.7	49.1	14.5	17.5	.....	.7	995
Hind quarter	15.7	50.4	15.4	18.3	.....	.7	1,045
Beef, corned, canned, pickled and dried:							
Corned beef	8.4	49.2	14.3	23.8	.....	4.6	1,245
Tongue, pickled	6.0	58.9	11.9	19.2	.....	4.3	1,010
Dried, salted and smoked	4.7	53.7	26.4	6.9	.....	8.9	790
Canned boiled beef	.....	51.8	25.5	22.5	.....	1 3	1,410
Canned corned beef	.....	51.8	26.3	18.7	.....	4.0	1,270
Veal:							
Breast	21.3	52.0	15.4	11.0	.....	.8	745
Leg	14.2	60.1	15.5	7.9	.....	.9	625
Leg cutlets	3.4	68.3	20.1	7.5	.....	1.0	695
Fore quarter	25.5	54.2	15.1	6.0	.....	.7	535
Hind quarter	20.7	56.2	16.2	6.6	.....	.8	580
Mutton:							
Flank	9.9	39.0	13.8	36.9	.....	.6	1,770
Leg, hind	18.4	51.2	15.1	14.7	.....	.8	890
Loin chops	16.0	42.0	13.5	28.3	.....	.7	1,415
Fore quarter	21.2	41.6	12.3	24.5	.....	.7	1,235
Hind quarter, without tallow	17.2	45.4	13.8	23.2	.....	.7	1,210
Lamb:							
Breast	19.1	45.5	15.4	19.1	.....	.8	1,075
Leg, hind	17.4	52.9	15.9	13.6	.....	.9	860
Pork, fresh:							
Ham	10.7	48.0	13.5	25.9	.....	.8	1,320
Loin chops	19.7	41.8	13.4	24.2	.....	.8	1,245
Shoulder	12.4	44.9	12.0	29.8	.....	.7	1,450
Tenderloin	.....	66.5	18.9	13.0	.....	1.0	895
Pork, salted, cured and pickled:							
Ham, smoked	13.6	34.8	14.2	33.4	.....	4.2	1,635
Shoulder, smoked	18.2	36.8	13.0	26.6	.....	5 5	1,335
Salt pork	.....	7.6	1.9	86.2	.....	3.9	3,555
Bacon, smoked	7.7	17.4	9.1	62.2	.....	4.1	2,715

Composition of common food products.—Continued

FOOD MATERIALS (as purchased)	Refuse.	Water.	Protein.	Fat.	Carbohydrates.	Ash.	Fuel value per pound.
ANIMAL FOOD—Continued							
Sausage:	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories.*
Bologna	3.3	55.2	18.2	19.7	.....	3.8	1,155
Pork	.....	39.8	13.0	44.2	1.1	2.2	2,075
Frankfort	.....	57.2	19.6	18.6	1.1	3.4	1,155
Soups:							
Celery, cream of	.....	88.6	2.1	2.8	5.0	1.5	235
Beef	.....	92.9	4.4	.4	1.1	1.2	120
Meat stew	.....	84.5	4.6	4.3	5.5	1.1	365
Tomato	.....	90.0	1.8	1.1	5.6	1.5	185
Poultry:							
Chicken, broilers	41.6	43.7	12.8	1.4	.....	.7	305
Fowls	25.9	47.1	13.7	12.3	.....	.7	765
Goose	17.6	38.5	13.4	29.8	.....	.7	1,475
Turkey	22.7	42.4	16.1	18.4	.....	.8	1,060
Fish:							
Cod, dressed	29.9	58.5	11.1	.2	.....	.8	220
Halibut, steaks or sections	17.7	61.9	15.3	4.4	.....	.9	475
Mackerel, whole	44.7	40,4	10.2	4.2	.....	.7	370
Perch, yellow, dressed	35.1	50.7	12.8	.7	.....	.9	275
Shad, whole	50.1	35.2	9.4	4.8	.....	.7	380
Shad, roe	.....	71.2	20.9	3.8	2.6	1.5	600
Fish, preserved:							
Cod, salt	24.9	40.2	16.0	.4	.....	18.5	325
Herring, smoked	44.4	19.2	20 5	8.8	.....	7.4	755
Fish, canned:							
Salmon	.....	63.5	21.8	12.1	.....	2.6	915
Sardines	(Oil) 5.0	53.6	23.7	12.1	.....	5.3	950
Shellfish:							
Oysters, "solids"	.....	88.3	6 0	1.3	3.3	1.1	225
Clams	.....	80.8	10 6	1.1	5.2	2 3	340
Crabs	52.4	36.7	7.9	.9	.6	1.5	200
Lobsters	61.7	30.7	5.9	.7	.2	.8	145
Eggs:							
Hens' eggs	11.2 (Shell)	65.5	13.1	9.3	.....	0.9	635
Dairy products, etc.:							
Butter	.....	11.0	1.0	85.0	.....	3.0	3,410
Whole milk	.....	87.0	3.3	4 0	5.0	.7	310
Skim milk	.....	90.5	3.4	.3	5.1	.7	165
Buttermilk	.....	91.0	3.0	.5	4.8	.7	160
Condensed milk	.....	26 9	8 8	8.3	54.1	1.9	1,430
Cream	.....	74.0	2.5	18.5	4 5	.5	865
Cheese, Cheddar	.....	27.4	27.7	36.8	4.1	4.0	2,075
Cheese, full cream	.....	34.2	25.9	33.7	2.4	3.8	1,885
VEGETABLE FOOD.							
Flour, meal, etc.:							
Entire-wheat flour	.....	11.4	13.8	1 9	71.9	1.0	1,650
Graham flour	.....	11.3	13.3	2.2	71.4	1.8	1,645
Wheat flour, patent roller process—							
High-grade and medium	.....	12.0	11.4	1.0	75.1	.5	1,635
Low grade	.....	12.0	14.0	1 9	71.2	.9	1,640
Macaroni, vermicelli, etc	.....	10.3	13.4	.9	74.1	1.3	1,645
Wheat breakfast food	.....	9.6	12.1	1.8	75.2	1.3	1,680
Buckwheat flour	.....	13.6	6.4	1.2	77.9	.9	1,605
Rye flour	.....	12.9	6.8	.9	78.7	7	1,620
Corn meal	.....	12.5	9 2	1.9	75.4	1.0	1,635

Composition of common food products.—Continued

FOOD MATERIALS (as purchased)	Refuse	Water.	Protein.	Fat.	Carbo-hy-drates.	Ash.	Fuel value per pound.
VEGETABLE FOOD—Continued							
Flour, meal, etc.—Continued.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories.*
Oat breakfast food	.....	7.7	16.7	7.3	66.2	2.1	1,800
Rice	.....	12.3	8.0	.3	79.0	.4	1,620
Tapioca	.....	11.4	.4	.1	88.0	.1	1,650
Starch	.....	.....	.....	.....	90.0	.....	1,675
Bread, pastry, etc.:							
White bread	.....	35.3	9.2	1.3	53.1	1.1	1,200
Brown bread	.....	43.6	5.4	1.8	47.1	2.1	1,040
Graham bread	.....	35.7	8.9	1.8	52.1	1.5	1,195
Whole-wheat bread	.....	38.4	9.7	.9	49.7	1.3	1,130
Rye bread	.....	35.7	9.0	.6	53.2	1.5	1,170
Cake	.....	19.9	6.3	9.0	63.3	1.5	1,630
Cream crackers	.....	6.8	9.7	12.1	69.7	1.7	1,925
Oyster crackers	.....	4.8	11.3	10.5	70.5	2.9	1,910
Soda crackers	.....	5.9	9.8	9.1	73.1	2.1	1,875
Sugars, etc.:							
Molasses	.....	.....	.....	.....	70.0	.....	1,225
Candy (unmixed with nuts, chocolate, etc.)	.....	.....	.....	.....	96.0	.....	1,680
Honey	.....	.....	.....	.....	81.0	.....	1,420
Sugar, granulated	.....	.....	.....	.....	100.0	.....	1,750
Maple sirup	.....	.....	.....	.....	71.4	.....	1,250
Vegetables:*							
Beans, dried	.....	12.6	22.5	1.8	59.6	3.5	1,520
Beans, Lima, shelled	.....	68.5	7.1	.7	22.0	1.7	540
Beans, string	7.0	83.0	2.1	.3	6.9	.7	170
Beets	20.0	70.0	1.3	.1	7.7	.9	160
Cabbage	15.0	77.7	1.4	.2	4.8	.9	115
Celery	20.0	75.6	.9	.1	2.6	.8	65
Corn, green (sweet), edible portion	.....	75.4	3.1	1.1	19.7	.7	440
Cucumbers	15 0	81.1	.7	.2	2.6	.4	65
Lettuce	15.0	80.5	1.0	.2	2.5	.8	65
Mushrooms	.....	88.1	3.5	.4	6.8	1.2	185
Onions	10.0	78.9	1.4	.3	8.9	.5	190
Parsnips	20.0	66.4	1.3	.4	10.8	1.1	230
Peas, dried	.....	9.5	24.6	1.0	62.0	2.9	1,565
Peas, shelled	.....	74.6	7.0	.5	16.9	1.0	440
Cowpeas, dried	.....	13.0	21.4	1.4	60.8	3.4	1,505
Potatoes	20.0	62.6	1.8	.1	14.7	.8	295
Rhubarb	40.0	56.6	.4	.4	2.2	.4	60
Sweet potatoes	20.0	55.2	1.4	.6	21.9	.9	440
Spinach	.....	92.3	2.1	.3	3.2	2.1	95
Squash	50.0	44.2	.7	.2	4.5	.4	100
Tomatoes	.....	94.3	.9	.4	3.9	.5	100
Turnips	30.0	62.7	.9	.1	5.7	.6	120
Vegetables, canned:							
Baked beans	.....	68.9	6.9	2.5	19.6	2.1	555
Peas, green	.....	85.3	3.6	.2	9.8	1.1	235
Corn, green	.....	76.1	2.8	1.2	19.0	.9	430
Succotash	.....	75.9	3.6	1.0	18.6	.9	425
Tomatoes	.....	94.0	1.2	.2	4.0	.6	95

* Such vegetables as potatoes, squash, beets, etc , have a certain amount of inedible material, skin, seeds, etc. The amount varies with the method of preparing the vegetables, and cannot be accurately estimated. The figures given for refuse of vegetables, fruits, etc., are assumed to represent approximately the amount of refuse in these foods as ordinarily prepared.

Composition of common food products.—Continued

FOOD MATERIALS (as purchased)	Refuse.	Water	Protein.	Fat.	Carbo-hy-drates.	Ash.	Fuel value per pound.
VEGETABLE FOOD—Continued							
Fruits, berries, etc., fresh:	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories.*
Apples	25.0	63.3	0.3	0.3	10.8	0.3	190
Bananas	35.0	48.9	.8	.4	14.3	.6	260
Grapes	25.0	58.0	1.0	1.2	14.4	.4	295
Lemons	30.0	62.5	.7	.5	5.9	.4	125
Muskmelons	50.0	44.8	.3	.....	4.6	.3	80
Oranges	27.0	63.4	.6	.1	8.5	.4	150
Pears	10.0	76.0	.5	.4	12.7	.4	230
Persimmons, edible portion	.....	66.1	.8	.7	31.5	.9	550
Raspberries	.....	85.8	1.0	.....	12.6	.6	220
Strawberries	5.0	85.9	.9	.6	7.0	.6	150
Watermelons	59.4	37.5	.2	.1	2.7	.1	50
Fruits, dried:							
Apples	.....	28.1	1.6	2.2	66.1	2.0	1,185
Apricots	.....	29.4	4.7	1.0	62.5	2.4	1,125
Dates	10.0	13.8	1.9	2.5	70.6	1.2	1,275
Figs	.....	18.8	4.3	.3	74.2	2.4	1,280
Rasins	10.0	13.1	2.3	3.0	68.5	3.1	1,265
Nuts:							
Almonds	45.0	2.7	11.5	30.2	9.5	1.1	1,515
Brazil nuts	49.6	2.6	8.6	33.7	3.5	2.0	1,485
Butternuts	86.4	.6	3.8	8.3	.5	.4	385
Chestnuts, fresh	16.0	37.8	5.2	4.5	35.4	1.1	915
Chestnuts, dried	24.0	4.5	8.1	5.3	56.4	1.7	1,385
Cocoanuts	*48.8	7.2	2.9	25.9	14.3	.9	1,295
Cocoanut, prepared	.....	3.5	6.3	57.4	31.5	1.3	2,865
Filberts	52.1	1.8	7.5	31.3	6.2	1.1	1,430
Hickory nuts	62.2	1.4	5.8	25.5	4.3	.8	1,145
Pecans	53.2	1.4	5.2	33.3	6.2	.7	1,465
Peanuts	24.5	6.9	19.5	29.1	18.5	1.5	1,775
Piñon	40.6	2.0	8.7	36.8	10.2	1.7	1,730
Walnuts, black	74.1	.6	7.2	14.6	3.0	.5	730
Walnuts, English	58.1	1.0	6.9	26.6	6.8	.6	1,250
Miscellaneous:							
Chocolate	.....	5.9	12.9	48.7	30.3	2.2	2,625
Cocoa, powdered	.....	4.6	21.6	28.9	37.7	7.2	2,160
Cereal coffee, infusion (1 part boiled in 20 parts water)†	.....	98.2	.2	.....	1.4	.2	30

* Milk and shell.

† The average of five analyses of cereal coffee grain is: Water 6.2, protein 13.3, fat 3.4, carbohydrates 72.6, and ash 4.5 per cent. Only a portion of the nutrients, however, enter into the infusion. Infusions of genuine coffee and of tea like the above contain practically no nutrients.

MEASURING BY WHEAT POUNDS.—This idea of measuring food by calories seems in practical, every-day use strange and meaningless. It was a unit so small that a day's food supply ran into the thousands of units, while the detailed figures became too complicated to be easily thought of and remembered. With a view to making the scientific measure-

ment of food values more practical, Milo Hastings of the staff of Physical Culture, and formerly of the Department of Agriculture, devised the wheat pound system. By this system the values of all foods are expressed by comparison with whole wheat. A pound of wheat is the unit of measurement, and may be expressed by 1.00. This wheat pound is the equivalent to 1,670 calories, and the value of foods expressed in calories may be reduced to wheat pounds by dividing by six and pointing off four decimal places.

The advantages of the wheat pound system are as follows: First, the unit of measurement seems to mean something practical and comprehensible. Everyone has some idea of the food value and cost of a pound of wheat (or whole-wheat flour), while to conceive of the value of a calorie is a complex process, requiring abstract scientific reasoning.

Second, the wheat pound is a unit of such size as to be significant in the daily bill of fare. One does not sell coal by the ounce or quinine by the ton. To say that a man should eat 2,505 calories in a day seems to lay a stress of accuracy that common sense shows to be impractical. To say that he should eat one and a half (1.50) wheat pounds has the ring of common sense, because the difference between 1.50 wheat pounds and 2.00 wheat pounds is significant and comprehensible.

The third advantage of the wheat pound system is that it greatly reduces the amount of calculation in figuring food values. Wheat is chosen as a unit instead of milk, bread or potatoes for the reason that there are a large number of foods that are essentially equivalent in food value to wheat.

The first practical use to be made of the wheat pound system is in the comparison of food values with the market price. The second use is in computing quickly and practically the total amount of food eaten, so that one may form something of an idea of whether he is under or over eating.

A great deal of time has been utterly wasted in this world by the effort of busy, practical people to apply the complicated and beautifully scientific system of measuring foods by calories.

The scientist worships at the shrine of truth, and like most worshippers he misses the spirit in following the letter of the law.

Thus we are gravely told by the United States Department of Agriculture that very lean loin of beef, as purchased, contains 475 calories per pound. From very lean the classification runs up through lean, medium fat, fat and very fat, and when we reach the last, then we have 1,525 calories per pound. The calorie statement is expressed to an accuracy of less than one-thousandth of the total figure, but the question of judging as to whether the loin is very lean, lean, medium fat, just plain fat, or very fat, is left to the user and leaves room for error of judgment, with a range of a possible inaccuracy of over a hundred per cent. In other words, the scientific recording of the number of calories per pound which have been published in all government tables, and practically all dietetic books, have recorded calories several hundred times more accurately than the probable accuracy of judgment in estimating the fatness of a particular cut of beef. The only way the scientist could make such infinitely painful food chemistry practical would be to produce a breed of cattle that would grow standardized loin cuts!

When the diet of a large portion of our population is known to be from fifty to one hundred per cent in excess of actual needs, and there are grave national and individual reasons for checking the enormous waste of excessive eating, we need some sort of a practical system to enable the food buyer of the household to get an approximate estimate of the food she serves her household.

For this purpose the wheat pound system is feasible and comprehensible, and accurate enough for the work in hand. Careful trial calculations with varied diets have shown that the method of calculating food values in wheat pounds will never involve an error of more than ten per cent, as compared with the most painstaking calculation from government tables. As the variation in particular food samples is as great as this, further accuracy is meaningless.

Below you will find a very much simplified table for calculating the value of all foods in wheat pounds, and following it a table carried to two decimal places for use in more careful work.

TABLE OF APPROXIMATE WHEAT POUND FACTORS.

This brief table gives approximate results sufficiently accurate for every-day use. For more detailed calculations use the table that follows:

To Find the Value in Wheat Pounds:

Multiply the weight (in pounds) of the various foods by the figure given at the head of the group under which the food is listed.

Multiply by 2.5

Pure Oils and Rendered Fats (Lard, Tallow, etc.).

Multiply by 2

Butter, Oleomargarine, Meat Fats (not rendered). All nuts not elsewhere mentioned.

Multiply by 1.8

Cocoanut, Almonds, Bacon, Peanuts (roasted), Peanut Butter.

Multiply by 1.1

Cheese, Doughnuts, Cookies, Crackers, Granulated Sugar, Oatmeal, Popcorn.

Take Weights as They Stand (Multiply by 1)

Dry Cereals, Flours, Beans, Peas, Lentils, Sardines in Oil, Candy, Maple and Brown Sugar, Honey, Dates, Raisins, Figs, Currants, Cakes, Gingerbread, Sweetened Condensed Milk.

Multiply by .8

Biscuits and Rolls, Mince Pie, Molasses, Syrups, Prunes, Salt and Smoked Herring or Mackerel.

Multiply by .7

All Breads, Fruit Pies, Jams, Jellies, Preserves, Average Loin Cut of Beef, Ham, or Mutton, Lean Pork.

Multiply by .6

Eggs (*measured by dozen, not pound*).

Multiply by .5 or Divide by 2

Mature Poultry, Average Veal, Lean Beef, Salmon, Shad, Condensed unsweetened Milk, Custard and Pumpkin Pies, Puddings.

Multiply by .33 or Divide by 3

Salt Codfish, Fresh Halibut and Herring, Young Poultry, Sweet Potatoes, Baked Beans, Cottage Cheese, Fresh Lima Beans.

Multiply by .25 or Divide by 4

Potatoes, Bananas, Grapes, Plums, Corn (green or canned), Crabs, Lobster, Smelts, Trout.

Multiply by .20 or Divide by 5

Oysters, Haddock, Flounder, Cod, Okra, Parsnips, Whole Milk, Peas (green or canned). All fruits not otherwise mentioned.

Multiply by .1 or Divide by 10

Melons, Lemons, Strawberries, Cranberries, Pineapple. All vegetables not otherwise mentioned.

DETAILED TABLE OF WHEAT POUNDS IN ONE POUND OF FOOD.

To determine the food value in wheat pounds of any quantity of food, multiply the weight of the food in pounds by the figures here given.

CEREAL GROUP.

CEREALS AND FLOURS.

Wheat, whole	1.00
Wheat flour, whole	1.00
White flour	.99
Farina	1.01
Bran	.90
Shredded wheat	1.02
Macaroni and spaghetti	.99
Corn or cornmeal	.99
Hominy	.99
Rice	1.01
Oatmeal	1.12
Rye flour	.98
Barley	.98
Popcorn	1.19
Cornflakes	.99

LEGUMES.

Beans, navy	.95
Beans, lima, dry	.96
Peas, dry	.99
Cowpeas	.90
Lentils	.96
Beans, baked	.36

BREADS.

Zwiebach	1.20
Biscuits or rolls	.80
Boston Brown	.60
Corn	.72
Sugar buns	.90
White	.72
Whole-wheat or graham	.72
Rye	.70

PASTRY.

Cakes, average	1.00
Cookies	1.15
Crackers	1.15
Doughnuts	1.20
Gingerbread	1.00
Pies, fruit, average	.75
Pies, custard or pumpkin	.50
Pies, mince	.80
Puddings	.45

SUGAR GROUP.

Granulated sugar	1.12
Brown sugar	1.05
Maple sugar	.92
Candy, average	1.05
Honey	.90
Corn syrup (glucose)	.88
Maple syrup	.80
Molasses, cane	.77

SWEET FRUITS.

Dates	.95
Raisins	.95
Figs	.90
Currants	.90

JELLIES, JAMS, PRESERVES AND MARMALADES.

General average	.70

FAT GROUP.

Olive oil	2.53
Cotton-seed oil	2.53
Lard, or similar fat	2.53
Butter	2.15
Oleomargarine	2.10
Chocolate (dry powder)	1.70
Cocoa (dry powder)	1.40
Ripe olives	.73
Clear beef fat (suet)	2.10
Bacon, average	1.75
Salt pork, clear fat	2.20

NUT MEATS.

Almonds	1.80
Brazil nuts	2.00
Cocoanut, fresh	1.70
Cocoanut, prepared	1.80
Filberts (hazelnuts)	2.00
Hickory nuts	2.00
Peanuts	1.55
Peanut butter	1.70
Pecans	2.05
Walnuts, English	2.00
Walnuts, black	1.90

VITAMINE GROUP.

VEGETABLES.

Asparagus	.06
Beans, fresh, lima	.35
Beans, string	.12
Beets	.13
Cabbage	.09
Carrots	.13
Cauliflower	.08
Celery	.05
Cucumbers	.05
Corn, green or canned	.27
Greens, dandelions, etc.	.15
Lettuce	.05
Mushrooms	.12
Okra	.17
Onions	.13
Parsnips	.18
Peas, fresh, uncooked	.27
Peas, canned	.15
Potatoes	.23
Radishes	.13
Rhubarb	.06
Spinach	.07
Squash	.13
Sweet potatoes	.34
Tomatoes, fresh or canned	.06
Turnips	.11

FRUITS.

Apples	.17
Apples, dried	.80
Apricots	.16
Apricots, dried	.80
Bananas	.27
Blackberries	.16
Blueberries	.13
Cherries	.22
Cranberries	.13
Grapes	.27
Huckleberries	.20
Lemons	.12
Muskmelon	.11
Oranges	.14
Pears	.17
Pineapples	.12
Plums	.24
Peaches	.13
Prunes	.84
Raspberries	.19
Strawberries	.10
Watermelons	.08

ANIMAL PROTEIN GROUP.

MILK PRODUCTS.

Cheese, full cream	1.15
Cheese, cottage	.30
Milk, whole	.19
Milk, skimmed	.10
Milk, condensed, unsweetened	.45
Milk, condensed, sweetened	.90

EGGS.

Eggs	.43

DETAILED TABLE OF WHEAT POUNDS IN ONE POUND OF FOOD.—*Continued*

Eggs, white	.15	Leg, average	.65	Haddock	.20
Eggs, yolks	1.02	*Pork*		Halibut	.34
MEATS.		Fresh, very lean	.55	Herring, fresh	.40
Beef		Chops, average	.95	Herring, smoked	.75
Very lean round steak	.40	Ham, cured, average.	.75	Mackerel, fresh	.38
Beef, half lean, half fat (as very fat flank)	1.40	*Fowls*		Mackerel, salt	.80
Average loin cut	.70	Chicken, edible portion	.30	Salmon, fresh	.58
Average round cut	.50	Chicken (based on purchase weight)	.15	Salmon, canned	.54
Dried beef	.50	Fowls, edible portion	.60	Sardines, canned	.90
Veal		Fowls, purchase weight	.45	Shad	.45
Very lean	.35	FISH.		Smelt	.25
Breast, average	.50			Trout	.27
Leg, average	.40	Bass (edible portion)	.28	SHELLFISH.	
Mutton		Cod, fresh	.20	Clams	.15
Very lean	.55	Cod, salt	.35	Crabs	.22
Loin (chop) average	1.10	Flounder	.18	Lobster	.23
				Oysters, fresh	.14
				Oysters canned	.20

No claim is here made that wheat pounds tell the whole story of food needs. Other essentials of a perfect diet must be considered, but the wheat pound system here given tells all the facts of heat or energy values of foods, the chief thing to be considered in figuring food quantity and food economy, and in the calculation of which the more complicated tables of calories are generally used.

In the chapter on "How and When to Eat" you will be told all that science can tell you in regard to how much food you should eat. It will seem a rather confusing problem, as there are so many things that affect the amount of food needed.

You can safely cut down on excessive eating with no other guide except your weight. If you are fatter than you need be, it is important that you cut down your food quantities considerably. Don't be a food slacker and fear little hunger pangs. Thousands of fat people have reduced their diet and thereby reduced their weight, and increased health, vigor and improved their appearance and physical and mental efficiency.

Even those of you who do not seem particularly fat, may be overeating. Try a moderate reduction in food and watch the scales. You will lose a few pounds, chiefly due to an emptying out of the congested intestines, but it will give you more room to breathe and a better chance to think. As long

as you do not continue to lose weight to a point of actual thinness, the reduction of food quantities won't hurt you, if the food quality is right.

OVEREATING AMERICA'S FAVORITE SIN.—We have been told repeatedly that we eat too much. The proof of the statement is seen when people who have hitherto given no thought to the quantity of food eaten decide to observe the matter of food economy as closely as they do their bank account. The outcome is that in four cases out of five the food intake is lowered, and genuine improvement in personal efficiency results. Money is saved and health is gained, the business of living shows double profits, just as when a man makes a change in his farm or factory management that cuts costs and at the same time increases income.

The conclusion that the majority of civilized men eat too much may be reached either by a process of general reasoning, or by the observation of individual experiences. The wild man, along with the wild animals, was endowed with an appetite and food receiving capacity far in excess of what would be needed three times a day. Food in the jungle was available by fits and starts, and the meal hours were irregular. The man with the greater appetite and food capacity had a better chance of surviving unexpected delays in the meal hours than did the man of dainty appetite. Hence our instinct as to the amount of food to be eaten is often wide of the mark for present-day conditions.

So today, at least among all of us, save those engaged in heavy muscular labor, the tendency is to overeat. Especially is this true of the man who in earlier life was devoted to athletic sports or engaged in heavy muscular labor, and who, upon changing to a more sedentary life, prides himself on his former capacity for "three square meals a day."

But the most convincing proof of the universal tendency to overeat is the vast number of those who have deliberately cut down their food quantity and gained better health thereby.

Food, when taken in excess of that consumed by the activity of the body, is disposed of in one of three ways. The first and

most direct way is by indigestion. The excessive food simply refuses to digest completely and is passed out through the bowels. Once the food is absorbed from the digestive tract there is no way that it can be eliminated from the body, except it be burned up by oxidation. If the food once digested is not burned up, only one other thing can happen. It must be deposited in the body as fat.

The conclusions from the above statements of physiological science are obvious and positive. If we overeat, and do not exercise to use up the surplus, we will get indigestion or get fat. Hence overeating leads to either dyspepsia or obesity, and sometimes to both. Thus we see that the control of body weight becomes a matter of the control of the intake of the food in relation to the amount burned up by muscular activity. If we would get fat we should increase the food and cut down the exercise. If we would lose fat we must decrease the food and increase the exercise. But note this, that few people desire to get fat. Those who wish flesh usually mean that they want to get flesh over a bony form, and that the flesh desired is muscular tissue, not fatty tissue. Hence, in practice, we exercise to gain weight, and we exercise to lose weight, which seeming contradiction is absolutely scientific and proper.

Dietary standards are measured in calories, or in the simpler unit of wheat pounds. Dietary standards were first arrived at by getting the facts as to how much food people do eat. For years such standards were published by the government and generally accepted by the scientific world. This conception of dietary standards was based upon the reasoning that all men should do what the average man does.

In the table below is given a list of dietaries based on investigations of the foods eaten by men when free to eat what they enjoyed eating, or what they could afford to eat. From such investigations the Atwater or government standard of dietaries was arbitrarily derived and were excessive because overeating is a universal sin—and, as the variations below will show, because men come nearer eating what they can afford to pay for than what they need for efficiency.

	Calories	Wheat Pounds
United States: Men at hard, muscular labor	6,000	3.6
Athletes	4,510	2.7
Men at moderate muscular labor	3,425	2.0
Men not employed at muscular occupations	3,285	1.9
Very poor working people	2,100	1.2
Ireland: Workingmen	3,107	1.8
England: Workingmen	2,685	1.6
Germany: Workingmen (hard work)	3,061	1.8
Japan: Laborers	4,415	2.6
Professional men	2,190	1.3
China: Laborers	3,400	2.0

In the last fifteen years a change, in which physical culture has been a leading advocate, has occurred in favor of lighter dietary standards. Now we would make the standard dietary an ideal dietary and not merely an average dietary.

Scientific work, recently conducted, enables us to determine such standard dietaries that are based upon the study of the ideal food intake rather than upon the average. This new standard dietary is not to be accepted as an absolute standard, but only as a basis to work from, for we now realize that there can be no standard applicable to all men, and that each individual must work out his own dietary standard, as affected by season and climate, stature, age, occupation, the degree of muscular activity, sex, and lastly the weight or degree of fatness.

We must have a basic unit to start from. This we call a man-day, which is the amount of food required to keep up the bodily strength and weight of the typical man 5 feet 8 inches in height, weighing 150 pounds and engaged in light indoor labor with exercise equivalent to two hours a day brisk walking in the open air. Such a man-day unit of food, or dietary standard, is 1.5 wheat pounds, or about 2,500 calories. From this basis other standards may be derived by correcting for variations as discussed in the chapter on "Adapting the Diet to Various Conditions."