The Nutrient Content of the Food Supply

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The levels of 14 nutrients and food energy provided by the Nation's food supply increased 1 to 5 percent from 1982 to 1983. Compared with 1967-69, 1983's levels ranged from 1 to 20 percent higher, except for declines of 1 to 8 percent for calcium, phosphorus, and vitamin B_{12} (table 1).

Table 1. Nutrients Available for Consumption, Per Capita Per Day[1]

Nutrient (unit)	1909-13	1967-69	1982	1983	1983 as a percent of[2] 1967-69	1982
Food energy (kcal)	3,460	3,290	3,380	3,450	105	102
Protein (gm)	100	99	100	102	102	102
Fat (gm)	124	157	162	166	106	103
Carbohydrate (gm)	489	377	390	394	104	101
Calcium (gm)	0.76	0.90	0.87	0.88	98	102
Phosporus (gm)	1.51	1.52	1.47	1.50	99	102
Iron (mg)	15.3	17.0	17.2	18.1	106	105
Magnesium (mg)	400	340	343	347	102	101
Vitamin A value (IU)	7,900	8,000	7,900	8,100	101	102
Thiamin (mg)	1.63	1.95	2.09	2.14	109	102
Riboflavin (mg)	1.86	2.37	2.37	2.43	103	103
Niacin, preformed (mg)	18.8	23.5	25.8	26.2	112	102
Vitamin B_6 (mg)	2.16	1.93	1.99	2.02	105	101
Vitamin B_{12} (mcg)	8.2	9.4	8.5	8.7	92	101
Ascorbic acid (mg)	106	104	119	125	120	105

[1]Quantities of nutrients are computed by the Human Nutrition Information Service, on the basis of estimates of per capita civilian food consumption (retail weight) prepared by the Economic Research Service. No deductions are made in nutrient estimates for loss or waste of food in the market or the home. Data include estimates of home garden produce and iron, thiamin, niacin, and riboflavin added to flour and cereal products; other nutrients added primarily as follows: Vitamin A value to margarine, milk of all types, flavored milk extenders; vitamin B_6 to cereals, meal replacements, infant formulas; vitamin B_{12} to cereals; ascorbic acid to fruit juices and drinks, flavored beverages and dessert powders, flavored milk extenders, and cereals. Data reflect for the first time the addition of tea and spice consumption to the historical series. [2]Percentages are based on unrounded data.

Changes in Nutrient Levels, 1982-83

Iron: The 5-percent increase, primarily from grain products, reflected the revised Federal standard for enriched white flour (effective in July 1983), and also use of more meat.

Ascorbic acid: The 5-percent gain was attributed to a 5.7-pound per capita increase in the use of fresh oranges and a 5-pound rise in frozen orange juice.

Fat: The meats, and fats and oils groups contributed equally to the 3-percent gain in fat. Beef and pork were the major contributors to the gain in fat from the meat category, while greater use of butter, salad and cooking oil, and beef tallow (used mainly for deep-frying by the food and restaurant industries) accounted for the gain from fats and oils.

Riboflavin: Increased use of lowfat milk led to most of the 3-percent gain, although greater use of meat also contributed.

Food energy (calories): The 2-percent increase was largely due to the higher fat level, although additional protein and carbohydrate also contributed. On an equal weight basis, fat provides more than twice as many calories as either of the other energy-yielding nutrients.

Protein: The 2-percent rise was attributed to use of more beef, pork, dairy products, and poultry (in that order).

Calcium: The 2-percent gain was due almost entirely to a 5.3-pound per capita increase in dairy product use, primarily fluid lowfat milks.

Phosphorus: Greater use of dairy products and meat accounted for almost all of the 2-percent increase.

Thiamin: Increased use of pork contributed to most of the 2-percent gain. Beef and offal (liver and other organ meats used primarily in luncheon meats) also contributed.

Niacin: This 2-percent gain, like that for thiamin, was largely a result of greater use of pork, although a rise in use of beef and offal also contributed.

Vitamin A: Increased use of offal mainly contributed to the 2-percent gain, although greater use of vegetables other than tomatoes and the dark green, deep yellow group also contributed.

Carbohydrate: A 1-percent gain occurred chiefly because of increased use of high fructose corn syrup (HFCS). Since 1970, use of all types of HFCS rose from 1 pound to 43.2 pounds per capita. Use of HFCS-55, a 55-percent fructose syrup introduced in 1980, increased threefold from 8.1 pounds per capita to 23.8 pounds in 1983. Smaller gains in carbohydrate also came from citrus and dairy products.

Vitamin B_6: Greater use of dairy products and meat chiefly accounted for the 1-percent gain.

Vitamin B_{12}: The 1-percent increase resulted from a small rise in the use of offal, a concentrated source of this vitamin.

Magnesium: Increased use of dairy products, meats, and citrus fruit accounted for most of the 1-percent rise. (For more details on this nutrient, see the "Closeup" section later in this article. There you'll find out about the sources of magnesium and what's causing a change in the levels in the American food supply.)

Changes in Nutrient Levels, 1967-69

Changes in nutrient levels tend to be greater, and trends more apparent, when observed over a longer period rather than year to year. Between 1967-69 and 1983, for example, increased use of citrus fruit boosted ascorbic acid in the food supply by 20 percent—the largest gain for any nutrient. Greater use of processed citrus juice mainly contributed to this rise, with frozen orange juice the leader as its use jumped from 19.5 pounds per capita to 38.5 pounds in 1983. Consequently, the

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The 2-percent gain in calcium from 1982 to 1983 is due almost entirely to increased consumption of dairy foods, especially lowfat milk.

proportionate contribution of ascorbic acid in the food supply from citrus fruit rose from 24 to 30 percent during the period (table 2). To a smaller degree, vegetables, chiefly the dark green, deep yellow group, also added to the ascorbic acid gain.

Increased levels for niacin, thiamin, and riboflavin (12, 9, and 3 percent, respectively) were mainly attributed to higher federal standards set in 1975 for enrichment of white flour with these vitamins. Moreover, use of wheat flour increased from 113 to 116 pounds per capita between 1967-69 and 1983. An increase in poultry from 45.8 to 65.5 pounds per capita also pushed up niacin levels. Poultry also accounted for most of the 5-percent increase in vitamin B_6; fruit and grain products contributed a smaller share.

The higher Federal standard for enrichment of white flour with iron went into effect in July 1983, and primarily was responsible for the 6-percent gain in iron between 1967-69 and 1983. As a result, the proportionate contribution of iron from grain products increased from 29 to 33 percent.

The 6-percent increase in fat was attributed primarily to greater use of salad and cooking oil, shortening, and edible beef tallow. The gain in fat from these foods more than offset decreased amounts from reduced use of lard, butter, and meat. Use of salad and cooking oils alone jumped from 15.9 pounds to 24.8 pounds per capita between 1967-69 and 1983.

The 4-percent increase for carbohydrate resulted chiefly from greater use of corn syrups, particularly HFCS. Between 1967-69 and 1983, corn syrup climbed from 16 to 65.6 pounds per capita, while total use of HFCS, first reported in the late 1960's, rose from 1 pound per capita in 1970 to 43.2 pounds in 1983. The 4.7-pound increase in use of grain products also contributed to the rise in carbohydrate. The higher levels for fat and carbohyrate combined with a 2-percent rise in protein, (caused primarily by greater use of poultry), boosted the level of food energy by 5 percent.

Magnesium and vitamin A also showed small increases between 1967-69 and 1983. Greater use of peanuts, poultry, and fruit (chiefly citrus) explained the 2-percent rise in magnesium. The slightly higher level of vitamin A was due primarily to gains from use of red pepper (a particularly concentrated source), vegetables, and poultry. Gains from these foods more than offset losses caused by the decline in the use of eggs—from 40 to 33 pounds per capita, and of meat—from 158 to 153 pounds.

From 1967-69 to 1983, declines occurred in the levels of vitamin B_{12}, calcium, and phosphorus. The 8-percent decline in vitamin B_{12} resulted from decreased use of meat (chiefly offal), and eggs. A decrease in the use of fluid whole milk and some dairy products was responsible for the 2-percent drop in calcium, which was not offset by gains from increased use of cheese and lowfat milks. The 1-percent decline in the level of phosphorus is attributed to reduced use of eggs, meat, and fluid whole milk.

Developing the Data

USDA's Human Nutrition Information Service (HNIS) annually compiles data on the nutrient content of the U.S. food supply, estimating per capita per day food energy and nutrients in foods available for consumption. Additionally, HNIS estimates the percentage contribution of each nutrient provided by the 13 major food groups. The historical series dates from 1909.

HNIS researchers derive their estimates by using information on the nutrient composition of foods and USDA's Economic Research Service (ERS) data on foods available for consumption. ERS determines the amount available by subtracting data on exports, year-end inventories, nonfood use, and military procurement from total production, imports, and beginning inventories. However, subsequent food losses during processing, marketing, and home use are not considered. Therefore, food available for consumption is referred to as used rather than ingested, and includes a greater volume of food than is actually eaten.

Table 2. Contribution of Major Food Groups to Nutrient Levels

Food group	Food energy	Protein	Fat	Carbohydrate	Calcium	Phosphorus	Iron	Magnesium	Vitamin A value	Thiamin	Riboflavin	Niacin	Vitamin B_6	Vitamin B_{12}	Ascorbic acid
								Percent							
1967-69															
Meat, poultry, and fish	21.4	41.7	37.2	0.1	4.0	27.2	31.2	13.1	22.5	30.5	22.4	47.9	40.4	69.4	2.0
Eggs	2.2	5.7	3.2	0.1	2.6	6.0	6.0	1.4	6.6	2.5	5.6	0.2	2.5	9.4	0.0
Dairy products, excluding butter	11.0	21.5	12.3	6.8	75.7	35.2	2.2	21.3	12.4	8.9	39.4	1.6	11.2	20.0	4.5
Fats and oils, including butter	17.0	0.2	40.1	(1)	0.2	0.1	0.1	(1)	8.1	(1)	0.1	(1)	(1)	0.0	0.0
Citrus fruits	0.8	0.4	0.1	1.7	0.9	0.6	0.7	1.9	1.2	2.4	0.4	0.7	1.3	0.0	23.8
Noncitrus fruits	2.2	0.6	0.2	4.9	1.2	1.1	3.7	4.0	6.2	1.8	1.6	1.8	6.5	0.0	12.5
Potatoes and sweetpotatoes	2.9	2.4	0.1	5.4	1.1	3.7	4.3	7.4	5.7	5.1	1.6	6.7	10.9	0.0	16.7
Dark-green, deep-yellow vegetables	0.2	0.3	(1)	0.4	1.1	0.5	1.3	1.7	20.7	0.7	0.7	0.5	1.8	0.0	7.9
Other vegetables, including tomatoes	2.2	3.1	0.3	4.4	4.6	4.7	9.0	10.1	12.6	6.4	4.3	5.5	10.7	0.0	29.9
Dry beans and peas, nuts, soy products	2.9	5.0	3.5	2.1	2.7	5.8	6.5	11.1	(1)	5.3	1.7	6.6	4.7	0.0	(1)
Grain products	19.9	18.4	1.4	36.5	3.6	12.8	29.2	18.4	0.4	36.0	17.0	23.5	9.8	1.2	0.0
Sugars and other sweeteners	16.3	(1)	0.0	36.8	0.3	0.1	0.8	0.3	0.0	(1)	0.1	(1)	0.1	0.0	(1)
Miscellaneous[2]	0.8	0.7	1.5	0.7	2.1	2.3	5.0	9.3	3.5	0.4	5.1	5.0	0.1	0.0	2.6
1983															
Meat, poultry, and fish	20.3	42.6	34.1	0.1	4.2	28.0	29.1	13.5	21.2	26.2	21.5	45.7	40.2	71.4	1.8
Eggs	1.7	4.3	2.4	0.1	2.3	4.3	4.2	1.3	2.3	1.5	4.5	0.1	2.2	6.5	0.0
Dairy products, excluding butter	10.2	21.3	11.4	5.9	74.5	34.2	2.6	20.1	12.7	7.6	36.7	1.3	11.0	20.5	3.1
Fats and oils, including butter	19.1	0.2	44.7	(1)	0.2	0.1	0.1	(1)	7.7	(1)	0.1	(1)	(1)	0.0	0.0
Citrus fruits	1.1	0.6	0.1	2.3	1.2	0.9	0.9	2.7	1.8	3.3	0.6	1.0	1.7	0.0	29.8
Noncitrus fruits	2.3	0.7	0.4	4.9	1.4	1.3	3.8	4.4	5.9	1.9	1.8	1.7	7.3	0.0	12.0
Potatoes and sweetpotatoes	2.8	2.3	0.1	5.4	1.1	3.7	4.5	7.1	5.3	4.8	1.4	6.1	9.6	0.0	13.4
Dark-green, deep-yellow vegetables	0.2	0.4	(1)	0.4	1.4	0.7	1.4	2.0	21.8	0.8	1.0	0.6	2.1	0.0	10.0
Other vegetables, including tomatoes	2.2	3.0	0.3	4.3	4.8	4.8	8.6	10.0	13.4	6.0	4.3	5.1	10.5	0.0	25.9
Dry beans and peas, nuts, soy products	3.0	5.4	3.8	2.0	3.0	6.3	6.3	11.9	(1)	5.1	1.9	6.6	4.8	0.0	(1)
Grain products	19.7	18.5	1.3	36.2	3.7	13.1	33.2	18.3	0.4	42.3	22.4	28.2	10.5	1.7	0.0
Sugar and other sweeteners	16.6	(1)	0.0	37.6	0.4	0.1	0.7	0.6	0.0	(1)	(1)	(1)	(1)	0.0	(1)
Miscellaneous[2]	0.9	0.7	1.5	0.8	1.9	2.3	4.6	8.2	7.4	0.4	3.9	3.5	0.1	0.0	3.9

[1]Less than 0.05 percent. [2]Includes coffee, chocolate liquor equivalent of cocoa beans, and fortification of products not assigned to a food group. Also includes for the first time the addition of tea and spices to the historical series.

Closeup: Magnesium Level Declines

Magnesium is an essential mineral used to build bones, synthesize proteins, release energy from muscle glycogen, and regulate body temperature and blood pressure. The Recommended Dietary Allowance (RDA) for magnesium is 300 and 350 milligrams (mg) per day for adult women and men.

Estimated magnesium levels in the U.S. food supply declined 15 percent between 1909 and 1983, from 409 mg to 347 mg per capita per day. Levels were generally lower after the mid-1950's, ranging between 335 and 340 mg per capita per day for most years (figure 1).

Sources of Magnesium Shift

Foods of vegetable origin consistently provided the largest proportion of magnesium, although the share fell from 77 to 65 percent between 1909-13 and 1983 as use of grain products and potatoes declined. Grain products were the major source of magnesium until the late 1940's, when dairy products took the lead.

Dairy products: Between 1909-13 and 1983, the amount of magnesium from dairy products increased from 55 to 70 mg per capita per day, boosting the share of magnesium provided by this food group from 14 to 20 percent (figure 2). However, in 1957-59 the share from dairy products peaked at 23 percent.

Fluid whole milk has accounted for the largest share of magnesium from dairy products, but the share from fluid whole milk dropped from 69 to 32 percent between 1967-69 and 1983 (figure 3). Use of whole milk peaked in 1945 at 335 pounds and declined to a record low of 132.9 pounds in 1983.

Fluid lowfat milks, in contrast, contributed 26 percent of magnesium in 1983, compared with 20 percent in 1909-13 and only 7 percent in 1947-49. Use of lowfat milks declined throughout the first half of the century to a record low level in the late 1950's. Since then the trend reversed and use peaked at 105.8 pounds in 1983.

Magnesium from cheese has increased fivefold since the beginning of the century, raising the share from 4 to 17 percent. Use of cheese increased steadily after 1960, perhaps reflecting its popularity as a snack food and greater use in fast food sandwiches and pizza. Use of American-type cheese doubled between 1960 and 1983 and accounted for slightly more than half of the magnesium provided by all cheese in 1983. During the same period, use of other cheese, primarily mozzarella, tripled, and thus accounted for almost as much magnesium as American-type cheese.

Of the processed milk products, dry milks and whey (a byproduct in cheese manufacturing) were the chief sources of magnesium in 1983, each providing about

Figure 1. Magnesium Declines in the U.S. Food Supply

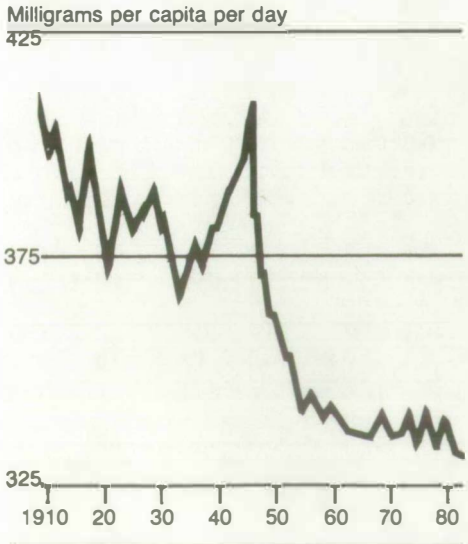
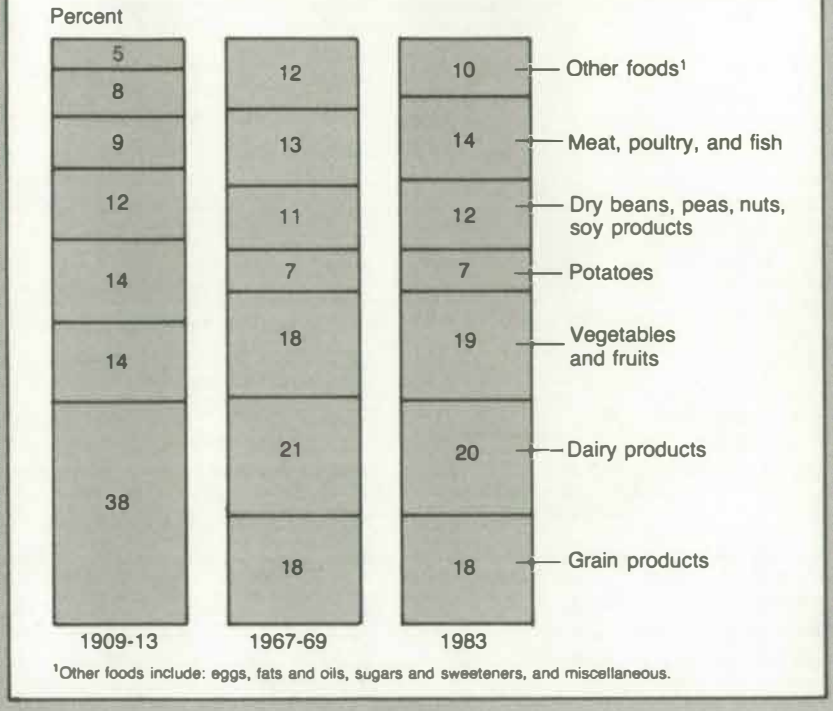


Figure 2. Sources of Magnesium Shift in the U.S. Food Supply



¹Other foods include: eggs, fats and oils, sugars and sweeteners, and miscellaneous.

7 percent. Magnesium from nonfat dry milk has declined almost steadily since 1960. In contrast, the amount provided by dry whey more than doubled after 1970 due to increased use as an economical substitute for nonfat dry milk in processed foods. The share of magnesium from frozen desserts, chiefly ice cream, increased from 1 to 7 percent between 1909-13 and 1967-69, and has remained around 6-7 percent.

Fruits and vegetables: Magnesium from fruits and vegetables (excluding potatoes) increased from 57 to 66 mg per capita per day between 1909-13 and 1983, providing from 14 to 19 percent of the magnesium in the food supply.

Vegetables accounted for about two-thirds of the magnesium from this food group throughout the century (figure 4). In 1983, tomatoes and dark green, deep yellow vegetables accounted for 25 percent of the magnesium from fruits and vegetables. Although fresh vegetables consistently provided the largest share, greater use of processed forms contributed to the increase.

The proportion of magnesium from citrus fruits rose from 3 to 14 percent between 1909-13 and 1983 because of increased use of frozen and chilled products. Noncitrus fruit contributed 23 percent of the magnesium from the fruit and vegetable group in 1983, down from 30 percent earlier in the century. Despite their decline in use, noncitrus products consistently provided the largest share.

Grain products: This food group ranked third behind dairy products and the fruit and vegetable group as a source of magnesium in 1983. Magnesium from grain products declined from 153 to 63 mg per capita per day between 1909-13 and 1983. Between 1909-13 and 1957-59, the proportion of magnesium provided by grain products was more than halved from 38 to 18 percent, reflecting a decline in grain use from 291 to 148 pounds per capita.

Wheat products were the major source of magnesium in this group. Although

Sources of Magnesium in Food Groups

Figure 3. Dairy Products

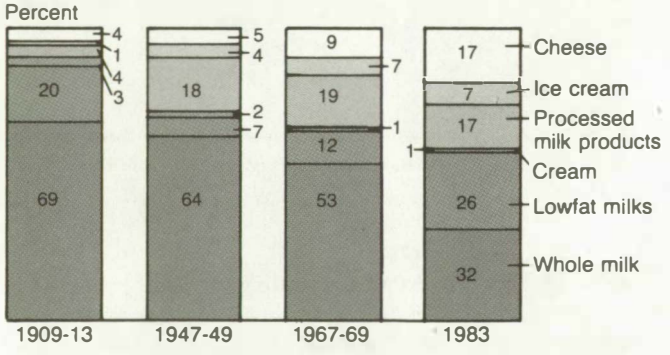


Figure 4. Fruits and Vegetables

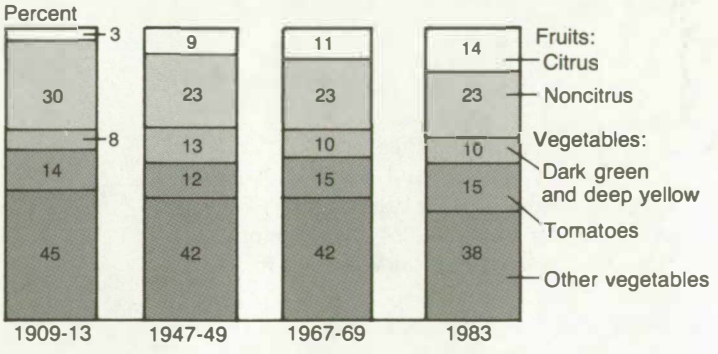


Figure 5. Grain Products

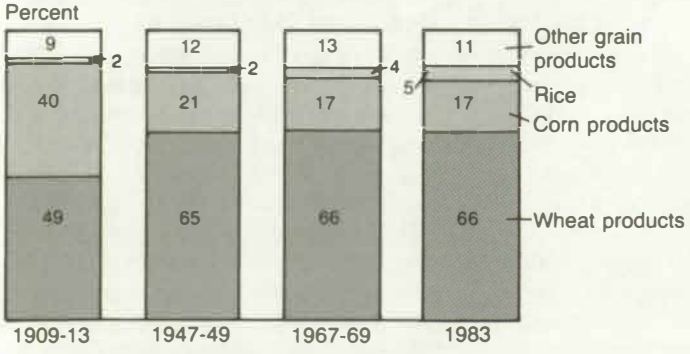
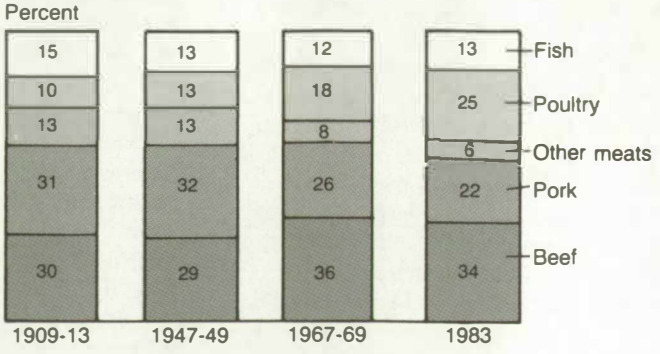


Figure 6. Meat, Poultry and Fish



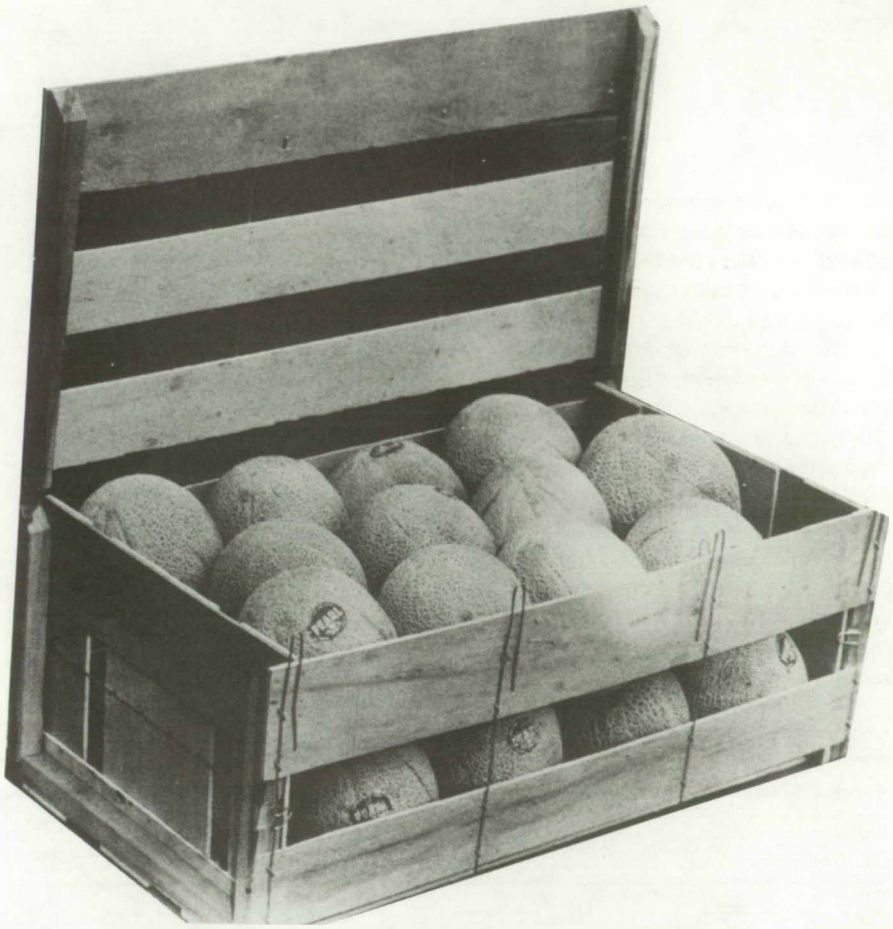
Note: Components may not add to 100 due to rounding.

the magnesium supplied by wheat products decreased (largely between 1909-13 and 1947-49), their proportionate share increased from 49 to 66 percent between 1909-13 and 1983 (figure 5). The drop in magnesium from all grain products and the substantial decline from corn products was responsible for wheat's increased share.

Corn products ranked second as a source of magnesium among grain products, although they provided a much smaller share than wheat products in 1983. The proportionate share of magnesium from corn products declined from 40 to 17 percent between 1909-13 and 1967-69, reflecting a sharp decline in use of corn meal, the chief component of corn products. Together, rice and other grains—oats, barley, and rye—have provided about the same proportion of magnesium as corn products since the late 1960's. However, the share from rice increased and that from other grains declined.

Meat, poultry, and fish: Magnesium from this group increased from 33 to 45 mg per capita per day between 1909-13 and 1967-69, with little change thereafter. In 1983, meat, poultry, and fish provided 47 mg of magnesium per capita per day, accounting for 14 percent of this nutrient in the food supply, up from 8 percent in 1909-13.

Pork provided the largest share of magnesium from the meat, poultry, and fish group between 1909-13 and 1957-59, although its share declined from 31 to 27 percent. In 1983, pork provided an even smaller share of magnesium—22 percent (figure 6). Beef was the leading source from this group after 1957-59, providing between 33 and 40 percent of the total. Peak use in 1976 pushed beef's share to 40 percent. However, use of beef dropped 16 pounds per capita between 1976 and 1983 and the share of magnesium from beef fell to 34 percent. The proportion of magnesium from other meats declined from 13 percent in 1909-13 to 6 percent in 1983.



No one can estimate how much of these cantaloupes or other foods people will eat or throw away. Thus, when nutritionists calculate the nutrients in the food supply, they look at food available for consumption—not what's actually eaten.

The use of poultry rose from 17.5 pounds to 65.5 pounds per capita, tripling the amount of magnesium from poultry and increasing poultry's share of magnesium from the meat, poultry, and fish group from 10 to 25 percent. In fact, the marked increase in poultry use accounted for most of the rise in magnesium from this group over the century.

Fish and shellfish provided 13-15 percent of the magnesium from the meat, poultry, and fish group during this century.

Other foods: The share of magnesium supplied by dry beans, peas, nuts, and soy products increased from 9 percent at the beginning of the century to 12 percent in 1983. Magnesium from dry beans and peas decreased since 1909-13, but the decline was more than offset by increased amounts from nuts, chiefly peanuts, and soy products.

The share of magnesium from potatoes decreased from 12 to 8 percent between 1909-13 and 1947-49 and dipped to 7 percent in 1983. The proportion of magnesium from processed potatoes has increased, chiefly from frozen french fries. In 1983, fresh and processed potatoes provided approximately equal amounts of magnesium.

Eggs, fats and oils, sugars and sweeteners, and miscellaneous products such as coffee, tea, cocoa, and spices—provided 10 percent of the magnesium in 1983, up from 5 percent in 1909-13. The addition of tea and spices to the historical series, 1909-13 to 1983, was a factor in this gain in magnesium. □