

# THE CANNED FOOD REFERENCE MANUAL



AMERICAN CAN COMPANY

230 PARK AVENUE

NEW YORK

1939

## CHAPTER 2

# A BRIEF HISTORY OF CANNING

DISCOVERY of the process of canning is accredited to the Frenchman, Nicolas Appert, although the literature contains at least one previous reference to the inadvertent preservation of food by the application of heat to a sealed container (Spallanzani, 1765). During recent years a number of publications have appeared which present the interesting story of the discovery and development of canning.<sup>1, 2, 3, 4</sup>

In 1795, France was not only in the grip of a revolution but at the same time was at war with several hostile European nations. The problem of providing adequate food supplies for her army and navy during the winter months was acute. Consequently, the Directory of France, the five-man governing board, voted a prize of 12,000 francs to be given any person who would develop a successful method of preserving food. Appert, a Parisian confectioner, entered the competition, won the prize in 1809, and his work laid the basis for modern canning procedure. He also published the first treatise on canning.<sup>5</sup>

In his work, Appert employed wide-mouth, glass bottles which he filled with food, corked, and heated in boiling water baths. In 1810, Peter Durand, an Englishman, conceived and patented the idea of using tin-coated, steel containers (as well as other types of vessels) instead of bottles. The art of canning spread to America, where the year 1820 found William Underwood and Thomas Kensett, in Boston and New York, respectively, in commercial production of foods canned by Appert's process.

<sup>1</sup> The Story of the Canning Industry, National Canners Association, Washington, D. C.

<sup>2</sup> 1937. The Canning Clan, E. C. May, Macmillan, New York.

<sup>3</sup> 1937. Appertizing or The Art of Canning; Its History and Development, A. W. Bitting, Trade Pressroom, San Francisco, Calif.

<sup>4</sup> 1938. Stories of American Industry, United States Department of Commerce, United States Government Printing Office, Washington, D. C.

<sup>5</sup> 1811. The Art of Preserving All Kinds of Animal and Vegetable Substances for Several Years, N. Appert, Black, Perry and Kingsbury, London.

From these humble beginnings, the canning industry has grown to its present position in America. During the 120 years of its growth, certain dates or periods are marked as outstanding for the advances made or developments occurring during that period. Space will permit description of only a few; for a fuller list, the reader is referred to a more complete treatise.<sup>2</sup>

- 1819-1820.* Commercial canning operations start in America.
- 1840.* The tin container comes into widespread use in America.
- 1861.* Calcium chloride is added to boiling water baths to raise the temperature of processing.
- 1874.* The closed, steam-pressure retort for processing canned foods is patented and comes into use.
- 1895-1900.* The science of bacteriology is first applied in the canning industry.
- 1900.* The first open-top "sanitary" style can is used, both plain and with "fruit" enamel.
- 1901.* The American Can Company is organized.
- 1906.* The Chemical Laboratory of the American Can Company is founded.
- 1907.* The National Cannery Association is established.
- 1918-1920.* Use of the sanitary can becomes practically universal for fruits and vegetables.
- 1921.* Commercial production of enamels for non-acid foods is started.
- 1923-1928.* A method for mathematical calculation of adequate heat processes for canned foods from physical and bacteriological measurements is perfected.
- 1930-1939.* Commercial production of canned foods reaches an all-time record.

Today, the American canning industry comprises some 3,000 canneries operating in 45 states in the Union, as well as in Alaska, Puerto Rico and the Hawaiian Islands. Production figures for certain canned items, presented in Table VII, give some indication of the volume of these commodities produced in recent years. As indicated in Table VIII, this great industry provides over 300 canned foods for the use of the American public.

TABLE VII

## RECENT CANNED FOOD PRODUCTION FIGURES\*

	1933	1934	1935	1936	1937
<b>Fruits**</b>					
Apples.....	2,126,176	2,584,162	2,331,581	2,620,373	2,672,328
Applesauce.....	1,730,103	1,892,187	1,887,256	2,353,250	3,161,001
Apricots.....	2,567,880	2,075,631	3,332,814	2,982,467	5,727,996
Blackberries.....	416,803	746,391	486,651	596,341	493,218
Raspberries.....	538,200	531,098	517,746	388,584	623,564
Cherries, Red Pitted....	1,725,419	1,855,045	2,562,683	1,450,335	2,471,982
Cherries, Sweet.....	877,158	526,162	535,393	569,785	518,979
Grapefruit.....		2,398,352	3,747,822	2,410,940	4,279,240
Grapefruit juice.....		739,844	2,556,124	2,235,699	6,016,240
Peaches.....	10,576,291	8,936,335	11,746,634	11,509,593	13,992,140
Pears.....	4,997,203	6,163,362	4,766,874	6,104,365	5,115,962
Plums.....	190,208	206,856	152,016	116,040	288,532
Prunes.....	825,592	1,124,755	1,766,570	1,891,364	.....
Grapes.....	61,533	136,812	105,998	108,067	121,859
Figs.....	127,782	222,670	216,550	313,930	412,481
Pineapple (Hawaiian)...	7,815,540	9,000,000	10,000,000	12,000,000	12,000,000
Pineapple juice (Hawaiian).....	1,500,000	2,000,000	2,500,000	5,000,000	7,500,000
Fruit Salad.....	2,281,257	1,381,724	1,340,547	1,465,186	1,256,492
Fruit Cocktail.....	inc. above	1,167,851	1,649,907	2,156,808	3,152,313
Strawberries.....	100,244	108,676	181,057	133,205	126,051
Loganberries.....	166,276	352,645	225,576	164,643	66,978
Gooseberries.....	34,376	34,471	49,549	57,379	57,195
Blueberries & Huckle- berries.....	291,985	.....	212,488	252,138	441,988
Orange Juice.....	110,597	342,678	1,107,299	1,227,186	1,975,000
Lemon Juice.....	.....	.....	100,000	300,000	500,000
<b>Vegetables***</b>					
Asparagus.....	2,319,361	2,149,131	2,519,958	2,790,994	2,703,966
Beans					
Green.....	4,844,309	5,157,128	6,031,152	5,675,399	7,526,611
Lima**.....	.....	1,280,812	1,133,776	1,512,737	1,449,040
Wax.....	687,556	1,143,234	1,129,955	954,070	1,370,724
Beets.....	1,215,679	2,196,116	2,461,768	2,490,250	3,210,403
Carrots.....	.....	.....	.....	.....	949,480
Corn.....	10,192,730	11,267,897	21,471,417	14,621,189	23,541,224
Peas.....	12,892,903	15,741,569	24,698,633	16,552,816	23,467,479
Pumpkin & Squash.**.	1,753,046	1,381,424	833,355	1,767,847	1,507,708
Spinach.....	3,179,080	3,602,131	4,318,001	4,143,167	6,136,051
Tomatoes.....	20,460,903	22,376,349	26,984,642	24,208,740	24,274,522
Tomato Juice.**.....	4,170,794	5,703,920	9,286,590	13,104,809	13,444,972
<b>Milk****</b>					
Evaporated and con- densed milk.....	40,604,630	40,779,724	43,535,000	48,122,230	.....

\* These figures were adapted from National Canners Association bulletin, *Canned Food Pack Statistics*: 1937, Parts 1 and 2, and from *Western Canner and Packer*, Yearbook, 1938.

\*\* On basis of actual cases packed.

\*\*\* On basis of cases of No. 2 cans packed, unless indicated by \*\*.

\*\*\*\* On basis of cases of 14½ oz. cans packed.

# CANNED FOOD MANUAL



PREPARED FOR

THE UNITED STATES ARMY

WITH THE HELP AND ADVICE OF THE SUBSISTENCE  
BRANCH, OFFICE OF THE QUARTERMASTER GENERAL

BY

AMERICAN CAN COMPANY  
230 PARK AVENUE, NEW YORK, N. Y.

1942

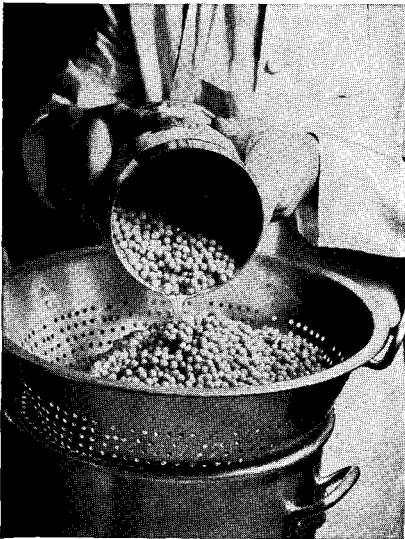
prepare canned foods is to consider them exactly as fresh foods—except for the fact that they've already been cooked.

### *What is the liquid in the can?*

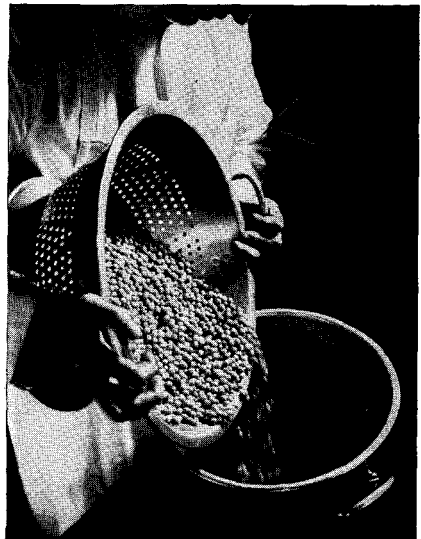
It is the water in which the food is cooked. It may be seasoned with some salt, sugar, or both. It may also contain soluble food components such as certain minerals and vitamins which have been extracted from the food. Consequently it should not be wasted.

### *How can the liquid in the can be used?*

Whenever possible it should be prepared back into the food. In the case of vegetables, this can be done in the following way: First drain them, boil the liquid down to one-fourth to one-half the original volume and then add the vegetables to the boiling liquid just long enough to heat them fully.



*Drain the liquid into a stock pot,  
and boil to reduce the amount*



*Add vegetable to boiling liquid,  
season and heat quickly*

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*Third Edition*

A PUBLICATION OF THE AMERICAN  
CAN COMPANY RESEARCH DIVISION

JAMES A. STEWART, *Vice President*  
BERTON S. CLARK, *Director*



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TABLE 17

**PRODUCTION OF MAJOR FOOD COMMODITIES, CALENDAR YEARS, 1935-39 AVERAGE 1943, 1944, 1945<sup>1</sup>**

Commodity	Unit	Average 1935-39	1943	1944	1945
<i>Meats (dressed weight)</i> .....					
Beef	Mil. lb.	6,936	8,523	9,137	9,920
Lamb and mutton	Mil. lb.	871	1,104	1,023	1,050
Pork (excluding lard)	Mil. lb.	7,337	13,349	12,893	10,040
Veal	Mil. lb.	1,038	1,160	1,595	1,590
<b>Total Meats</b>	<b>Mil. lb.</b>	<b>16,182</b>	<b>24,136</b>	<b>24,648</b>	<b>22,600</b>
<i>Poultry and Eggs</i>					
Chicken (dressed weight)	Mil. lb.	2,325	3,804	3,460	3,550
Eggs	Mil. doz.	3,335	4,972	5,305	5,062
Turkey (dressed weight)	Mil. lb.	350	466	547	680
<i>Dairy Products</i>					
Cheese <sup>2</sup>	Mil. lb.	669	993	1,016	1,115
Cond. and evap. milk	Mil. lb.	2,225	3,343	3,750	4,114
Fluid milk and cream <sup>4</sup>	Mil. lb.	44,146	53,921	56,144	59,508
<b>Total Milk<sup>2</sup></b>	<b>Mil. lb.</b>	<b>103,656</b>	<b>117,687</b>	<b>118,504</b>	<b>122,785</b>
<i>Fats and Oils<sup>5</sup></i>					
Butter, farm and factory	Mil. lb.	2,170	2,015	1,818	1,685
Lard <sup>6</sup>	Mil. lb.	1,624	2,884	2,951	2,050
Margarine (fat content)	Mil. lb.	303	500	479	517
Shortening	Mil. lb.	1,529	1,438	1,364	1,469
Other edible fats and oils <sup>7</sup>	Mil. lb.	575	1,272	1,123	971
<b>Total Fats and Oils</b>	<b>Mil. lb.</b>	<b>6,201</b>	<b>8,109</b>	<b>7,735</b>	<b>6,692</b>
<i>Fruits</i>					
Fresh:					
Apples (commercial)	Mil. lb.	4,384	3,107	4,181	2,421
Citrus	Mil. lb.	6,870	8,838	10,069	9,974
Other (excluding melons)	Mil. lb.	4,847	3,568	5,053	5,493
<b>Total Fruits (fresh)</b>	<b>Mil. lb.</b>	<b>16,101</b>	<b>15,513</b>	<b>19,303</b>	<b>17,888</b>
Processed:					
Canned fruit	Mil. lb.	1,702	1,587	2,087	1,870
Canned fruit juices	Mil. lb.	321	1,390	1,606	1,713
Dried	Mil. lb.	1,111	1,339	1,139	1,010
Frozen	Mil. lb.	106	214	314	385
<b>Total Fruits (processed)</b>	<b>Mil. lb.</b>	<b>3,240</b>	<b>4,530</b>	<b>5,146</b>	<b>4,978</b>
<i>Vegetables</i>					
Canned <sup>9</sup>	Mil. lb.	4,084	6,236	6,373	6,636
Canned baby foods	Mil. lb.	48	234	306	390
Canned soups	Mil. lb.	684	675	890	890
Dry edible beans <sup>11</sup>	Mil. lb.	1,361	1,935	1,497	1,231
Dry field peas <sup>11</sup>	Mil. lb.	230	1,000	803	507
Fresh <sup>8</sup>	Mil. lb.	30,498	31,672	34,402	36,177
Frozen	Mil. lb.	78 <sup>16</sup>	223	238	272
Potatoes	Mil. bu.	359	460	395	419
Sweet potatoes	Mil. bu.	68	73	71	67



TABLE 18

## ANNUAL PER CAPITA FOOD CONSUMPTION IN THE UNITED STATES 1909-1945\*

*Estimated Averages*

Food	1909-16	1917-21	1922-26	1927-31	1932-36	1937-41	1943	1944	1945
	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds
<b>Dairy Products</b>									
Fluid milk and cream†	248.8	249.6	264.4	272.8	269.0	274.2	322.4	338.4	357.6
Evaporated milk, cheese, ice cream	13.9	19.9	22.8	25.1	25.6	33.6	23.6**	21.1**	24.0**
Meats, poultry, fish‡	142.8	135.6	139.8	131.7	131.4	136.5	178.2	187.0	169.5
Eggs	37.2	35.7	39.5	40.9	35.5	37.7	43.1	43.9	48.8
Potatoes, including sweet potatoes	187.0	170.4	163.9	156.7	156.8	146.9	153.2	148.9	149.2
Beans, peas, and nuts	11.2	13.1	12.0	14.1	15.0	16.0	15.8	15.2	14.6
<b>Fresh fruit</b>									
Citrus	18.2	20.8	27.2	32.3	37.2	54.3	59.6	67.8	65.7
Other	156.0	139.4	140.9	144.4	132.6	144.1	61.3	76.8	80.8
Dried fruit	4.2	5.9	6.0	5.7	5.5	6.2	5.9	6.4	5.7
Canned fruit	4.2	7.9	9.2	13.0	12.5	17.2	18.8***	18.7***	23.9***
<b>Fresh vegetables§</b>									
Tomatoes			13.8	13.8	14.7	17.2	} 236.0	} 255.0	} 270.0
Leafy, green and yellow	100.0	100.0	51.7	57.6	60.8	69.5			
Other			36.1	40.1	41.0	47.8			
Canned vegetable	13.0	13.4	16.0	18.9	17.9	23.2	33.7	33.2	42.6
<b>Cereal products</b>									
Wheat flour	206.4	180.1	176.0	173.4	156.6	154.0	161.3	161.0	161.4
Other	77.0	55.6	51.3	49.4	43.3	42.1	46.2	43.0	42.0
Sugar and syrup¶	91.0	95.8	115.9	114.4	107.9	113.7	96.7	105.1	89.3
<b>Butter and fats</b>									
Butter	17.4	15.2	17.9	17.7	17.7	17.0	11.7	12.0	10.5
Other††	43.4	43.5	45.5	46.7	44.8	48.4	33.9	32.6	31.4
Coffee, tea, chocolate, and spices	13.2	16.6	16.7	17.4	18.4	21.2	16.4	19.9	20.4
<b>Total</b> <sup>□</sup>	<b>1385.0</b>	<b>1318.5</b>	<b>1366.6</b>	<b>1386.1</b>	<b>1344.2</b>	<b>1420.8</b>	<b>1517.8</b>	<b>1586.0</b>	<b>1607.4</b>