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HOW GREAT CITIES ARE FED

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TION)

HOW GREAT CITIES ARE FED

BY

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CARS OF CUCUMBERS RECEIVED IN NEW YORK MARKET
CROP YEAR, NOVEMBER, 1926-OCTOBER, 1927

COUNTRY OR STATE OF ORIGIN	Nov.	DEC.	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
Cuba	9	12	35	17	7	2	563	10				
Florida		20	4		27	403	39	441	9			
South Carolina								252	180			
North Carolina								19	80	2		
Virginia									98	28		
Maryland									59	41	1	
Delaware							1	2	160	387	18	1
New Jersey										33	362	106
New York												
Total principal sources	9	32	39	17	34	405	603	724	586	491	381	107
All other	2	1	1	0	0	3	22	38	0	18	4	1
Grand total	11	33	40	17	34	408	625	762	586	509	385	108

This is a description of the perishable food supply of a great city. Against this background we may examine the forces which have made our modern system of perishable food distribution, the new problems which have arisen, and the direction which an intelligent control may take in the future.

CHAPTER II

WATERSHEDS, MILKSHEDS, AND FOODSHEDS

Economic Barriers Direct Flow of Foodstuffs. The drainage basin from which a river draws its water is outlined by heights of land, making a continuous watershed, or divide. Along certain ridges of the Catskill Mountains in New York State the run-off from one slope after a heavy rainstorm will flow eastward into the Hudson River, and eventually reach New York City, while the run-off from the other slope will flow westward into the Delaware River, eventually reaching Philadelphia. By analogy, we may conceive of the flow of foodstuffs to consuming markets as determined by foodsheds. The barriers which deflect raindrops into one river basin rather than into another are natural land elevations, while the barriers which guide and control movements of foodstuffs are more often economic than physical. The dikes and dams which control and often stem new streams of produce are railroad freight rates, protective tariffs, and inspection standards.¹

Even a century ago the large cities depended upon near-by farms for all kinds of perishables. New York City drew its supply from Staten Island and Long

¹ These are the principal general factors determining the direction of flow to market. In specific instances, the business relationships between shippers in a given producing area and dealers in a given market may control. See Chapter VI for discussion of operators and joint-account dealers.

Island, northern New Jersey, and Westchester — all within a radius of fifty miles. One of the principal elements in the food supply, fluid milk, is still limited to a circumscribed producing radius, defined with sufficient clarity to be called a "milkshed."

Milksheds of Eastern Seaboard Cities. The Atlantic seaboard cities of Boston, New York, and Philadelphia draw their milk supply from well-defined territories which overlap on the edges but which are distinct geographical entities. Into the Boston milkshed, generally speaking, fall Maine, New Hampshire, Vermont, Massachusetts, and southern Quebec. The New York milkshed, beginning in the western part of Vermont, includes New York State entire, southern Quebec and Ontario, the northern counties of Pennsylvania, and the three northern counties of New Jersey. Philadelphia's milkshed begins immediately south of New York's, taking in Pennsylvania, Delaware, southern New Jersey, and part of Maryland. The boundaries of these areas are not precise. Some shipping stations on the borders serve both cities. Moreover, the smaller consuming centers in New England and the Middle Atlantic States have their own specific sheds carved out of the larger territories serving the three principal markets.

The Freight-Rate Structure. The milkshed of any city is very largely dependent upon the freight-rate structure and inspection standards. Milk freight rates are generally constructed on a mileage-zone basis. With such a rate structure, it is inevitable that the shortest distance to market will be a large factor in determining the direction of flow. In adopting the mileage basis for making milk rates to New York and

Philadelphia in 1917, the Interstate Commerce Commission recognized the claims of the near-by producers by lowering the rates from points less than 270 miles and raising those from points more than 270 miles. The language of the decision is significant:

We find that the present zone adjustment and charges maintained by the Pennsylvania Railroad on shipments of milk and cream to Philadelphia and other points are unreasonable and unduly prejudicial to producers and shippers from near-by points, and unduly prefer producers and shippers from distant points. (45 I. C. C. 386)

The Chicago Milkshed. An interesting example of a well-defined milkshed is that surrounding the Chicago market. The freight-rate structure, built upon a mileage scale of rates, acts as a protective tariff for the inner-district producers.¹ A large potential fluid milk shipping territory is located in Wisconsin in the zone lying immediately beyond the forty-cent rate. If the transportation charge should be reduced or prices increased, a much heavier supply of fluid milk would move into the Chicago market to the disadvantage of the inner-district producers. The recent entry into milk service of tank trucks and tank cars with their lower transportation charges is now breaking down the protective character of the rate structure. The milkshed has been materially enlarged, and new streams of

¹ Frank recognition of the "protective" character of a favorable freight-rate structure is found in a bulletin of the New Orleans Association of Commerce as reported in the *Times-Picayune*, December 31, 1927.

"Growers of farm products in the New Orleans trade area have a decided advantage over growers elsewhere — by the amount of the difference in transportation and handling expenses. Local growers have in reality a "protective tariff" in their favor if they would take advantage of it."

milk have been brought into the Chicago market. In 1923 Chicago milk dealers had 25 tank cars. By May, 1926, the number had increased to 140. Of the total

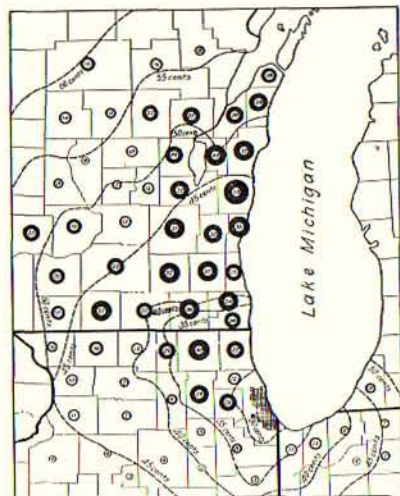


FIG. 6. — THE CHICAGO MILKSHED

Showing in thousands of gallons the milk produced per square mile within each freight-rate zone. Most of the fluid milk coming to the Chicago market originates within the forty-cent line, but in the next zone production almost doubles the inner district production. Courtesy of H. A. Ross.

transportation and continuous refrigeration have minimized distance. Freight rates are not always constructed on a mileage basis. Protective tariffs against importations take effect at widely separated frontiers. Hence, the

¹ Ross, H. A., *Marketing Milk in the Chicago Dairy District*, University of Illinois Agricultural Experiment Station Bulletin No. 269, June, 1925, pp. 471-473; and "Changing Methods of Milk Transportation," *Farm Economics* No. 39, November, 1926, pp. 549-561.

milk supply in May, 1926, 44 per cent arrived by tank car. The railroads haul milk 350 miles in tank cars at the same rate a hundred pounds as charged for a 130-mile haul of milk in ten-gallon cans.¹

Foodsheds Not Always Defined by Distance Zones. When we consider other commodities than milk, we find that the homogeneity of a producing territory feeding a given market often breaks down, for the twin engineering triumphs of rapid trans-

foodsheds surrounding our terminal markets are likely to be poorly defined from any geographical point of view.

Producers of perishables are not able to dominate near-by markets, by reason of lower transportation cost, to the same degree as producers of steel, gasoline, and bituminous coal. In the first place there is always a difference in the quality of the agricultural product. It is not turned out by automatic machinery or chemical formula. Quality is governed very largely by soil and weather. Potatoes raised in the heavy soil of upper New York State never sell for as high a price in the New York City market as those produced on Long Island or in Maine and do not compete on the same level. Secondly, agricultural production is seasonal, with peak shipments depending on climate in different sections of the country. Lettuce is first shipped northward from Florida and eastward from California; then from South Carolina and Arizona; then from North Carolina, Virginia, and Colorado; and finally from New Jersey and New York State. Shipping seasons of the southeastern states overlap to a greater or lesser extent, but there are weeks when one section dominates a whole group of markets. There is, however, for almost all commodities a simultaneous competition from at least two sections.

Potato shipments from the early states follow in rotation, with some overlapping periods, from Florida northward to Virginia; but when the late crop starts moving in October, there are heavy shipments simultaneously from Maine, Long Island, western New York, Michigan, Wisconsin, Minnesota, and Idaho.

Late Potato Crop Moves to Near-by Markets. Late crop potatoes, raised and shipped simultaneously from

Quality
Seasonal
Prod.

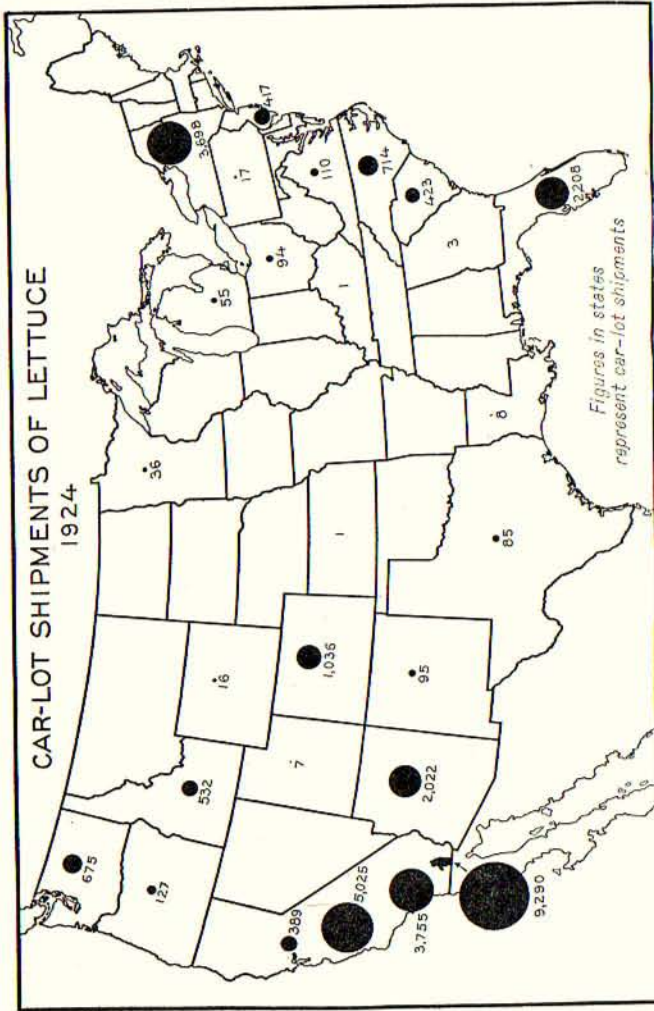


Fig. 7.

Important shipments of "Big Boston" lettuce are made from the Atlantic Coast States, Florida to New York, and of "Iceberg" lettuce from the Pacific and Mountain States to markets all over the country. U. S. Bureau of Agricultural Economics.

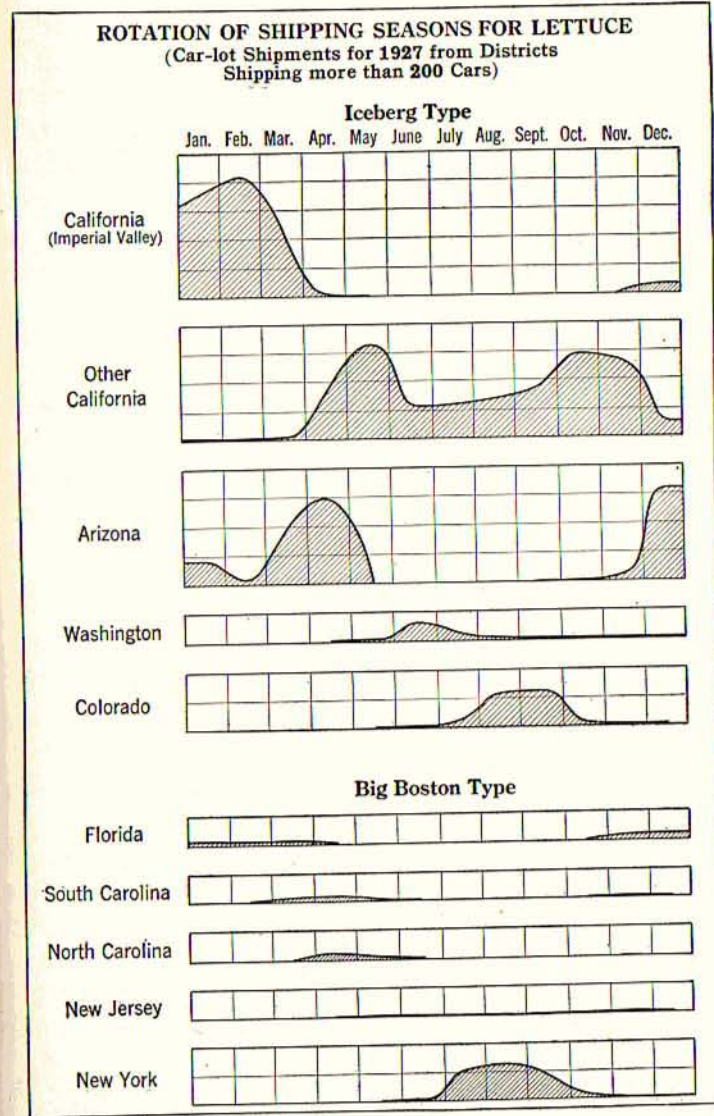


FIG. 8.

Shipments of each type of lettuce are moving from some producing area every month of the year.

six or eight important areas, find their course to market determined largely by freight-rate structure. Since distance is a primary factor in making short-haul rates and since there are many potato-shipping sections in northern states, making possible relatively short hauls to markets, the potato sheds are, perhaps, next in order to milksheds in geographical isolation. Ninety-eight per cent of the Boston supply of late potatoes comes from Maine.¹ The freight rate from important shipping points in Aroostook County, Maine, to Boston, is 39½ cents per 100 pounds, and no other freight rate from a principal potato-producing area to Boston is comparably low. New York City draws 96 per cent of its late-crop potatoes from three sections: Maine, western New York State, and Long Island. A representative freight rate from Maine to New York is 55½ cents per 100 pounds; from Long Island, 17 cents; and from western New York State, 28½ cents.

Moving west to Pittsburgh, we find Michigan furnishing most of the potatoes, with New York State second. These two together make up 63 per cent of the late potato-crop receipts in Pittsburgh. Michigan dominates the Cleveland market. In Chicago, Wisconsin is the largest single factor, furnishing 47 per cent of the supply. If one takes the northern potato-crop production, plotting the volumes shipped by each area to each market, and connects them with lines showing freight rates, it will be found that the freight rate is the dominant factor in determining the potato shed.

The value of potatoes in relation to their weight and

¹Strowbridge, J. W., *Origin and Distribution of the Commercial Potato Crop*. United States Department of Agriculture Technical Bulletin No. 7, 1927.

volume is low. The same holds for late cabbage and onions. Consequently, the freight-rate structure creates fairly well-defined basins from which these crops move to market. Where commodities have a high value in relation to weight or volume, freight rates are not so effective in delimiting areas. Moreover, in order to stimulate the production of fruits and vegetables in sections far distant from consuming centers, the railroads have frequently adjusted freight rates with relatively small regard to length of haul.

Distance a Small Factor in Distribution of High-Value Fruits and Vegetables. Lettuce and citrus fruits from California and Florida compete in practically every important market. California is three times as far from New York City as is Florida, but freight rates are not adjusted on a strict mileage basis. The rate on citrus fruit from California to New York City is \$1.55 per 100 pounds, while the rate from Florida for an equivalent unit ranges from \$1.12 to \$1.19. The distance from California is almost three times as great, but the freight rate is only 40 per cent more.¹

In the construction of transcontinental rates considerable allowance has been made for heavier traffic volume, heavier car loading, and the competitive necessity of crossing the sparsely settled intermountain territory in order to reach the populous eastern markets. The rates from California are blanketed; that is, made the same to all points east of the Missouri River. The carriers charge no more to transport fruit from Cali-

¹By order of the Interstate Commerce Commission (144 I. C. C. 603), effective October 10, 1928, the Florida citrus rates were reduced to all territories. Rates per 100 pounds to New York range \$.88 to \$.98, making transcontinental rates about 75 per cent higher.

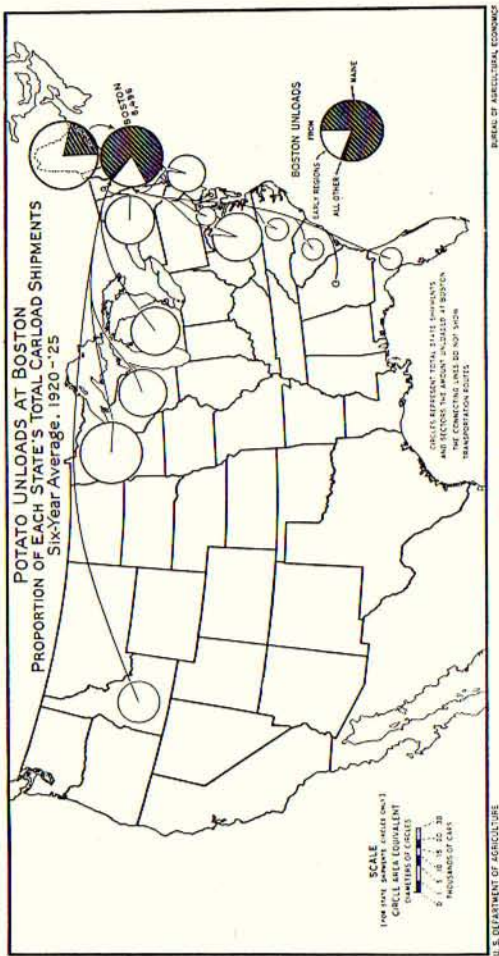


Fig. 9 a.

Practically all of the late potatoes received in the Boston market come 470 miles from Maine, the nearest producing area with the lowest freight rate. The value per hundredweight of potatoes is relatively low. U. S. Bureau of Agricultural Economics.

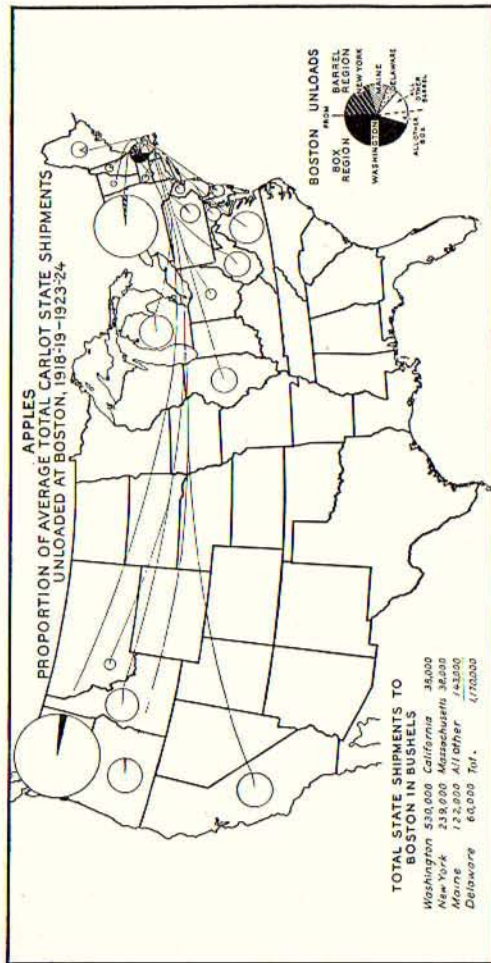


Fig. 9 b.

Most of the apples received in the Boston market come from the Pacific Coast, more than three thousand miles away. The value of apples is high compared to the freight rate. U. S. Bureau of Agricultural Economics.

ifornia to New York than to Chicago. A decision of the Interstate Commerce Commission in 1927 ordered the rate on deciduous fruit (grapes, pears, peaches, and plums) from California to New York cut from \$1.73 to \$1.60 per 100 pounds. It is now cheaper to ship peaches from California to New York than from the Ozarks section of Arkansas to New York. Under the new rates there is a charge of \$1.60 to haul grapes from California across the continent against a rate from western New York State points averaging 68½ cents per 100 pounds. The length of haul in the first instance is almost three thousand miles, and in the second about three hundred and fifty miles.¹

A strong tendency is noticeable in recent decisions of the Interstate Commerce Commission toward making rates more nearly proportioned to mileage. In fact, in the California deciduous-fruit decision referred to, Commissioner Eastman, who has been a strong advocate of the mileage theory, filed a dissenting opinion objecting to the continuance of the blanket adjustment in the territory from the Missouri River east to the Atlantic Seaboard. It is possible that, in the future, distance will play a more important part in establishing rates from competitive producing areas to the principal markets, reënforcing to some extent the geographical limitations on foodsheds.

The Tariff as an Economic Dike. The protective tariff is a frankly economic dike which has been raised to maintain certain foodsheds. The tariff is, of course,

¹ Upon completion of hearings in the complaint of New York State grape shippers, Docket 20,141, Examiner Fuller of the I. C. C. recommended, in April, 1928, a mileage scale establishing a rate for hauls of 300 miles of 49 cents per 100, and for 400 miles of 57 cents per 100, a reduction of more than 20 per cent.

a barrier against foreign competition only. Until recent years the principal foreign competition in perishable foodstuffs on American markets came from European sources. Denmark shipped quantities of butter to the United States. Italy and Switzerland sent cheese. The importations of citrus fruits from Italy and onions and grapes from Spain have for many years been a factor in domestic markets.

The height of the barrier raised against these streams of foodstuffs has varied considerably from time to time, depending upon the political faith of the administration and Congress. The rates on perishable food importations have generally followed the ups and downs of the level of the tariff schedule as a whole, increased in 1890, decreased in 1894, increased in 1897, decreased in 1913, and increased under the emergency tariff of 1921, followed by the same or still higher rates in the Fordney-McCumber tariff of 1922.

The Lemon Tariff. The importation of Italian lemons is a trade of long standing. From 1897 to 1913 the tariff stood at 1½ cents per pound (about \$1.11 per box) under the Payne-Aldrich Act. This rate averaged about 30 per cent of the New York wholesale price of domestic lemons. In 1909, for example, the price per box for California lemons in New York during May, a month of heavy importations, was \$3.62. In the year ending October 31, 1909, 2,000,000 boxes or about 5000 car-load equivalents of Italian lemons were imported. Total United States consumption was equally divided between California and Italian lemons. In October, 1913, the Underwood Tariff reduced the rate to 35 cents per box, a figure less than 10 per cent of the then current New York wholesale price on domestic

lemons. The percentage of imported lemons in the total United States consumption rose from 50 to over 70. By 1915 the effect of the war had begun to neutralize the low tariff, so that Italian imports fell off steadily until 1919, amounting in that year to only 2500



FIG. 10. — LEMON IMPORTS ARE AFFECTED BY TARIFF BARRIERS
U. S. Bureau of Agricultural Economics.

car-load equivalents or 20 per cent of the United States consumption.

A recovery began in 1920 but was checked by the emergency tariff, enacted May, 1921, which raised the rate on lemons to 2 cents per pound (about \$1.48 per box). The new tariff schedule, which was reënacted in the Fordney-McCumber Act of 1922, has been sufficiently high to make the lemon duty range from 30 to 40 per cent of the May average of New York auction prices on the domestic product. When the percentage

which the duty bears to New York lemon prices is compared with the proportion of the total United States consumption made up of Italian lemons, year by year since 1921, there appears a close inverse relation between the two series.

Since 1921, Italian imports have risen above 3000 car loads, or 20 to 25 per cent of total consumption,

RELATION OF IMPORT DUTY TO ITALIAN LEMON TRADE

YEAR	TOTAL U. S. CON- SUMPTION	IMPORTS (Cars)	PER- CENTAGE	MAY PRICE N. Y. AUCTIONS	DUTY (per Box)	PER- CENTAGE
1921	13,821	2017	15	\$3.82	\$1.48	39
1922	13,132	3484	26	4.95	1.48	30
1923	13,197	4725	36	6.12	1.48	24
1924	14,526	1609	11	3.18	1.48	46
1925	15,240	3943	26	5.71	1.48	26
1926	15,829	2809	18	4.79	1.48	31
1927	14,677	1780	12	3.92	1.48	38

only when the New York price on domestic fruit during May has climbed to the neighborhood of five dollars per box, so that the ratio of duty to price falls below 30 per cent.

In the last two decades the trend of Italian imports has been strongly downward, even when the war period is discounted. The steady increase in California production and improvement in marketing organization have operated to push out the Italian product, irrespective of the tariff, but the tariff has been a real factor. Today, a 30-per-cent tariff permits an import amounting to only 20 per cent of the total consumption, whereas a 30-per-cent tariff in 1909 divided the market equally between the domestic and imported product.

Year-by-year fluctuations in prices govern the rate of importation. High prices, resulting from low domestic production, as in 1923, enable 2,000,000 boxes to leap the tariff barrier, while low prices, as in 1924, cut imports to 640,000 boxes. The juggling of tariff schedules raises or lowers the height of the barrier which New York prices must top to induce importations. As domestic production increases, New York prices sag nearer to the barrier, and imports dwindle.

Tariff Protection against Our North American Neighbors. While pre-war competition in perishable foodstuffs was primarily from Europe, and therefore the tariff duty was simply another tier of cost laid on a three-thousand-mile ocean haul, new springs of foreign production have begun in recent years to flow from the continent of North America. Potato production in eastern Canada is growing in importance. Cream and milk shipments from Canadian dairies to Boston and New York attained a real importance in 1926.¹

Southward there appears a rapid extension of truck gardening in Mexico, in many cases under American management and financed by American capital. In 1922 less than two million pounds of tomatoes were imported from Mexico into the United States, whereas in 1924 there were forty-four million pounds, in 1925 sixty-one million pounds, and in 1926 sixty-seven million pounds. These Mexican tomatoes compete with the

¹Total imports from Canada to the United States in 1926 were 7,386,203 gallons of fluid milk and 5,374,131 gallons of cream. Schoenfeld, "Some Economic Aspects of Milk and Cream in New England," U. S. D. A. Cir. No. 16, October, 1927, p. 9: "In spite of an import duty of 20 cents per gallon on cream that contains more than 45 per cent butterfat, Canadian shipments have steadily increased. In 1926 Canada supplied 14 per cent of the total receipts of cream in metropolitan Boston."

Florida, Louisiana, and Texas production despite a tariff wall equal to about 16 per cent of the import value. The domestic tomato growers are agitating for a higher tariff.

Sanitary Standards and Plant Embargoes. The enforcement of sanitary standards and embargoes on account of injurious pests and plant diseases are important barriers in specific instances to the inflow of perishable foodstuffs. The New York City Department of Health insists that milk shipped to New York come from dairies and milk-shipping stations which have been approved as to sanitation by its own inspectors. To that end it is necessary to maintain an extensive corps of inspectors to make periodic rounds of the milkshed. Strict maintenance of the standards laid down by the Department of Health means that a barrier of a sort has to be placed about the New York City milk supply. In so far as the administrative policy leans toward confining approval to a definite zone, capable of being covered by New York field inspectors, this barrier assumes a geographic significance.¹

The Lenroot-Taber Bill. In 1927 Congress erected a federal barrier against Canadian milk and cream by enacting the Lenroot-Taber bill, "to regulate the im-

¹ *Department of Health Annual Report*, p. 113. City of New York, 1926. "The 'western sources,' which received official sanction to ship in 1924 and 1925, were never properly inspected and did not at any time fully comply with the milk regulations and standards of the department. The absurdly small force of inspectors assigned to milk inspection prevented proper inspection of 'western sources,' even if we had felt it desirable to expand our milkshed from one with a maximum radius of five hundred miles to that with a maximum western radius of possibly thirteen hundred or fourteen hundred miles. On January 16, 1926, an order rescinding the approval of eleven sources of cream supply, located in Wisconsin and Minnesota, was enforced."

portation of milk and cream into the United States for the purpose of promoting the dairy industry of the United States and protecting the public health." Milk or cream may not be imported except by permit from the Secretary of Agriculture. Either is declared unfit: (1) when cows are not healthy or have not been examined within the previous year; (2) when cows have not passed the tuberculin test; (3) sanitary conditions of the dairy does not score at least fifty out of one hundred points according to score of United States Bureau of Dairy Industry; (4) when the raw milk bacteria count exceeds 300,000 per c.c. and pasteurized milk exceeds 100,000 per c.c.; raw cream bacteria count exceeds 750,000 per c.c. and pasteurized cream exceeds 500,000 per c.c.; (5) when the temperature of milk or cream exceeds 50° Fahrenheit at time of importation.

In administering this act, the Secretary of Agriculture is permitted to accept state, municipal, or Canadian official certification as to the first three conditions and to waive the fourth and fifth requirement on milk imported from near-by Canadian dairies for pasteurizing or condensing in United States border plants.¹

The Horticultural Board Quarantines. The Horticultural Board of the United States Department of Agriculture has from time to time exercised its author-

¹The National Dairy Council of Canada estimated that the cancellation of temporary permits to Canadian milk exporters on May 31, 1928, which brought into full force the regulatory act of Congress, would result in cutting down the total 1928 exports of milk from Canada to the United States to only 25 per cent of the 1927 total. However, this prediction was not entirely realized. The cream imports into the United States for the ten months from June, 1928, to March, 1929, dropped to 60 per cent of those from June, 1927, to March, 1928, but the milk imports gained 2 per cent during the same period.

ity to regulate or to prohibit the importation of fruits and vegetables from sources known to be infested with fruit and melon flies, weevils, canker, or other injurious pests and diseases. Since 1912 the board has placed twenty embargoes against foreign plants and plant products. The quarantine orders and regulations applied to fruits and vegetables prior to 1923 may be summarized briefly as follows:

DATE	VARIETY	ORDER	CAUSE
September 20, 1912	Irish potatoes — Europe, United Kingdom, Newfoundland	Prohibited	Potato wart
January 15, 1913	Fruits — Mexico	Prohibited	Fruit fly
December 22, 1913	Irish potatoes — all other countries	Under regulation	Potato wart
February 27, 1914	Alligator pear — Mexico and Central America	Prohibited	Weevils
January 1, 1918	Sweet potatoes — all foreign countries	Prohibited	Weevils
August 1, 1918	Citrus fruits — eastern and southeastern Asia	Prohibited	Citrus canker

On November 1, 1922, a sweeping embargo was placed on all fruits from countries other than Canada except bananas, pineapples, lemons, limes, and grapes of the *Vinifera* type, on account of the fruit fly. The chief fruit barred is the Almeria grape from Spain, which has been imported in quantities as great as one million barrels a year. The exclusion of these grapes created some friction with the Spanish government and delayed consummation of a commercial treaty between Spain and the United States. The agents of the United States Department of Agriculture have from time to time resurveyed the Spanish fruit-fly situation; but in December, 1927, the Federal Horticultural Board announced the continuance of the embargo.

Trends in Delimitation of Foodsheds. A market such as New York, situated on the seaboard and readily accessible to overseas transportation as well as to domestic rail transportation from all quarters of the continent, finds its foodshed affected by the protective tariff, sanitary and quarantine standards, and freight rates. The flow of produce in the future will depend not only upon the development of new kinds of transportation but upon the governmental policy in determining rates, schedules, and regulations. A survey of the recent trends in protective measures both sanitary and economic indicates that we may depend less and less upon overseas importations in the future and more and more upon domestic production. In so far as mileage theories of rate making prevail, particularly for the heavier and bulkier foodstuffs, definitely circumscribed foodsheds may result, as in the case of milk and main-crop potatoes. Where mileage is disregarded or specific values are high enough to make transportation charges a small percentage of the total cost, the foodshed is without geographical limitation, other than that set by considerations of production.

CHAPTER III

THE REVOLUTIONARY ACTIVITIES OF THE REFRIGERATOR CAR

Growing Importance of the "Icebox on Wheels."
No single event in the last century had more significance to the perishable food industry than the successful shipment under ice of a car load of strawberries from Anna, Illinois, to Chicago in 1872.¹ This achievement was the culmination of more than a decade of patient experiment by Parker Earle and other pioneers in the field of mobile refrigeration. As early as 1857 optimistic shippers were experimenting with the "icebox on wheels." A patent was granted to Sutherland of Detroit on a refrigerator car in 1867, and in the following year to Davis of the same city for an "improved" car.

The meat-packing industry was the first to make use of the new invention. In 1869 a successful shipment of dressed beef from Chicago to Boston is recorded. It is an interesting commentary on the novelty of the movement to note that the beef refrigerator cars were so wide at the eaves that it was impossible to pull them through the Hoosac Tunnel at North Adams, Massachusetts. It was necessary to back out the train and

¹ In the author's opinion the successful combination of rapid transportation and continuous refrigeration in the refrigerator car outranks in importance even such momentous discoveries as milk pasteurizing, the canning process, and large-scale cold-storage warehousing.