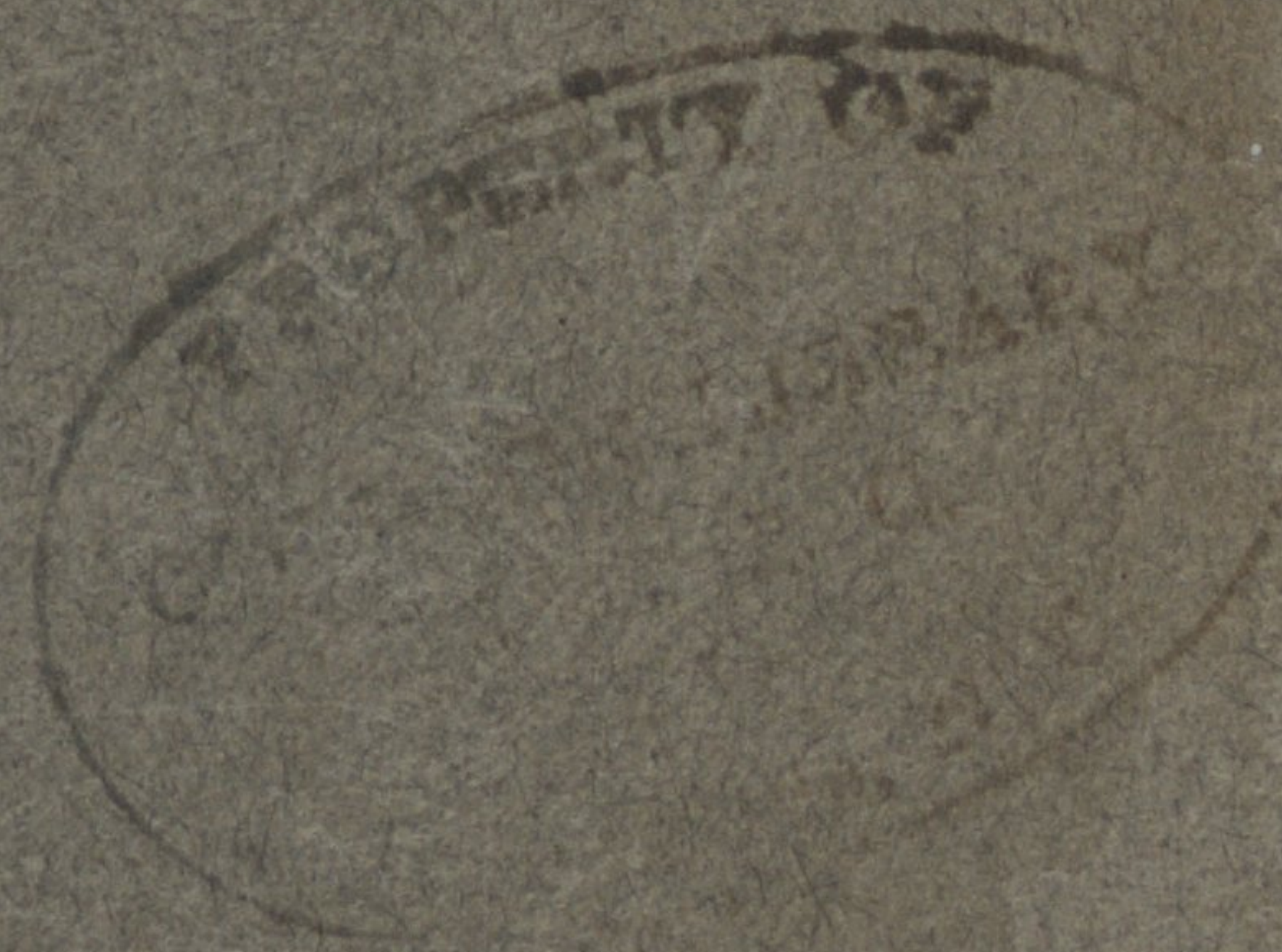
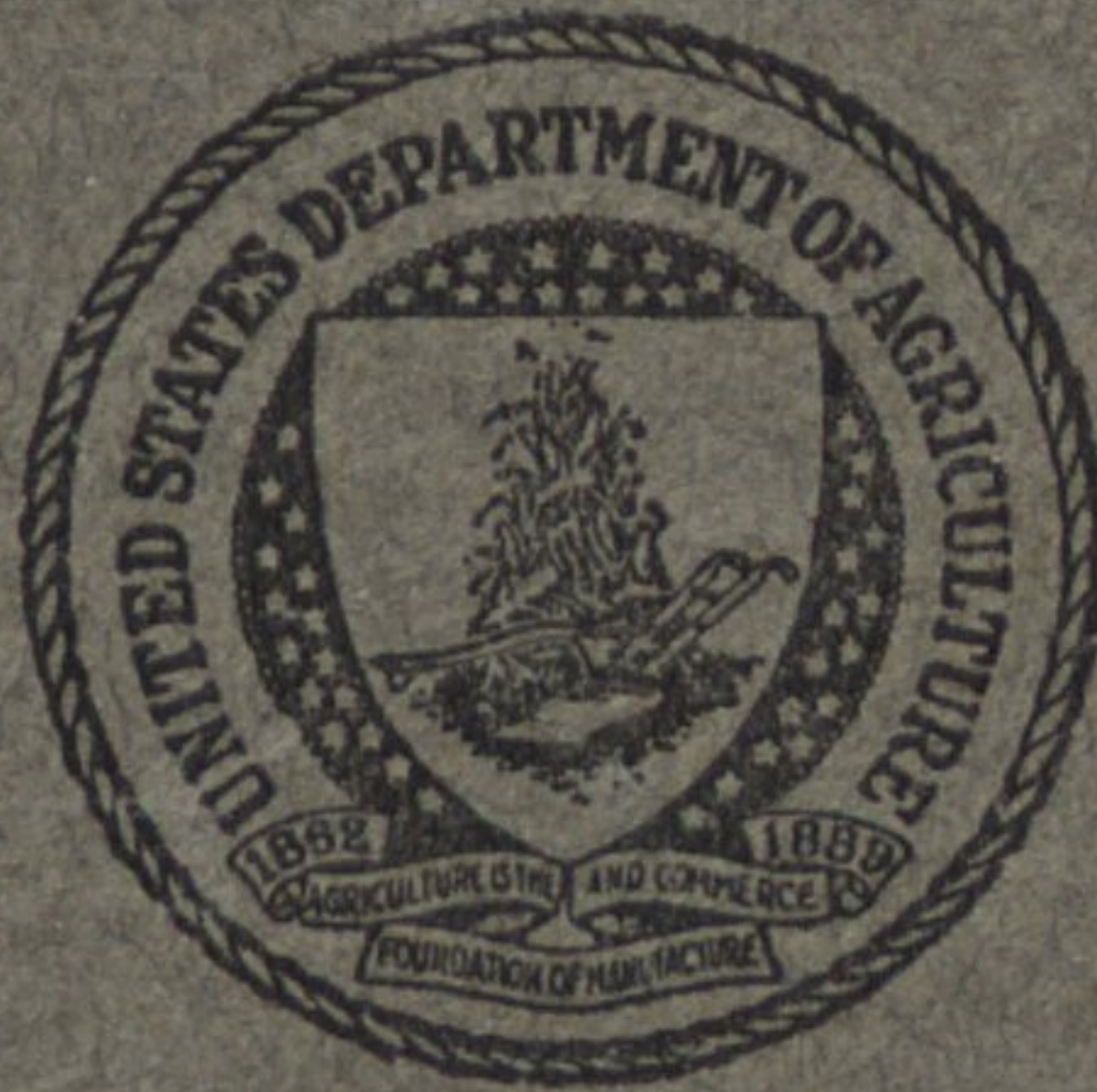


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**Municipal Milk Distribution**  
**in**  
**Tarboro, North Carolina**

Issued December 1938



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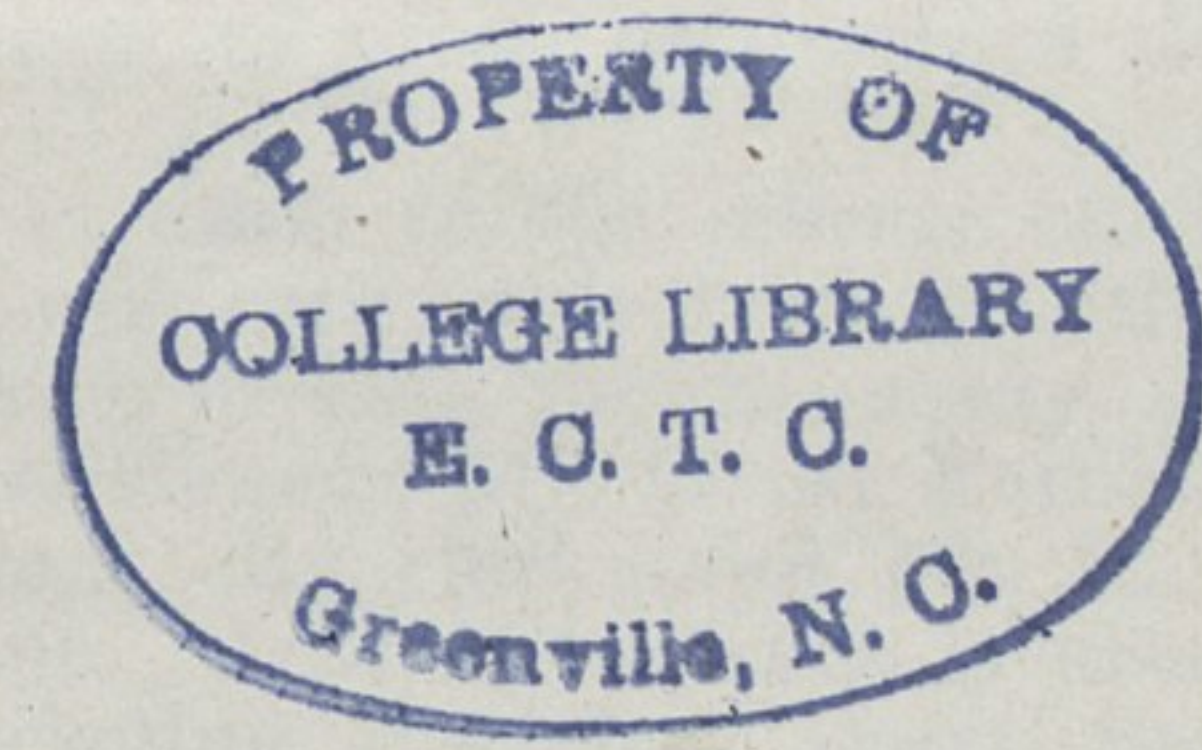


# Municipal Milk Distribution in Tarboro, North Carolina

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## MUNICIPAL MILK DISTRIBUTION IN TARBORO, N. C.

### INTRODUCTION

A growing recognition of the dietetic value of milk has resulted in a great deal of public interest in the milk trade. Early manifestations of this interest centered largely in requirements for sanitation in the milk supply. More recently, however, the price of milk both to producers and consumers has attracted an increasing amount of public attention.

Consideration of the cost of milk usually involves some study of the costs of distributing milk, and in recent years this particular element of cost has been the subject of much discussion and numerous investigations. Consequently, proposals have been advanced for increasing the efficiency of milk distribution and lowering the cost of the distributive service. Frequent among these proposals are those requiring that distributors' margins be closely regulated, that firms be given a franchise for the distribution of milk, that such firms be regulated strictly, and that milk distribution be carried on by the municipality.

The purpose of this report is to make available further data on municipal milk distribution. The report consists of a description and evaluation of the operation of a unified milk plant and distribution system, municipally owned and operated, in Tarboro, N. C. The data used are those compiled mainly from records of that city. The study develops (1) the historical basis of the Tarboro milk enterprise, (2) data and information on receipts and sales in that market, and (3) an analysis of the operations of the municipal system. While the unusual features of the Tarboro market preclude direct comparisons with other markets, and the lack of established standards for evaluating a municipal milk plant prohibits any final conclusions, the experiences of this city seem to offer valuable insight on unified milk handling under public ownership and control. The study does not attempt to prove or disprove the benefits of community enterprise.

Acknowledgment is made to the several officials of the city of Tarboro and others who generously furnished their time and assistance in the compilation of data for this study, including Mr. A. D. Mathews, milk commissioner; Mr. G. N. Earnhart, city clerk; Mr. C. P. Cullen, assistant city clerk; and Mr. L. J. Wall, manager, municipal milk plant. Acknowledgment is also due to Mr. J. J. Murray, senior marketing specialist, Dairy Section, Agricultural Adjustment Administration, for his assistance in the collection of the data used.

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### CONTENTS

	Page
Introduction.....	1
Summary.....	2
Origin and development of the unified plant.....	3
General characteristics of the market.....	5
Supply conditions.....	5
Health supervision.....	6
Volume and value of dairy products consumed.....	6
Per capita consumption of milk.....	6
Value and consumption of sales.....	7
Seasonal variation in sales.....	8
Price aspects of the market.....	10
Price plans used.....	10
Prices to producers.....	11
Prices to consumers.....	12
Price spread.....	13
Plant operations.....	14
Facilities and products handled.....	14
Investment in plant.....	16
Method of financing.....	17
Results of operation.....	18
Unit handling costs.....	21
Comparison with other markets.....	25
Outstanding features of the Tarboro enterprise.....	27
Administrative organization.....	27
Fiscal procedure.....	27
Bad debt losses.....	28
Bottle losses.....	28
Special service.....	29
Legal aspects.....	29
Local reaction to the milk plant.....	29

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## SUMMARY

The findings of this survey may be summarized as follows:

1. As far as is known, the city of Tarboro, N. C., is the only municipality in the United States in which the milk processing and distributing business is operated as a public enterprise. The inception of municipal distribution, which occurred in 1918, resulted largely from the urgent need for a sanitary milk supply. The producer-distributors who furnished Tarboro with its milk supply at that time were not willing to undertake pasteurization, and in order to secure a sanitary milk supply the city found it necessary to start its own milk processing and distributing enterprise. The city plant encounters no competition from private operators in pasteurized products, and no evidence was found that bootlegging of raw milk is attempted in any appreciable volume, if at all.

2. The supply conditions in Tarboro are very simple, the milk and cream requirements of this city of 6,400 people being supplied mostly by three or four specialized and large-scale producers. In 1935 and in the first half of 1936, the prices paid to producers for milk used in bottled form amounted to 7.5 cents per quart, and for milk used for all other purposes, such as cream, chocolate milk, and the like, about 3.8 cents per quart. The average price for all milk during the last half of 1936 was 6.25 cents per quart. These prices were intended to be at competitive levels after due allowance for quality.

3. The price charged consumers for milk, 12 cents per quart, was found to be lower than that charged in a number of other cities of North Carolina at the time of the survey. Prices of cream and other products likewise were priced low in this market. This is significant in view of the high quality of dairy products sold by the municipal system, which was reported to compare favorably with that of dairy products distributed in other markets of the State.

4. The investment in plant and delivery facilities recorded for the milk enterprise on the city records amounted to \$16,600 during the midyear of 1936. This value, which represented the cost of the milk plant adjusted for discarded and new equipment, was equivalent to about 4.25 cents per quart of milk handled during the year ended June 1936, and was probably somewhat less per unit of output than that found in typical competitive plants in the same section of the country. Inclusion of the value of properties not recorded as a part of the milk enterprise but nevertheless used exclusively in that function would increase the above-named figure by several percent. Financing of plant and equipment has been from general tax funds, but local policy intends that working capital be derived exclusively from operations.

5. Since this milk enterprise is one of service and not of profit, yet is intended to be on a self-sufficing basis, net revenues would be expected to be only sufficiently large to insure maintenance of the properties and to provide adequate working capital. This was not found to be exactly the case during that period for which figures were available. Net revenues for the 8-year period ended June 1936 exceeded expenditures (which, however, do not include any allowance for interest on capital donated to the milk enterprise, taxes—the plant pays none—and accrued depreciation), by approximately \$5,900.

6. The money cost of processing and delivering milk and other dairy products in the Tarboro municipal plant averaged 3.27 cents per quart of milk handled during the year 1935-36, of which volume about 58 percent was sold in bottled form. This cost is exclusive of charges for the equivalent of depreciation, interest, and taxes. As closely as could be computed, these costs (depreciation at rates typical for this type of enterprise, interest at 5 percent, and taxes at then prevailing rates) probably would add not over 10 percent to the total unit cost as given above. While delivery costs in conventional accounting are prorated over the volume of products or points actually dispensed on the delivery routes, rather than over the total volume handled in the plant as in this case, rough comparison with operating costs in other markets is permissible if the same bases are used throughout. On this basis, the estimated cost in this market was found to be about the same as for an average of privately operated but much larger plants in Milwaukee, Wis., during the first 4 months of 1934, and from 0.5 to 0.75 cent per quart (similarly for all fluid products expressed in milk equivalent) less than that for 22 various-sized plants in West Virginia during 1933.

7. All things considered, it appears that the citizens of Tarboro believe their milk plant to be a good investment and that under no circumstances should it pass into private hands. This position seems to be justified on the basis of survey data: Products of high quality are obtainable at reasonable cost, the service appears to be excellent, and no evidence was found indicating any of the oft-alleged wastes of public enterprise.

Whether a unified system of milk handling could be operated successfully in another community would depend to a considerable extent upon the characteristics of the market, the policies followed in operation, the efficiency of management, and upon other factors. Moreover, the simplicity of supply conditions in Tarboro, the absence of competition in the handling of milk, and the introduction of the municipal enterprise without requiring elimination of private operators must not be overlooked in any considerations pointing to unification of milk-handling activities in other markets on the basis of successful experience in Tarboro.

## ORIGIN AND DEVELOPMENT OF THE UNIFIED PLANT

The city of Tarboro, N. C., is the first if not the only city in this country to have established a municipal milk enterprise, the processing and distribution of milk and related products having been undertaken as a public enterprise in that city in October 1918. Reports are to the effect that a public milk plant was to have been established at Lyons, Toombs County, Ga., in 1936, while one for Monroe, Ga., was rejected in that year in favor of private distribution. Similar proposals have been advanced in recent years in several other and larger cities, including Milwaukee, Wis.<sup>1</sup>

The Tarboro market is small, having a population of only 6,387 according to the 1930 census; hence, it is in marked contrast to such

<sup>1</sup> For a detailed treatment of a proposed unified system of milk processing and distribution for Milwaukee, Wis., see *A Survey of Milk Marketing in Milwaukee*, United States Department of Agriculture, Agricultural Adjustment Administration, Division of Marketing and Marketing Agreements, May 1937.

important foreign markets as Wellington, New Zealand,<sup>2</sup> and Rome, Italy,<sup>3</sup> which also have municipal milk systems. The Wellington enterprise originated about the same time as the one in Tarboro, while that for Rome was started in the last decade.

The municipal milk enterprise at Tarboro grew out of a health and sanitation problem. Prevalent dysentery disorders and outbreaks of typhoid fever had been traced to the milk supply, but efforts aimed at improving production conditions on the farms met with more or less indifference from the dozen or so producers serving the market. An ordinance establishing standards for pasteurization and prohibiting distribution of milk within the city unless so pasteurized was enacted, therefore, as the most practical solution to the problem. To this action the producer-distributors took the position that since the city required pasteurization, it should likewise provide the facilities. Moreover, while in time private capital probably would have established a pasteurization plant (the market probably was too small for competing producer-owned plants), none was forthcoming for this purpose at the time when action was imperative. Under these circumstances, an ordinance was enacted authorizing public operation of a milk plant, and the establishment of the municipal plant followed.<sup>4</sup>

The motivating force leading to municipalization thus was one of obtaining a sanitary and healthful supply of milk; economic considerations were of secondary importance.

The modest beginning of the public milk plant, with the necessary pasteurizing and other equipment housed in the municipal water plant, apparently left much to be desired. Nevertheless, pasteurization became an actuality and with pasteurization came the possibility of a more sanitary supply of milk than that available previously. (Dissatisfaction with pasteurization in bottles soon gave way to vat pasteurization.) Moreover, the experience under this arrangement pointed the way to an expansion program: in 1921 new milk processing equipment was purchased and housed in the steel building used mainly as an electrical supply depot; in 1930 a new and separate plant completely furnished with up-to-date equipment was constructed to meet the increasing demand for milk products. Some time later an experienced and well-trained plant manager was placed in charge, under whose directions efforts have been made to expand whole milk consumption mainly by educational methods and by supplying dairy products of high quality at lowest possible prices.

<sup>2</sup> According to a brochure, *The Realization of an Ideal*, issued by the City Council of Wellington, New Zealand, September 1931, the reasons for municipalization were mainly three: Producers did not receive a reasonable proportion of the consumers' dollar, shortages of milk were common during autumn and winter months, and the milk vendors failed to provide adequate facilities for handling milk and insuring its purity. Legislative authority for the municipal enterprise was obtained in 1910.

<sup>3</sup> Municipal operation of the milk business in Rome, Italy, was preceded by private operation of the publicly owned unified system. For a brief discussion see Bacon, Lois B., and Cassels, John M., *The Milk Supply of Paris, Rome, and Berlin*, *The Quarterly Journal of Economics*, Vol. LI, August 1937.

<sup>4</sup> The municipal milk project was sponsored mainly by the then health supervisor of Edgecombe County, a surgeon from the United States Public Health Service, assigned at the request of the North Carolina State Department of Health to inaugurate a practical study of rural health administration in that county. See *Public Health Reports* (U. S.) 40 (45): 2461-2471, 1925.

## GENERAL CHARACTERISTICS OF THE MARKET

### SUPPLY CONDITIONS

Tarboro is situated in Edgecombe County in the northeastern part of North Carolina, a region in which a cash-crop system of farming predominates. The area is part of the sandy soil coastal region where the rainfall is very heavy, averaging about 56 inches a year. The principal cash crops produced are cotton, tobacco, corn, and potatoes.

Dairying is not an important enterprise in this area. Of the 4,000 farms in the county, only 10 were classified as dairy farms (those receiving 40 percent or more of farm income from the dairy enterprise) in the Census of Agriculture for 1930. The volume of milk produced is small and sufficient only for local purposes, being equivalent in 1929 to approximately 10 pounds per capita of the population. This is in sharp contrast with the production in heavy producing areas, as, for instance, the 798 pounds per capita of the population in Monroe County, Wis. The trend in production in Edgecombe County apparently is upward, however, as indicated by the fact that the 1934 volume was about one-third above the 1929 level.

At the time of the survey, the milk supply for Tarboro was obtained principally from three specialized producers. The most distant one was located 6 miles from the city, while the other two were 2 miles distant. The three farmers were large-scale operators, each having a herd of 75 or more heavy-producing cows, and produced corn, cotton, peanuts, tobacco, hay, and some wheat and oats in addition to milk. Eligible supplies were available also in more limited quantities from three other farmers. As a result, the supply under normal production conditions from the three specialized producers, and more irregularly from the three others, was usually sufficient for local requirements. With the seasonality in milk production fairly high, however, the volume delivered to the market during winter months often was very low. On such occasions emergency supplies of milk and cream were obtained from plants in neighboring cities after approval had been obtained from the Tarboro Health Department.

As an accommodation to some two dozen farmers who did not wish to undergo the expense and trouble of producing grade A milk (that quality of product eligible for fluid usage according to specifications of the local health ordinance), sour cream was also purchased for manufacture into butter.<sup>5</sup>

The simplicity of the supply in this market probably made it possible to establish municipal milk handling much more easily than in a larger, more complex market. Certainly the supply factors have been of considerable importance in the success of the enterprise. There is little, if any, competition from producer-distributors in raw milk, such as is frequently encountered by distributing firms in many markets (bootlegging of milk was reported to be negligible, if present at all), and very little possibility of competition in pasteurized products either from producer-distributors or from private distributing firms. Producer-dealer relationships probably are sim-

<sup>5</sup> Presumably there were no cream stations within at least a 30-40 mile radius of the city.

plified in that negotiations between buyer and seller are on a personal basis. In addition, the numerous problems encountered in country-plant organization and operation through the supply areas of some large markets were not found in Tarboro; nor were institutional factors of as great importance. All of these factors are essential to any consideration of milk handling by community enterprise in this market.

#### HEALTH SUPERVISION

Much emphasis should be placed upon the relationship between control of milk sanitation and the development of the municipal milk enterprise. The milk ordinance, established in 1918, not only serves as the foundation upon which the municipal milk enterprise was built, but also tends to restrict to some extent both the number of producers and the output of milk eligible for bottling, since compliance with the sanitation regulations is both costly and difficult. The ordinance, amended in 1925 to conform to the United States Public Health Ordinance, provides for rigid inspection of the milk supply of the regular producers and of the town people keeping cows. (The raw or unpasteurized milk is not sold commercially.) Production conditions are inspected monthly, and frequently weekly.<sup>6</sup> The herds are also inspected annually for bovine tuberculosis, and the percentage of infection is low (approximately 0.1 percent for the past few years, which is about the average for the State). Samples of milk from each herd are tested daily at the plant laboratory for fat, solids-not-fat, bacteria count by reductase methods, sediment and adulteration, and periodically at the health department for bacteria by plate count and for other impurities.

The health regulations have thus changed the milk situation from an extremely bad condition to one of marked sanitary improvement. Purity is further assured by the delivery of the milk to the city plant shortly after each morning and evening milking. For this reason, cooling and refrigeration are not deemed necessary at either of the two farms located close to the city, although the third regular producer aerates and cools his supply to 60 degrees before delivery.<sup>7</sup>

#### VOLUME AND VALUE OF DAIRY PRODUCTS CONSUMED

**Per capita consumption of milk.**—The annual per capita consumption of dairy products was very low in the Tarboro market, even though supplies of high quality milk, cream, and related products were available regularly at reasonable prices. A considerable proportion of the families, particularly those living in what was described as the mill section of the city, apparently purchased no fresh

<sup>6</sup> The rigid rules pertaining to farm production conditions specify sanitary barns of wooden construction, periodically whitewashed, concrete floors, feed mangers, drain troughs, metal roofs, ample ventilation, steel stanchions, and no lofts above the milk barn. Detached milk houses are required with separate boiler and steam sterilizing rooms.

<sup>7</sup> The average bacteria count of the milk delivered by the three producers varied before pasteurization at the city plant from 3,800 to 19,000 on October 1, 1936; comparable figures on December 1 were 600 and 1,200. This is in marked contrast with the situation found in four cities in Virginia in 1930, where the average number of bacteria per cubic centimeter in the milk supply during the summer months varied from 60,000 to 257,000 and during the winter months from 33,000 to 38,000. For details see: Maxton, J. L. and Taylor, C. C., *Marketing Fluid Milk in Four Virginia Cities*, Va. Agr. Expt. Station Bulletin 275, page 14, December 1930.

milk products. The amount of fresh milk consumed per capita in Tarboro in 1936 is estimated to have been approximately 30 to 40 quarts, compared with 110 to 120 quarts per person per year in the Boston market,<sup>8</sup> which is an area of heavy milk consumption. Differences in dietary habits and in the size of average family income perhaps account for the wide variation in the rates between these two markets. Moreover, the influence of the heavy negro population (the census for 1930 reveals that almost 47 percent of the population of Tarboro Township was colored) may be of significance in this respect.<sup>9</sup>

**Value and composition of sales.**—Records furnished by the city show that the value of sales of dairy products varied markedly between 1929 and 1936. From 1929 to 1932 there was a decline of 33.2 percent in values of the product sold, but probably a much smaller decline in volumes. In fact, the decrease, if any, in volumes must have been slight, since resale prices of milk during this period were decreased one-third, and those on the other products proportionally. In contrast, the increase in sales from \$20,847 for the year ended June 30, 1933, to \$44,307 in the comparable period 3 years later was attributable largely to an increased volume accompanying improvement in consumer purchasing power, since there was no change in resale prices during these years (except for butter).<sup>10</sup> (See table 1.)

TABLE 1.—Value of dairy products sold from the municipal plant, years ended June 30, 1929–36

Year ended June 30	Value	Change from preceding year		Year ended June 30	Value	Change from preceding year	
		Increase	Decrease			Increase	Decrease
	Dollars	Percent	Percent		Dollars	Percent	Percent
1929 <sup>1</sup> .....	31,219			1933.....	20,847		17.3
1930 <sup>1</sup> .....	32,621	4.5		1934.....	27,691	32.8	
1931.....	32,897	.9		1935.....	43,844	58.3	
1932.....	25,231		23.3	1936.....	44,307	1.1	

<sup>1</sup> Year ended May 31.

Based upon audit reports of certified public accountants.

In terms of dollars, the composition of products sold from the municipal plant during the year ended June 30, 1936, was as follows: Fluid milk, 55.6 percent; cream, 12.1 percent; whole buttermilk (that made from whole milk), 6.9 percent; plain buttermilk (that made from skim milk), 3.1 percent; chocolate milk, 5.6 percent; butter, 7.3 percent; bulk milk (i. e. sales to a local ice cream manufacturer and to distributors in nearby towns), 8.5 percent; and miscellaneous, 0.9 percent. Sales of the several products during the preceding year

<sup>8</sup> Report of the Federal Trade Commission on the *Distribution and Sale of Milk and Milk Products*, Boston, Baltimore, Cincinnati, St. Louis, 74th Congress, 2d Session, House Document No. 501, p. 15, 1936.

<sup>9</sup> See *A Survey of Milk Marketing in Milwaukee*, p. 25, for comparison of per capita rates of consumption of dairy products by negroes and other racial groups in Milwaukee, Wis.

<sup>10</sup> These data should not be used for the purpose of developing figures on milk consumption in Tarboro, since the data at hand were not in sufficient detail to permit determination of the portion of the increase in sales, if any, that was due to increases in the volume sold in bulk to distributors in other towns, to sales to local ice cream manufacturers, etc.

were in about the same proportion, except that cream sales were relatively low and bulk milk sales were relatively high.

The figures above cannot be interpreted as sales in the usual accounting sense in that, under the method of bookkeeping employed, they reflect collections from customers rather than values of goods disposed of during the periods involved. A more exact determination would involve adjustment upward for bad debt losses and, perhaps of more importance, for charity milk. The latter, donated by the city to needy families during the 1936 period, amounted to about 4,400 quarts, having a sales value of approximately \$527. The whole milk equivalent of sales (assuming milk of 4 percent butterfat content) from the municipal plant during the year ended June 1936 amounted to 582,257 quarts, or 390,885 quarts exclusive of cottage cheese and butter sales. The latter probably was more indicative than the former of fluid volumes handled. Of these amounts approximately 204,000 quarts were sold as whole milk in bottles, and an additional 45,000 quarts in bulk form to a local ice cream manufacturer and to distributors in nearby towns for resale. (See table 2.)

TABLE 2.—Volume of sales by products and proportion represented by each, years ended June 30, 1935 and 1936<sup>1</sup>

Product	Volume (in milk equivalent)		Percent of total volume	
	1934-35	1935-36	1934-35	1935-36
	Quarts	Quarts	Percent	Percent
Bottled whole milk.....	200,143	204,149	34.8	35.0
Chocolate milk.....	17,337	18,509	3.0	3.2
Whole lactic buttermilk.....	22,497	25,214	3.9	4.3
Plain buttermilk.....	1,792	2,340	.3	.4
Cream.....	63,831	95,442	11.1	16.4
Bulk milk.....	76,136	45,231	13.2	7.8
Butter.....	<sup>2</sup> 194,283	<sup>3</sup> 191,372	33.7	32.9
Total.....	576,019	582,257	100.0	100.0

<sup>1</sup> Sales of cottage cheese excluded.

<sup>2</sup> Equivalent to total butter sales of 9,612 pounds. Of this amount 3,923 pounds were apparently purchased for resale.

<sup>3</sup> Represents sales of 9,468 pounds of butter, of which 7,588 pounds were processed in the milk plant. Butter purchased for resale cost, on the average, 27.2 cents per pound; butterfat churned into butter at the plant yielded producers an estimated average price of 21.9 cents per pound.

Compiled from plant records.

The proportion of whole milk sold in quarts and in other-sized containers was not determined precisely, but the quart size probably was the most popular.

**Seasonal variation in sales.**—Sufficient data were not available for the determination of the normal or usual seasonal and daily variation in sales in the Tarboro market. Complete data were available for only 2 years, and it is improbable that the seasonal variation shown in these years would be comparable to that developed from data covering a longer period of time, or periods when market conditions were more stable.

As would be expected, sales of products constituting class I milk during the years 1934-35 and 1935-36 were subject to considerably

less variation than products utilizing class II or surplus milk.<sup>11</sup> For instance, monthly sales of class I milk during the year ended June 1935 varied from a low of 4,143 gallons to a high of 5,004 gallons, a variation of 861 gallons, or 18.2 percent of average monthly sales for the year (computed on an average daily basis). The variation in class II sales was over four times as great, or 77.1 percent. The comparable figures for the year 1935-36 are 35.2 percent and 211.8 percent respectively. Expressed in terms of average daily total sales for the year, daily average sales of class I milk during the period July 1934-June 1935 varied from 53.9 percent in November 1934 to 70.6 percent in January 1935. Comparable figures for 1935-36 are 35.2 percent (June 1936) and 78.7 percent (March 1936). (See table 3.)

TABLE 3.—Volume of class I and class II sales and percent of total represented by class I, years ended June 30, 1935 and 1936

Month	1934-35			1935-36			Percent of total sales represented by class I	
	Class I	Class II	Total	Class I	Class II	Total	1934-35	1935-36
	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons	Percent	Percent
July.....	4,594	2,393	6,987	4,219	2,838	7,057	65.8	59.8
August.....	4,143	1,928	6,071	4,288	2,725	7,013	68.2	61.1
September.....	4,495	2,250	6,745	6,007	2,298	8,305	66.6	72.3
October.....	4,808	3,349	8,157	5,598	2,492	8,090	58.9	69.2
November.....	4,778	4,091	8,869	4,869	1,718	6,587	53.9	73.9
December.....	4,896	4,169	9,065	4,725	2,450	7,175	54.0	65.8
January.....	4,800	2,000	6,800	4,257	3,680	7,937	70.6	53.6
February.....	4,299	3,428	7,727	4,056	3,414	7,470	55.6	54.3
March.....	5,004	2,247	7,251	5,075	1,370	6,445	69.0	78.7
April.....	4,558	2,094	6,652	4,637	3,695	8,332	68.5	55.6
May.....	4,570	3,616	8,186	5,011	5,865	10,876	55.8	46.1
June.....	4,715	2,683	7,398	4,597	8,468	13,065	63.7	35.2
Total.....	55,660	34,248	89,908	57,341	41,014	98,355	61.9	58.3

Based upon records of the Tarboro milk plant.

The large increase in the variation from the low to the high point in class II sales in 1935-36 over the previous year was largely the result of a substantial increase in deliveries of milk to the plant without a corresponding increase in class I sales (milk used for bottled milk and whole lactic buttermilk). Most of this increase in deliveries appears to have been sold as bulk milk and bottled cream. The variation in bulk milk in the latter year amounted to 147.1 percent of average, compared with 46.1 percent a year earlier. The variation in cream likewise increased from 103.4 percent to 311.9 percent. Comparisons of the variations in monthly sales of these products and others from the low month to the high month are given in table 4.

<sup>11</sup> As is pointed out in more detail below, class I milk was that used for bottling purposes and for whole lactic buttermilk; class II or surplus milk was that sold in bulk or used for bottled cream, chocolate milk, plain buttermilk, cottage cheese, and ice cream manufacture.

TABLE 4.—Variation in monthly sales of specified products from the low month to the high month, expressed as percent of the average daily sales for the year, years ended June 30, 1935 and 1936

Product	Variation in sales		Product	Variation in sales	
	1934-35	1935-36		1934-35	1936-36
	Percent	Percent		Percent	Percent
Milk.....	19.7	43.6	Chocolate milk.....	109.9	61.5
Cream.....	103.4	311.9	Bulk milk.....	46.1	147.1
Whole lactic buttermilk.....	35.7	43.6			
Plain buttermilk.....	53.4	41.0	All products.....	39.2	84.4

Computed from sales data filed at the municipal plant.

#### PRICE ASPECTS OF THE MARKET

**Price plans used.**—By and large, the plan used for paying producers in a market varies with the peculiarities of the market in question. Because of its simplicity, the flat or one-price plan is used extensively in a number of small markets, especially those where producers are unorganized. In many other and particularly the larger markets, the classified-price plan is used for determining the value of milk as utilized by distributors. Generally speaking, under the classification plan milk sold in bottled form commands one price, usually termed the class I price, that in the form of cream, another and usually a lower or class II price, and that used for manufacture of such products as butter, still a lower or class III price. Many variations from this classification are found in milk markets. The use values of milk to distributors are prorated to producers as composite or average prices through use of one of several pooling methods. Such pooling devices may take several forms, the most common being the individual-handler pool, the association pool, and the market-wide pool. Base rating, which may be used with either type of pool, involves an adjustment in distributing proceeds of sales among producers on the basis of their deliveries during some selected period of time.<sup>12</sup>

The pricing plan used in the Tarboro market has been modified several times since the inception of municipal milk distribution. During the early years of operation, the city purchased milk on a flat-price basis. Beginning about 1932, the one-price plan of purchase was superseded by a classified-price plan having two classes. Class I milk consisted of that used for bottling purposes, as well as that used for whole lactic buttermilk; class II represented milk used for all other purposes, including bottled cream, chocolate milk, plain buttermilk, cottage cheese, and milk and cream sold in bulk to small distributors in nearby towns and to a local ice cream manufacturer. Under this arrangement the producers were paid prices representing the average values of all sales as computed on the basis of the prevailing class prices and utilization of the milk. In addition, sour cream not eligible for the bottled trade in the city was purchased on a butter-fat basis.

<sup>12</sup> For a discussion of buying plans see Gaumnitz, E. W., and Reed, O. M., *Some Problems Involved in Establishing Fluid Milk Prices*, United States Department of Agriculture, Agricultural Adjustment Administration, Division of Marketing and Marketing Agreements, ch. 2, 1937.

In July 1936 the classified-price plan was discontinued and the city inaugurated what might be termed a quota system for buying milk from the farmers. According to the new arrangement, producers under written agreement with the city were to receive a predetermined price for all their milk up to a certain agreed amount (initially set at 9,000 gallons monthly, or 3,000 gallons for each producer) and a price based upon a wholesale butter price formula for all milk in excess of this quantity, allowance being made for butterfat in milk testing more than 4 percent butterfat.<sup>13</sup> In order that each producer may know the volume of milk purchased, monthly statements of amounts received are issued by the plant superintendent. With the municipality the sole buyer of milk from a limited number of producers, there appears to be no need for pricing arrangements other than that now in effect, provided that the resulting returns to producers are reasonable in view of supply and demand conditions and provided further that the desirable attributes of the milk of different producers, if any, such as uniformity of deliveries, are taken into account in the buying plan. The quota appeared to be based upon a monthly average of annual sales, allowance being made for an expanding volume of business, rather than one taking seasonality into account.

Refinements in the buying plan might be directed toward inclusion of differentials for butterfat in milk testing other than 4 percent fat, a desirable measure in view of the wide variation in fat content during different seasons of the year, and of provision for premiums or other incentives for increasing the usually low winter production of milk.

**Prices to producers.**—Inspection of the different prices paid producers reveals the several changes in policy and supply conditions which have taken place since the municipal plant was first established. Prior to 1932, producers were paid 40 cents and more (48 cents when the city first started operations) per gallon for all milk delivered to the city plant. The price at Tarboro thus varied from \$4.79 to \$5.56 per hundredweight between 1918 and 1932, compared (on the basis of incomplete data) with a range of at least \$2.91 to \$4.91 per hundredweight during these years in Asheville, \$3.04 to \$3.81 in Greensboro, \$3.30 to \$4.27 in Durham, \$2.89 to \$3.50 in Winston-Salem, all in North Carolina, and \$3.06 to \$5.03 in Richmond, Va. Following inauguration of the classified-price plan in 1932, the class I price was first set at 30 cents per gallon (\$3.49 per hundredweight), but was later changed to as low as 25 cents (\$2.91 per hundredweight). During a price war which occurred in 1933, producers were forced to accept a 20-cent price per gallon. A 28-cent price (equivalent to \$3.26 in hundredweights) prevailed during the latter half of 1934, and was then raised to a 30-cent level through June 1936. Class II milk during these years is reported to have netted the producers \$1.75 per hundredweight delivered at the city plant. On the basis of plant utilization data given above, the average prices received by producers in the Tarboro market amounted to \$2.77 and \$2.75 per hundredweight during the 1934-35 and 1935-36 periods, respectively.<sup>14</sup>

<sup>13</sup> The agreements provide for dropping a producer upon 30 days' notice and for voiding of the provisions with respect to any producer if he refuses to accept lower prices during any price wars which might be instigated by new producers.

<sup>14</sup> During a part of this period, one producer received a flat price of \$2.65 per hundredweight for milk of 4 percent fat content, with a differential of 3 cents per point over or below 4 percent.

The contracts made with producers for the year beginning July 1, 1936, stipulated a flat price of 25 cents a gallon (\$2.91 per hundred-weight) for production up to the agreed quantity, rather than the 30-cent price which had been proposed earlier. Since deliveries of milk to the city plant did not exceed the quota in any month during the latter half of 1936, this price became the net price to producers.

Judged from limited available data, the Tarboro price to producers was above levels in other cities in that particular section of the country, although the difference was by no means as great as in earlier years. The \$2.91 price for all milk which prevailed during the latter half of 1936 might be compared with an average price of \$2.88 per hundredweight in Richmond, Va., with basic or fluid milk prices (for milk containing 3.5 percent butterfat) approximating \$2.60 in Asheville and \$2.80 in Durham, Greensboro, and Winston-Salem,<sup>15</sup> during this period. With class II or surplus prices bringing less than \$2 per hundredweight (estimated at \$1.85), the average prices received by producers in these cities of North Carolina likely were somewhat below the Tarboro price. From these figures it might be concluded that milk production in the Tarboro area is exceedingly profitable, but it should be remembered that high costs are involved in producing milk of a quality eligible for the fluid trade there. However, interviews with the producers disclosed that the prices in effect during the fall of 1936 were satisfactory to them.

**Prices to consumers.**—Except for a short period during 1933, the resale price schedule established in 1932 remained unchanged through 1936. Under this schedule, the retail delivered price for grade A milk of 4 percent butterfat content or more (averaging about 4.3 percent) was 12 cents per quart, compared with 17 to 18 cents prior to 1932. The comparable wholesale price was 10 cents per quart. Heavy cream containing 38 to 40 percent butterfat was sold at retail only and was priced at 20 cents per half pint. A complete list of the prices of all products handled by the municipal plant, except cream sold for ice cream manufacture and surplus milk sold in wholesale quantities, is given in table 5.

TABLE 5.—Schedule of resale prices in effect in Tarboro, 1933-36<sup>1</sup>

Product	Resale price		Product	Resale price	
	Wholesale	Retail		Wholesale	Retail
Milk (4 percent plus butterfat):	<i>Cents</i>	<i>Cents</i>	Whole lactic buttermilk (4 percent butterfat):	<i>Cents</i>	<i>Cents</i>
Quart.....	10	12	Quart.....	10	12
Pint.....	5	7	Pint.....	5	7
Half-pint.....	3.5	5	Half-pint.....	3.5	5
Cream (38 to 40 percent butterfat):			Plain buttermilk (½ percent butterfat):		
Quart.....		75	Quart.....	6	8
Pint.....		40	Butter: Pound.....	(2)	(2)
Half-pint.....		20	Cottage cheese: 12-ounce package.....	15	15
Chocolate milk (4 percent butterfat):					
Quart.....		12			
Pint.....					
Half-pint.....	3.5	5			

<sup>1</sup> The only exception occurred during a temporary price war in 1933.

<sup>2</sup> Varies with the market price.

Taken from the milk plant records.

<sup>15</sup> In terms of 4 percent milk, these prices would be increased by approximately 20 cents from the ones given above.

The disruption of the established price schedule occurred during the price war which lasted for several months of 1933. It was reported that one of the producers took offense when the city accepted the milk of a new producer, discontinued shipping to the city plant, and attempted to sell unpasteurized milk to city consumers from a depot located outside of the city limits. With the city successful in its competition against the roadside price of 7 cents per quart, a success made possible through reduction in prices to the other producers (to 20 cents per gallon), the producer ceased independent operations and resumed his delivery to the city plant. The reestablishment of the original price schedule followed.

The retail price of milk in Tarboro was relatively low compared with prices charged in other markets of North Carolina. One of the 14 other markets in the State for which data were obtained had the same price as that in Tarboro, namely 15 cents per quart. Three of the other markets reported a 13-cent delivered price per quart, one a 14-cent price, three a 14- to 15-cent price, five a 15-cent price, and one a 16-cent price. (See table 6.) The price of a bottle of milk delivered to the family trade was likewise lower than in several out-of-State markets, viz, 13 to 14 cents in Richmond, Va., and 15 cents in Norfolk, Va., and Charlestown and Columbia, S. C. It is evident from these data that during at least the period under review milk was available to consumers in Tarboro at relatively low prices. The quality of the milk, moreover, as well as that of the other products, reputedly compared favorably with the quality of products distributed to consumers in other cities of the State. These quality considerations were applicable particularly with respect to the fat content in products other than milk. For instance, heavy cream, containing from 38 to 40 percent butterfat, sold in Tarboro for 20 cents per half-pint, a price only slightly higher than that charged for light cream (18 to 22 percent butterfat) in the other cities noted above.

TABLE 6.—Retail selling prices per quart for milk delivered, various North Carolina cities, fall 1936

City	Retail price per quart, delivered	City	Retail price per quart, delivered	City	Retail price per quart, delivered
	<i>Cents</i>		<i>Cents</i>		<i>Cents</i>
Tarboro.....	12	Asheville.....	14	Greensboro.....	15
Wadesboro.....	12	Winston-Salem.....	14-15	Gastonia.....	15
Hickory.....	12½-13	Raleigh.....	14-15	Southern Pines.....	15
Salisbury.....	13	Durham.....	14-15	Goldsboro.....	15
Statesville.....	13	Charlotte.....	15	Morehead City.....	16

<sup>1</sup> According to figures available to the Bureau of Agricultural Economics, U. S. Department of Agriculture, the buying price in this market for 3.5 percent milk was \$2.80 per hundredweight (approximately 6.5 cents per quart of 4 percent milk as sold).

Prices as obtained from the Bureau of Agricultural Economics, U. S. Department of Agriculture, and from dairy specialists at the University of North Carolina.

**Price spread.**—Prior to 1932, the Tarboro plant policy seems to have been to charge consumers a high price, and by keeping distribution costs down, to reimburse producers generously. In this respect the 17- to 18-cent prices per quart charged consumers prior to 1932 probably were not unreasonable in view of the high price (10 to 12 cents per quart) paid producers.

In 1932, when the new policy was inaugurated, the price to producers was reduced to what was considered to be the competitive level, and the price to consumers was decreased by one-third to 12 cents. On a buying basis of 7.5 cents per quart (30 cents per gallon) this allowed an operating margin to the plant of 4.5 cents per quart of milk delivered to the family trade, and 2.5 cents for that sold on the wholesale route. Under the 25-cent per gallon price to producers, the gross margin on milk delivered to homes was 5.75 cents per quart; the corresponding margins on milk sold in pint and half-pint bottles were somewhat greater. Identical margins presumably were obtained for whole buttermilk. The margin on bottled milk delivered for family consumption thus was several cents per quart lower than in the other cities studied. On this basis, it might be concluded that the Tarboro milk enterprise operated on substantially smaller receipts than those required for private operations in other cities.

### PLANT OPERATIONS

As was revealed in the foregoing pages, the milk situation in Tarboro points to the handling of high-quality products at relatively low prices to consumers, yet apparently yielding higher prices to producers than in comparable markets. One or more of three sets of factors probably was responsible for this narrow operating margin: (1) The municipal milk plant was neither more efficient nor less efficient than the typical milk enterprise having similar characteristics, and the savings to consumers and the relatively higher prices to producers merely represented the division of profits normally accruing to private owners; (2) the savings were not real, representing impairments of capital and high plant losses of milk rather than actual economy in handling operations; (3) the municipal enterprise was conducive to more efficient operation than has been found to be typical under competitive conditions, and the savings were fully reflected in the purchase and resale price schedules. In subsequent pages, following a brief description of the facilities used, an appraisal is made to ascertain which of these circumstances most nearly applies.

### FACILITIES AND PRODUCTS HANDLED

Elimination of alternative sources of supply under municipalization of milk processing and distribution means that the milk plant under the unified system must be so equipped as to permit regular handling of all products in such quantities as demanded. Size is important, accordingly, for economy is as difficult to obtain in an oversized and overequipped plant as in one too small. Once having determined a suitably sized plant for a market, however, success in operations, production conditions being assumed constant, probably is dependent less upon layout and utilization than in any of several competitive plants, because the only variation in output in the one is that caused by changes in the total market demand for a product or products, while in the others utilization is closely dependent upon the working of competition as well. Moreover, the lack of competition in a market like Tarboro, in which there is little likelihood of competition from private operators in raw milk and very little possibility of competition in pasteurized milk or manufactured products,

might be a factor perpetuating public operation even though it is inefficient.

By and large, it appeared that the size of the Tarboro milk plant is conducive to efficient operation. The main building, a double-walled brick structure, part one story and part two story, with separate rooms provided for the different functions,<sup>16</sup> is sufficiently large to permit ample room for the equipment and workers, yet not too large to handicap handling of the products. An adjacent frame building, municipally owned, is used for storage purposes, and two sheet-metal garages house the delivery trucks. The plant equipment, arranged quite closely upon the straight-line principle, likewise appeared to be well utilized even on the basis of the then existing sales output, although sufficient reserve capacity has been provided to handle whatever increases in volume might reasonably be expected.

The products handled include grade A milk (some of which is sold in bulk), chocolate milk, cream, buttermilk (both whole lactic and plain), cottage cheese, and butter. The equipment, therefore, consisted not only of that necessary for handling fluid milk, such as receiving, pasteurizing, bottling, and bottle-washing machinery, but of a cream separator and ripener, chocolate-mixing tanks, a butter churn, and butter printer as well. All appeared to be of modern type and kept in a good state of repair. Both pasteurizers were fairly new, as were the aerator and cooler and the fully automatic bottle-filling and -capping machines. (A new 200-gallon pasteurizer was installed some time after the survey data were obtained.)

For the purpose of delivery service the city was divided into three areas, and milk, cream, and other products were distributed over three routes. Two routes were entirely retail; the other predominantly wholesale. One of the two vehicles used in retail delivery was horsedrawn, the other a lightweight one-man truck equipped with a special body. A similar truck was used on the wholesale route. The vehicles were not insulated for refrigeration, but the products were iced as needed to prevent spoilage during delivery. Prior to 1935 there were but two routes, and prior to 1932 but one.

The delivery service made available to the residents of Tarboro was not much different from that in most milk markets operating under private enterprise. The morning delivery was made as usual to the homes of consumers and to the limited number of grocery stores and restaurants handling fresh milk products. Supplementary service included an afternoon delivery, generally by one driver only, plus such service as was required, in filling special orders received over the telephone. Such special order service, which was quite heavy during the summer months, was not unique in Tarboro since the same situation has been found in a number of other cities in the South. The reasons were different, however: In the one case, it was a matter of plant policy to give consumers every reasonable service possible; in the other markets competition for customers required extensive special delivery, often by motorcycle or bicycle.

Seven persons were employed on a full-time basis in carrying out the milk-handling functions. The plant manager, who was assisted at the sales counter and in his office duties by a bookkeeper,

<sup>16</sup> The walls are of building tile, double thickness, to a height of 10 feet. To provide maximum ventilation without impairment of sanitation, screening is used from the ceilings to the tops of the partitions. Screened doors and windows also are used throughout.

devoted a considerable part of his time to laboratory testing and to plant supervision. Three men handled the delivery duties, one of whom assisted the two regular plant men in bottle washing and related duties after returning from his route. Additional plant help is employed as needed.

#### INVESTMENT IN PLANT

Records of the city of Tarboro show that on June 30, 1936, there was invested a total of about \$15,600 in plant and equipment, which sum represented the original construction cost of the present building and the purchase and installation cost of each unit of equipment, modified only by the write-off of discarded equipment and the increase in values brought about by additions and replacements. (This is in decided contrast to the original investment of \$1,800 in 1918.) This total is exclusive of the value of land (the milk plant is situated on the extremity of a municipal park, centrally located), of the adjacent frame buildings used for plant storage, of two sheet-metal garages used for housing the delivery trucks as mentioned above, of the value of the delivery horse, and of a proportional part of the municipal stable.<sup>17</sup> (For details see table 7.) It would be desirable from an accounting viewpoint that the value of these omitted properties be allocated to the service enterprise of which they are a part.

TABLE 7.—Investment in the Tarboro milk plant, June 30, 1932 and 1936

Item	Investment as of June 30	
	<sup>1</sup> 1932	<sup>2</sup> 1936
Land <sup>3</sup> .....	Dollars 1,000.00	Dollars 1,000.00
Building <sup>4</sup> .....	6,324.38	6,324.38
Equipment:		
Laboratory.....	183.90	} \$ 9,260.18
Power.....	265.00	
Refrigeration.....	1,261.00	
Processing <sup>5</sup> .....	5,690.00	
Delivery.....	500.00	
Office.....	100.00	
Total equipment.....	7,999.90	9,260.18
Total investment.....	15,324.28	16,584.56

<sup>1</sup> Based upon a summary prepared by the plant manager, 1933.

<sup>2</sup> Investment per city records.

<sup>3</sup> The value used here arbitrarily represents 1/25th of the book value of the city-owned park upon which site the plant is located.

<sup>4</sup> Exclusive of: an adjacent one-story frame building, municipally owned, used for storage, and two adjacent sheet-metal garages used for housing the delivery trucks. The horse used for delivery and a proportional part of the municipal stable in which the delivery wagon and horse were kept were likewise excluded from the equipment account. No satisfactory valuation was obtained for these excluded properties, but the combined total probably did not exceed \$1,000.

<sup>5</sup> No break-down of this figure was available; the increase from 1932 apparently is accounted for mainly by additions to delivery equipment and processing equipment.

<sup>6</sup> Power units (electric motors) which were a part of the processing equipment assemblies were included.

<sup>17</sup> The city owns a number of horses used mainly for sanitation work. In the absence of location difficulties, it is advantageous to house all the animals, including that used in the milk enterprise in one stable.

However, the officials have seen no purpose in allocating a part of the park land to the milk department, which position is perhaps tenable in that for ordinary purposes valuation of publicly owned land and other assets is unimportant. Only under special circumstances, such as contemplated sale, does value become important. The book value of the park land was recorded at \$25,000, of which it has been assumed for purposes of analysis that one twenty-fifth represents a fair value of the area used for milk operations. Adding this derived value to the total investment shown above, increases the amount to \$16,600. The additional values involved in the remaining nonallocated plant assets were not determined, but the total likely was small, probably less than \$1,000.

The 1936 book investment of the milk enterprise, land included, but exclusive of certain properties detailed above, was equal to 4.24 cents per quart of milk equivalent of all products except butter and cottage cheese handled in the plant during 1935-36. In a general way, this may be compared with an average investment of 5.42 cents per quart of milk handled in 1933 in 8 small plants, 6.97 cents in 7 medium-sized plants, and 6.86 cents in 7 large plants, all in West Virginia.<sup>18</sup> In terms of volume, the Tarboro plant handled about twice that of the smallest plants referred to here, about one-half that in the medium-sized plants, and slightly over one-fourth that in the largest ones. Similarly, the book value of 15 Milwaukee firms in 1934 was 4.2 cents per quart of milk purchased; the sound value, i. e., reproductive cost as determined by plant appraisal less accrued depreciation of 23 plants averaged 3.1 cents per quart of milk purchased.<sup>19</sup>

#### METHOD OF FINANCING

The Tarboro milk enterprise was financed very simply. The moneys for the purchase of the original equipment as well as of the present plant, involving but relatively small outlays of capital in each case, were obtained from general tax funds. In contrast, funds for the municipal water works and for the electric system were obtained by the issuance of bonds.

It is contended that the milk department is self-supporting from operating funds derived from sales of milk and other dairy products, and under no conditions would its affairs be permitted to ebb to such a point that further outlays were necessary from the general funds of the city, either in the form of capital expenditures or as operating revenues. Over an extended period of time, net revenues thus would be expected to be sufficient to cover not only operating costs but additions and such other disbursements as would be necessary for proper upkeep of the plant as well. Other things remaining the same, operations on a self-supporting basis should not be difficult since in the absence of interest, tax, and possibly dividend obligations, substantially less revenue probably would be required to maintain the plant than would be the case under private ownership.

<sup>18</sup> Stelzer, R. O., and Thurston, L. M., *Milk-Distribution Costs in West Virginia, I. A Study of the Costs Incurred by 22 Plants During 1933*, W. Va. Expt. Sta. Bul. 266, table 2, p. 12, April 1935.

<sup>19</sup> *A Survey of Milk Marketing in Milwaukee*, U. S. Department of Agriculture, Agricultural Adjustment Administration, Division of Marketing and Marketing Agreements, tables 25 and 66, pp. 42 and 108, respectively, May 1937.

Since this organization does not incur tax or interest charges, their equivalent might at first hand be construed to be savings to the residents of the city. However, the Tarboro enterprise, the same as any municipal or other public works, probably could be considered economically self-supporting over a long period of time only if the so-called profits after expenditures for replacements in lieu of depreciation were sufficient to maintain the capital investment, the original investment either was returned to the city or interest regularly charged thereon, and the loss of taxes to the community was returned as milk-plant earnings. Unless this situation prevails, the taxpayers are definitely out-of-pocket, although the loss might be compensated through lower prices for milk, cream, and other products, and better service than was obtainable otherwise.

### RESULTS OF OPERATION

The analysis of the results of operation included here begins with an inspection of operating costs as recorded on the city ledgers and is followed by a comparison of these data, as adjusted, with available costs for plants in other markets.

The city of Tarboro maintained its accounting records on a cash basis at the time of the survey, hence without provision for expenses incurred or sums receivable until such time as cash is disbursed or received. Revenues and disbursements of the milk department as recorded on the city ledgers, therefore, were not accurate reflections of operating conditions over short periods of time, such as from month to month.<sup>20</sup> For instance, the total cost of a lot of bottles purchased was charged against operations for the month in which payment was made, even though only a small part of the quantity purchased was lost or broken during that particular month. However, over longer periods, such as a year, disbursements as well as revenues reflected actual operations satisfactorily, and probably in accordance with the so-called replacement policy under which maintenance and replacement of properties may be expected to result in uniform or regular charges to expense (assuming no net additions or retirements and no significant change in price levels) in much the same manner as under the more scientific accrual procedure. Unless these requirements are met there is a tendency to confuse *expense* with *expenditure*. By definition the former is a cost incurred in operations during a particular period, as for instance wages, the latter a payment for properties or services chargeable only in part to operations during the period involved.

Judging solely from the book figures recorded in the accounts of Tarboro City, but as audited by certified public accountants, the operations of the municipal milk plant resulted in a net gain during the 8-year period from July 1928 through June 1936. Total receipts of cash from sales amounted to \$258,657.09. This sum was disbursed as follows: cost of sales, \$172,015.02; costs of operation and administration, \$80,732.98; leaving an excess of receipts over expenditures of \$5,909.09 for the 8-year period, or an average of about \$739.00 per year. Since these figures are unadjusted, the net rev-

<sup>20</sup> Sales, of which a substantial part are made on a credit basis, are recorded in the month in which cash is received, hence should more properly be termed collections from sales.

enue figure as used here is exclusive of certain charges, the most important of which are depreciation, taxes, and the equivalent of interest, but inclusive, as pointed out subsequently, of a considerable sum improperly charged against revenue expenditures rather than against capital expenditures.

Based upon such figures contained in audit reports, the composition of costs incurred by the municipal milk department was found to be somewhat different than that ordinarily occurring in privately owned milk-handling companies. The average cost of operations during the 8-year period ended June 1936 was 31.2 percent of net receipts from sales of milk and other products, varying from 23.8 percent for the year ended May 31, 1930, to 40.9 percent for the year ended June 30, 1933. These percentages are considerably smaller than those usually found in private plants. As in the case of competitive companies, however, the principal part of the disbursements represented salaries and wages of milk plant personnel, at wage rates apparently equal to, if not somewhat higher than rates in markets of similar size in the southeastern section of the country. The cost of sales or the cost of milk and cream purchased for resale, and inclusive of the cost of milk donated by the city to needy families, ranged from 57 to 76 percent of net receipts, leaving net revenues varying from 3.2 to 7.7 percent of net receipts in 6 of the 8 years under consideration and losses of 9.7 and 10.0 percent in 2 other years. (See table 8.) The average rate of net revenue was 2.3 percent of net receipts.

TABLE 8.—Comparative statements of income and expenditures for the municipal milk plant, 1929-36

Item	Year ended June 30—								Average 8 years
	1929 <sup>1</sup>	1930 <sup>1</sup>	1931	1932	1933	1934	1935	1936	
Net receipts <sup>2</sup> .....	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cost of sales.....	76.30	68.49	69.24	65.37	69.06	57.34	60.59	67.13	66.50
Margin on sales.....	23.70	31.51	30.76	34.63	30.94	42.66	39.41	32.87	33.50
Expenditures:									
Salaries and wages.....	14.25	13.31	14.02	17.02	19.55	18.55	16.12	16.94	16.04
Supplies.....	5.56	3.39	5.33	5.60	8.13	12.45	3.76	4.08	5.65
Repairs.....	9.05	3.15	2.30	.88	1.35	1.18	4.90	1.91	3.26
Replacements.....							2.04	1.47	.60
Fuel.....	.31	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	.14	.85	.83	.40	( <sup>3</sup> )
Water.....	.96	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	5.53	2.34	1.25	1.44	( <sup>3</sup> )
Power and light.....	2.08	<sup>4</sup> 2.56	2.16	3.46	2.66	1.76	.67	.62	3.43
Gas, oil, and horse feed.....	.85	1.23	1.22	1.66	2.11	1.21	1.30	1.35	1.33
Telephone.....	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	.29	.19	( <sup>5</sup> )
Insurance and bonding.....	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	.30	.12	.31	.33	( <sup>5</sup> )
Stationery and printing.....								.38	.06
Advertising.....								.52	.09
Miscellaneous.....	.37	.17	.42	1.31	1.17	.98	.44	.07	.76
Total.....	33.43	23.81	25.45	29.93	40.94	39.44	31.91	29.70	31.22
Excess of receipts over expenditures.....	<sup>6</sup> 9.73	7.70	5.31	4.70	<sup>6</sup> 10.00	3.22	7.50	3.17	2.28

<sup>1</sup> Year ended May 31.

<sup>2</sup> These figures represent cash collections, hence are adjusted for sales returns and bad debt losses.

<sup>3</sup> Included with power and light expense.

<sup>4</sup> Includes fuel and water expense.

<sup>5</sup> Included in miscellaneous expense.

<sup>6</sup> Deficit incurred.

Based upon audit reports submitted by certified public accountants.

Whether the Tarboro milk plant and delivery system represent a prudent investment must go unanswered to some extent. If the consumers obtain their milk products and services at rates comparing favorably with those charged or those which likely would be charged by private operators under identical operating conditions, the enterprise would be advantageous to them. The difficulty, however, is that a test cannot be applied, since records are not available for comparison with an alternative system operating under the same conditions. Moreover, it is difficult to weigh the increased quality of milk products available to the consumers against what must be considered to be losses from operations, true economic losses when charges for depreciation, interest, and tax equivalents are entered into the cost calculation. The final cost to the consumers represents the prices paid for the products, plus that part, if any, of the consumers' tax bill used in subsidizing the milk plant. The book costs are relatively unimportant as far as the community is concerned, however, in that profits or losses of the milk department involve merely the transfer of funds from one pocket to another, so to speak.

Adjustment of the book figures to a comparative cost basis, therefore, involves inclusion of the equivalent of charges ordinarily incurred under private operation or those paid indirectly by Tarboro City through impairment of the capital of the milk enterprise. Under the particular method of financing, cash on hand was transferred to the milk department from the general funds of the city, in which case no interest charges were incurred. However, if the enterprise had been financed with borrowed money (for instance, through a bond issue), interest charges on such loans would constitute a proper charge against earnings. Inclusion of the equivalent of interest charges thus represents the return on investment which likely would have accrued to the city from employment of these funds elsewhere (total cash receipts from sales were insufficient to cover cost of sales, total operating charges, and estimated depreciation and tax costs). Moreover, it is necessary that the equivalent of depreciation charges be included as a cost to offset, as in private enterprise, what otherwise would be in time total exhaustion of properties. The equivalent of taxes likewise must be considered since the saving to consumers resulting from the nonpayment of taxes by the milk plant is offset at least in part by the reduction in operating funds of the city, which otherwise would be derived from such levies.

Consideration of these nonmoney charges as costs reveals that the operations of the milk department from 1928 through July 1936 were financed in part from capital. Whether profits in earlier years were sufficiently great to offset these losses has not been determined. The difference between receipts and disbursements during this 8-year period was sufficient to offset the equivalent of interest on investment but not the equivalent of depreciation and taxes. The combined value of depreciation, taxes, and the balance of interest not offset by the excess of receipts over disbursements, represented about 4.3 percent of total receipts of cash from sales during the 8-year period, or 13.6 percent of all recorded costs of operation. Understatement of costs is by no means peculiar to this organization, although a commercial enterprise probably could not operate with deficits over an extended period; neither is the result such as to obliterate the apparent and potential economic benefits of this community enterprise.

The understatement in the recorded or book costs due to the omission of these charges thus is not of material significance for purposes of this evaluation even though the computed loss represents almost 46 percent of the average value of invested capital during the period involved.

The computations for the equivalent of interest, depreciation, and tax charges leading to the above conclusion may be described as follows. Calculated at a rate of interest at 5 percent, charges for interest on investment average about \$825 per year, or a total of about \$6,600 for the 8-year period. This sum is \$691 in excess of the \$5,909 profit (per books) during the same period.<sup>21</sup> The use of the typical depreciation rate of 2.5 percent per annum on the brick building (exclusion of the other buildings, all of low value, has little effect upon this analysis) and an over-all rate of 10 percent on equipment estimated to have an average value of \$9,843,<sup>22</sup> results in a gross annual depreciation charge of \$1,142. The principal type of tax, that on property, if computed at the local tax rate and charged against the milk plant probably would add \$150 per year to operating costs, or roughly \$1,200 in total for the 8-year period.

Thus, the adjustment of costs to include charges for interest, depreciation, and taxes shows that during the 8-year period studied additional revenues of about \$1,378 per year would have been necessary to make the milk enterprise entirely self-sufficient. During this period, it should be noted, numerous private firms likewise were not self-supporting. However, if it is assumed that 5 percent interest must be earned on investment by private firms in order to attract and hold capital in the field, and that taxes and depreciation must be met in the amounts calculated, it follows that success in a private plant, operating in the same fashion and under the same conditions as the public enterprise, would have required \$1,378 more revenue per year than that actually secured by the Tarboro plant.

It is important that such considerations be borne in mind in comparing the results of operations of the Tarboro enterprise with those of private plants. From the point of view of the community as a whole, however, it would appear to make little difference whether operating revenues are adjusted upward to cover such items as interest and taxes that under the present method of operation are not charged against plant operations, or operating revenues are sufficient merely to cover operating costs as incurred. On the one hand, the city foregoes certain revenue in the form of interest on capital allocated to the milk plant and taxes.<sup>23</sup> On the other hand, milk and other dairy products are obtainable at lower cost than otherwise.

#### UNIT HANDLING COSTS

An analysis was made of all disbursements of the milk department for the year 1935-36 for the purpose of deriving first, approximate unit costs of operating the several departments, and secondly, a reasonably accurate indication of total handling costs in this municipi-

<sup>21</sup> Offsetting interest against operating profit is proper as in this case interest is a non-operating rather than an operating charge.

<sup>22</sup> Average of 1932 midyear book value of \$8,000 and of 1936 midyear book value of \$9,260 plus \$2,426 for replacements to property or assets transferred from repairs expense.

<sup>23</sup> The obligations of the milk plant to the city, taxes excepted, would seem to end with repayment of the original capital at interest. Repayment of further profits would be equivalent to a sales tax on the customers.

pal enterprise. In the case of certain items, such as gas, oil, and horse feed, there was no difficulty in the allocation. In other cases, however, such as for supplies and repairs, it was necessary to inspect all vouchers to determine what part of the total was properly allocable to the processing, delivery, and administrative departments. Where found necessary, salaries and wages were prorated on a time basis in accordance with the manager's estimates of the employees' duties. Half of his salary thus was charged to processing and half to administration. Similarly, three-fourths of the wages of one employee engaged both in plant and delivery functions were segregated to processing, the balance to delivery.

It should be emphasized that the resulting proration of costs cannot be construed as more than an approximation of the situation.<sup>24</sup> For instance, power, light, and water expenses, as well as those for fuel, were considered applicable wholly to plant operations, whereas an exact accounting would require that a small part be charged against the plant office and another part to delivery. Moreover, in view of the smallness of the enterprise, advertising and related costs were included mainly with administrative expense rather than being allocated to a selling department. Of more importance, perhaps, was the treatment of costs carried on the books of the city but not charged against the milk plant, including stable expense, and those charges not carried on the books, such as depreciation.

Full insight into the Tarboro situation also would require that costs be computed on a product basis as well as on a departmental basis, but cost accounting by products would involve meticulous analysis without adding appreciably to the general results of this study.

For the purposes of analysis, unit costs of operation are expressed in terms of the estimated volume of milk purchased from producers which have been presumed to be the fluid equivalent of sales, exclusive of cottage cheese and butter sales, plus an increment of 3 percent to cover plant losses of milk.<sup>25</sup> This procedure appears reasonable insofar as plant costs are concerned, except that inclusion of a portion of total plant costs chargeable to the manufacture, packaging, and refrigeration of cottage cheese and butter without inclusion of a comparable volume of products, tends to overstate plant costs somewhat. In reducing delivery costs to unit terms, however, particularly when prices of specific products in the several-sized containers are under scrutiny, the proration generally is on the basis of the volume of products, or number of points, actually handled from the delivery routes (or under more detailed analysis, from the particular vehicle), rather than on the total milk equivalent of products handled in the plant. This distinction in cost bases is very important since use of total plant volumes may result in unit cost figures varying widely from those obtained under the more usual method.

<sup>24</sup> Receipts from sales represent cash collections, hence are net after deductions for bad debt losses and relief milk. The latter represents city charity charged against the milk plant.

<sup>25</sup> The percentage of loss used is arbitrary for want of a better figure and is not intended to reflect upon the efficiency of plant operations. While the cost of plant loss does not appear on the books (being reflected as an understatement in "margin on sales") it is necessary to give weight to this factor in an expression of unit costs in terms of volumes purchased. If the allowance is too low, unit costs are overstated, and vice versa.

Computed by the method described above, the total money cost (hence, exclusive of depreciation, taxes, and interest) of handling milk and other dairy products in the Tarboro market during the year 1935-36, amounted to 3.27 cents per quart of milk purchased from producers. (See table 9.) This was divided as follows: Processing, 1.5 cents; delivery, 1.08 cents; and administration, 0.69 cent. As used here, processing includes all handling costs incurred in the preparation of products for sale, the handling of product returns and empty containers, as well as refrigeration costs. Delivery costs represent that part of total handling expense involved in the transportation of the products from the plant to the customer's doorstep or to the store or restaurant, as the case may be. Administration costs are those of the plant office, and selling expenses.

TABLE 9.—Cost of milk plant operations expressed as percent of net receipts and total operating cost, and per quart of milk purchased from producers, year ended June 30, 1936

Departmental cost	Cost expressed as percent of		Cost per quart of milk purchased <sup>1</sup>
	Net receipts	Total operating cost	
	Percent	Percent	Cents
<b>Processing:</b>			
Salaries and wages.....	6.04	20.35	0.66
Supplies, including bottles, caps, etc.....	2.93	9.89	.32
Repairs and replacements.....	2.23	7.47	.24
Power and light.....	.62	2.07	.08
Water.....	1.44	4.86	.16
Fuel.....	.40	1.34	.04
<b>Total processing.....</b>	<b>13.66</b>	<b>45.98</b>	<b>1.50</b>
<b>Delivery:</b>			
Salaries, wages, and commissions.....	6.97	23.45	.77
Gas, oil, and horse feed.....	1.35	4.56	.15
Repairs.....	1.11	3.73	.12
Supplies.....	.33	1.13	.04
<b>Total delivery.....</b>	<b>9.76</b>	<b>32.87</b>	<b>1.08</b>
<b>Total processing and delivery.....</b>	<b>23.42</b>	<b>78.85</b>	<b>2.58</b>
<b>General and administrative:</b>			
Salaries.....	3.93	13.25	.43
Telephone.....	.19	.63	.02
Repairs.....	.05	.18	.01
Supplies.....	.81	2.72	.09
Insurance and bonding.....	.33	1.10	.04
Stationery and printing.....	.38	1.28	.04
Advertising.....	.52	1.77	.06
Miscellaneous.....	.07	.22	.01
<b>Total general and administrative.....</b>	<b>6.28</b>	<b>21.15</b>	<b>.69</b>
<b>TOTAL OPERATING COST.....</b>	<b>29.70</b>	<b>100.00</b>	<b>3.27</b>

<sup>1</sup> The volume of milk purchased was estimated to be the milk equivalent of all sales, except cottage cheese and butter, plus 3 percent for plant loss.

Computed from data obtained from the milk plant and the city hall. These figures are unadjusted for the equivalent of depreciation and tax charges.

The processing, delivery, and administrative costs for the municipal milk plant as indicated above are somewhat at variance with those commonly found for private milk companies. (See table 10.) For instance, processing costs in Tarboro during 1935-36 were larger than delivery costs, while in most cases the reverse is true; processing costs generally vary from 10 to 15 percent of net sales, and de-

livery costs from 15 to 25 percent or more of net sales. Moreover, salaries and wages apparently constituted a more important item of expense in both the processing and delivery functions than is usual in private companies. Thus, salaries and wages of plant personnel amounted to 6 percent of net receipts (net sales) in Tarboro in 1935-36 contrasted with a usual figure of about 4 to 6 percent of net sales. Similarly, salaries, wages, and commissions of delivery employees amounted to 23.4 percent of net receipts contrasted with an average of about 15 to 20 percent of net sales elsewhere. The latter is of significance, particularly in view of the favorable showing of the delivery functions.<sup>26</sup>

TABLE 10.—Percentage costs of materials and expenses of operation are of net sales in Tarboro compared with percentages in selected markets for specified periods

Classification	Tarboro 1935-36	5 smaller Connecti- cut com- panies, 1934 (6 mo.) <sup>1</sup>	3 smaller Philadel- phia com- panies, 1934 (10 mo.) <sup>1</sup>	2 Balti- more com- panies, 1935 <sup>2</sup>	4 Cincin- nati com- panies, 1935 <sup>2</sup>	3 St. Louis com- panies, 1935 <sup>2</sup>	2 Boston com- panies, 1935 <sup>2</sup>
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of raw materials.....	67.1	56.8	53.9	55.6	47.8	51.8	62.4
Gross spread.....	32.9	43.2	46.1	44.4	52.2	48.2	37.6
Expenses:							
Processing.....	13.6	15.2	11.6	9.9	12.0	12.2	7.2
Delivery.....	9.8	14.5	27.0	25.6	30.8	34.2	26.1
Selling.....	6.3	5.9	1.2				
General and adminis- trative.....		6.0	7.4	2.9	4.4	3.2	1.7
Total expense.....	29.7	41.6	47.2	38.4	47.2	49.6	35.0
Operating profit.....	3.2	1.6	<sup>3</sup> 1.1	6.0	5.0	<sup>3</sup> 1.4	2.6

<sup>1</sup> Report of the Federal Trade Commission on the *Sale and Distribution of Milk Products*, 74th Cong., 2d sess., H. Doc. No. 387, tables 14 and 16, pp. 61 and 67, respectively, 1936.

<sup>2</sup> Report of the Federal Trade Commission on the *Distribution and Sale of Milk Products, Boston, Baltimore, Cincinnati, St. Louis*, 74th Cong., 2d sess., H. Doc. No. 501, p. 150, 1936.

<sup>3</sup> Losses incurred.

A precise appraisal cannot be made of the net effect of adjusting the unit cost figures as given to about what would be considered an exact cost basis, but there are indications that the understatement in the aggregate cost is not significant. Adjustments upward include provision for depreciation and taxes<sup>27</sup> in both the processing and delivery departments, for stable expense other than feed of the delivery horse, and for costs of personnel in the city clerk's office involved in milk plant accounting. It is necessary also to include plant losses of milk as a processing cost since the denominator (volume of milk purchased) represents the volume of sales plus plant losses. These increases apparently are offset in part by the exclusion from plant costs of expenditures for replacements and additions to

<sup>26</sup> Gas, oil, feed, and coal are purchased by the city at wholesale rates, but the charges for water and electricity (obtained from other municipal enterprises) are on the basis of regular commercial rates, although in early years this was not the case.

<sup>27</sup> Interest on investment is excluded because it is a nonoperating charge rather than an operating charge. Moreover, net receipts during the 12-month period under review were more than sufficient to offset the equivalent of this item. In the intermarket comparison below, interest on investment is excluded because by and large the several concerns under consideration owned their fixed assets, and the interest on capital borrowed to finance fixed assets was not included as an operating expense.

the building and equipment (as, for instance, an expenditure in 1936 of \$650 for a new bottle-filler and capper) as well as that portion of total plant charges attributable to processing, packaging, storing, and handling of butter and cottage cheese (since the milk equivalent of these products is excluded from the volume used in the unit cost calculations). Thus, as closely as could be estimated, total expenses per quart of milk purchased are overstated by the amount of cheese and butter charges, but understated by the amount of plant loss, depreciation, and taxes. If an allowance for depreciation and taxes were made, these two items would amount to about 0.32 cent per quart and 0.04 cent per quart, respectively. The exclusion of replacements from plant costs probably would reduce processing costs by approximately 0.16 cent per quart. The total unit cost figure of 3.27 cents per quart, therefore probably is understated by about 0.333 cent per quart, or less than 10 percent of the total.

#### COMPARISON WITH OTHER MARKETS

Comparison of the estimated costs of operation in the public milk plant in Tarboro with estimated costs elsewhere is made difficult by the lack of satisfactory standards for comparison. Considering that public enterprises are generally intended and operated for purposes other than profit, in this case for service, the ordinary criterion of commercial efficiency, business enterprise income, cannot be used. The limitation applies not only to net income or that accruing from all phases of the enterprise, but also to operating income or that resulting from the main activity of milk handling. For want of a better basis, internal efficiency must therefore be expressed in terms of money costs of operation, i. e., outlays for all handling costs inclusive of administration, even though in a concern of this type operating costs may tend to approach closely the difference between the selling and buying prices of the products. As was pointed out earlier, the price schedules in Tarboro were so arranged as to leave a margin sufficient only for what was deemed to be proper maintenance of the enterprise.

Assuming comparability during different periods in plants unlikely to be wholly similar in function, costs of operations in the Tarboro plant would appear to compare favorably with costs found in studies of selected plants in West Virginia<sup>28</sup> and in Milwaukee, Wis.<sup>29</sup> As is indicated in table 11, total operating costs in eight comparable (small) plants in West Virginia amounted to 4.32 cents per quart of milk handled, which is almost one-third greater than that found for Tarboro as unadjusted, or one-fourth greater than the adjusted cost. Corresponding unit costs (4.26 cents per quart) in seven other (medium-sized) West Virginia plants were found to be only slightly less than for the small plants, the average for the 22 plants being 4.12 cents. The weighted average cost for 20 Milwaukee plants, handling a volume averaging over 15 times that handled in Tarboro, is about the same as for the municipal enterprise. Processing costs were high in Tarboro compared with those in Milwaukee. On the other hand, delivery costs were low.<sup>30</sup> This is as would be expected;

<sup>28</sup> Stelzer, R. O., and Thurston, M. L., *ibid.*, p. 12.

<sup>29</sup> *A Survey of Milk Marketing in Milwaukee*, op. cit., p. 56.

<sup>30</sup> The firm having the lowest delivery cost in the Milwaukee market was one whose business was predominantly wholesale, hence not comparable to the Tarboro enterprise.

unit delivery costs usually increase as the size of the enterprise increases, while plant costs tend to decrease rather markedly. Cheaper labor<sup>31</sup> in Tarboro than in Milwaukee probably is of significance in this respect.

TABLE 11.—Costs per quart of milk purchased in the Tarboro plant, 1935-36, compared with costs in 22 West Virginia plants, 1933, and 20 Milwaukee plants, part of year 1934

Item	Tarboro 1935-36	22 West Virginia plants, 1933 <sup>1</sup>				20 Milwaukee plants 1934 <sup>2</sup>		
		8 small plants	7 me- di- um- sized plants	7 large plants	22 plants	High	Low	Average
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Cost of milk purchased.....	6.53	3.55	3.56	3.51	3.53	3.33	3.33	3.33
Operating cost:								
Processing.....	1.50	1.58	1.60	1.32	1.42	2.21	0.71	1.00
Delivery.....	1.08	1.91	1.64	1.78	1.74	2.86	.74	1.86
Administration.....	.69	.83	1.02	.93	.96	1.46	2.20	1.44
Total operating cost....	3.27	4.32	4.26	4.03	4.12	6.51	1.89	3.30
TOTAL COST.....	9.80	7.87	7.82	7.54	7.65	9.84	3.22	6.63
Milk purchased (thousand pounds).....	866	434	1,442	3,288	1,663			13,800

<sup>1</sup> Based upon figures from: Stelzer, R. O., and Thurston, M. L., *ibid.*, table 3, p. 12. The small plants are those with purchases of less than 1,000,000 pounds; the intermediate-sized plants are those with purchases from 1,000,000 to 2,000,000 pounds; the large plants are those handling over 2,000,000 pounds. Costs per hundredweight of milk purchased have been converted to a quart basis. Interest on investment is excluded.

<sup>2</sup> These figures, for the first 4 months of 1934 and in terms of milk purchased, are based upon: *A Survey of Milk Marketing in Milwaukee*, p. 56.

<sup>3</sup> Inclusive only of cost of fluid milk as purchased from farmers, that is, exclusive of the cost of sour cream and cost of milk donated to charity but charged against purchases.

<sup>4</sup> Approximations.

<sup>5</sup> Includes selling expense.

<sup>6</sup> Understated as in table 9. For amount of understatement see text.

<sup>7</sup> Represents figures for the highest and lowest cost companies and not a summation of the costs of different companies by functions as above.

<sup>8</sup> Milk equivalent of sales, except of cottage cheese and butter, plus 3 percent allowance (arbitrary) for plant loss.

The validity of the foregoing comparisons can be determined only in a general manner. To be entirely comparable the figures must be adjusted for changes in economic conditions during the several years under review, as well as for differences in plant functions and for quality of products. Since the effect of such changes cannot be fully ascertained, it is erroneous to conclude that the unified system of milk handling in Tarboro has resulted in savings of 0.5 cent to 0.75 cent per quart of product. It can be stated, however, that the relatively favorable showing of the municipal plant does not appear to be diminished by those adjustments which are possible on the basis of available data. Thus, if utilization of milk may be taken as a criterion of plant function, the variation in the per unit costs attributable to differences in this factor probably is not of material significance.<sup>32</sup> Neither should quality considerations be of

<sup>31</sup> The remuneration to employees in the Tarboro enterprise probably is somewhat above competitive rates for the particular section of the country. (The route men are paid premiums for increased sales volumes, the same as in competitive markets.)

<sup>32</sup> In general, milk was utilized in about the same manner in the three areas under consideration. During those periods for which corresponding cost data are given, the proportion of eligible bottling milk used for whole milk and cream, and for other purposes was as follows: Tarboro, 52, 25, and 23 percent, respectively; Milwaukee, 51, 13, and 36 percent, respectively; West Virginia plants, 53, 19, and 28 percent, respectively. No reconciliation could be made of differences in the cost data due to differences in byproducts manufactured.

major importance. Moreover, with average costs of materials in 1935-36 about 20 percent or more higher than in 1933 and about 7 percent higher than in 1934 and with wage rates in even more striking contrast,<sup>33</sup> adjustments of costs in the several markets to a comparable basis likely would reveal the results for Tarboro in a more favorable position than is indicated in table 10.

The favorable cost situation in Tarboro as indicated above probably has been the result in part of more efficient utilization of equipment and personnel than is typical under alternative methods of operation. Other things remaining the same, costs would be expected to be lower, particularly in the important delivery function, where the output per man and per unit of equipment is the greater. The significance of such volume considerations can be illustrated to some extent: The average volume handled by each dealer-distributor (one who buys milk from others for resale) in the four Virginia cities of Newport News, Petersburg, Lynchburg, and Bristol, cities with populations (1930) from 20,000 to 40,000, or from 3 to 6 times that of Tarboro, daily in 1930 apparently was 280 gallons, 432 gallons, 596 gallons, and 376 gallons, respectively,<sup>34</sup> contrasted with 271 gallons daily (1935-36) for the Tarboro enterprise. However, when all participants in each market, producer-distributors as well as dealer-distributors are included, the average volume per handler is decreased to 60, 123, 119, and 88 gallons, respectively. The significance of such larger plant volumes in Tarboro upon the efficiency of equipment and personnel is not difficult to visualize.

## OUTSTANDING FEATURES OF THE TARBORO ENTERPRISE

There are several special features of the Tarboro milk plant which merit brief consideration.

### ADMINISTRATION ORGANIZATION

Administration of the milk department devolved upon several authorities. Full responsibility for operating aspects was charged to the plant manager, one who in recent years has been an experienced and well-qualified dairy specialist. All matters of policy, including price determination, however, were reserved to the seven elected city commissioners, of whom one, the milk commissioner, was of particular importance in this respect. The milk commissioner acted mainly as a negotiator between the plant management and the city hall and was able to follow all results closely on the basis of detailed reports submitted monthly to him.

### FISCAL PROCEDURE

As is indicated in preceding pages, the accounting records of the city, including that of the milk department, were kept on a cash basis. For simplicity and economy, the principal bookkeeping func-

<sup>33</sup> The index of wholesale prices of all commodities (1909-14=100) of the United States Bureau of Labor Statistics for the years involved are as follows: 1933, 96.2; 1934, 109.3; 1935, 116.8; and 1936, 117.0 (approximate). Wages of industrial workers (Bureau of Labor Statistics, 1924-29=100) for the years 1933 to 1936, inclusive, are represented by the following index numbers: 48, 60, 67, and 77, respectively.

<sup>34</sup> Based upon data from Maxton, J. L., and Taylor, C. C., *Marketing Fluid Milk in Four Virginia Cities*, Va. Agr. Expt. Sta. Bul., 275, pp. 6, 11, and 16, December 1930.

tions were performed in the office of the city clerk. The only accounting duties performed at the milk plant, consequently, involved recording of sales and receipts therefrom on the route books, accounting for the resulting moneys, and the payment of minor bills from petty cash. A full-time clerk was employed for this purpose, assisted as needed by special helpers. Cash collected by the route men and from counter sales was deposited daily with the city clerk whose office handled all payments after approval by the plant manager. The milk plant thus was relieved of considerable office routine without adding appreciably to the duties or costs of the city clerk's office. The result was one of low office overhead.

#### BAD DEBT LOSSES

The plant manager stated that bad debt losses were unusually low. As is indicated above, losses on accounts do not appear as expense items, as in ordinary cases, but represent the difference between values of products sold and amounts actually collected. In private concerns, uncollectible accounts usually vary from practically nothing to several percent of sales, depending largely upon economic conditions and the success of the particular business. It was explained that the relatively high balance of accounts receivable generally shown in the route books in Tarboro was due more to the method of bookkeeping than to actual bad debts. Some sales were made for cash, in which case a token system of payment was used; the balance, or about 40 percent of the total volume were on accounts collected weekly or monthly depending upon the circumstances of the particular customer. Nonpayment of unreasonably past-due bills may prompt discontinuation of delivery service, hence virtual stoppage of fresh milk supplies unless purchased from other cities.<sup>35</sup> Regularity in delivery of milk to a customer's home thus is dependent upon payment of his milk bill. The only way a customer can avoid payment is to move away from the city. This type of collection practice is used extensively by utility companies.

#### BOTTLE LOSSES

No exact data were obtained on the average number of trips milk and cream bottles were used, but estimates were given to the effect that bottle losses, which were heaviest for the half-pint size, were held down to about half of those of competitive plants in neighboring cities, largely through discontinuation of service if customers become markedly irregular in putting out empties for the route men. Other factors accounting for low bottle costs, which in most markets constitutes several percent of total operating expenses, include: Prohibition by State law of the use of milk bottles for other purposes, and the absence of competitors with various and sundry types of containers. Purchases of bottles in carlot quantities through cooperation with plants in nearby cities also helps keep bottle costs down.

<sup>35</sup> This is important in that only a few stores sell fresh milk products and there are no roadside stands outside the city limits. Moreover, while some bootlegging of milk by those townspeople keeping their own cows and by nearby farmers was reported, the volume does not appear important.

#### SPECIAL SERVICE

As was pointed out earlier, one of the unique features of the Tarboro set-up was the special service given to customers. In contrast with competitive markets, this service was not a form of sales inducement but definitely a responsibility of the milk plant which could not be ignored. Particularly is this true when but a limited number of stores handle fresh milk products and customers must necessarily turn to the milk plant for extra quantities. Moreover, off-hour delivery may be justifiable in those cases where lack of refrigeration facilities in homes prevents extensive holding of products. In other cases, however, the telephone order business probably, was more of a convenience than a necessity. Frequent requests for quick deliveries of a quart of milk or a half-pint of cream, as occasioned under these circumstances, probably added disproportionately to delivery costs. Use of lighter vehicles than the regular delivery trucks, such as a motorcycle or bicycle, might alleviate this situation to some extent.

#### LEGAL ASPECTS

On the basis of available data, it appears that Tarboro operates its milk plant without specific legal authority; presumably, there is nothing in the statutes of North Carolina conferring such powers on municipalities.<sup>36</sup> The only basis is the pasteurization ordinance of 1918, as amended in 1925, which establishes standards for pasteurizing milk and prohibits sale within the city limits of milk not so pasteurized, and a subsequent measure which provided for the construction of a processing plant, the purchase of raw milk, and the sale of the pasteurized product. There are no restrictions, therefore, upon the sale of milk except that it must be pasteurized.

In 1923 a conviction under that part of the ordinance prohibiting the sale of raw milk was upheld by the Supreme Court of North Carolina.<sup>37</sup> The power of the city to operate a pasteurization plant or to sell milk and other dairy products was not at issue. The position taken subsequently has been that since in the interest of public health the municipality has the express power requiring pasteurization, it must likewise have the implied power to obtain for its residents supplies of wholesome milk; without pasteurization and sale by the city, such requirements likely would not be met. This interpretation appears logical in view of the supply conditions in the market.

#### LOCAL REACTION TO THE MILK PLANT

The citizens of Tarboro apparently considered their municipal milk enterprise an excellent asset. Their position seemed to be that prices were low in view of the high quality of products, that the plant was self-supporting, and under no circumstances should it pass into private hands. Milk handling as a public enterprise in Tarboro would thus appear to be as deeply entrenched as are the water works and the electric system.

<sup>36</sup> Section 2787 of the Consolidated Statutes of North Carolina confers certain powers on municipalities.

<sup>37</sup> See *State v. Edwards*, 187 N. C. 259; 121 S. E. 444.

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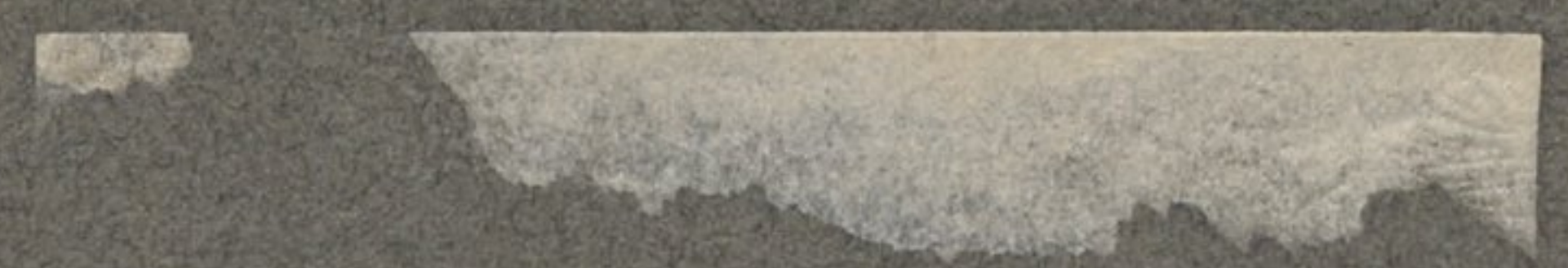
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Whatever factors may be contributing to the success of the Tarboro milk plant, the fact remains that the results of this study cannot well be projected to other areas. Success of public handling of milk and related products in other markets would depend largely upon the peculiar characteristics of the markets, the policies followed in operations, and perhaps of even more importance, the efficiency of management. Moreover, the transition in Tarboro from a wholly producer-distributor market to a unified market without requiring retirement of private capital or without encountering serious legal barriers must be recognized as a distinct advantage not likely to be enjoyed in many markets.

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