MARKET MILK PROBLEMS OF MICHIGAN

Thesis for the Degree of M. Agr.

Stanley J. Brownell

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Thesis

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By

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Foreword.

Many of the problems of the market milk industry have been purposely omitted because of the writer's close association with the following Bulletins covering these subjects. A great amount of information and statistics given in these bulletins was gathered by the writer. In order that this thesis on market milk problems may be used as a reference on the subject in the future, the author is placing with the thesis these bulletins.

Special Bulletin No. 111 .....Nov. 1921
Special Bulletin No. 99 ..... Nov. 1919
Bulletin No. 286 ..... Jan. 1920

Outline

Market Milk Problems of Michigan.

Stanley J. Brownell.

Introduction.

The problems of the market milk industry are those which relate to the efficient administration of the milk supply of a city. These problems are undoubtedly brought to the attention of all classes of people oftener than those of any other edible commodity. A large proportion of our producers are directly interested in dairy products either through the sale of dairy products or as a market for their crops through the dairy cow; also processing and distributing of milk for direct consumption represents the average sized industry of a city. But possibly greater than the above interests is the fact that practically every person is a daily consumer of milk, which suggests to him with amazing frequency, problems of the market milk industry. These problems invariably refer to the efficiency of administering the supply of milk to a city.

Part I.

The first essential in administering the milk supply of a city is to assure an adequate supply of pure

milk of a good quality. Cities that have had milk shortages extending over several days or more realize how dependent they are on milk for nourishment; and especially for nourishment of the infant and invalid class.

One factor tending to insure an adequate supply of desirable milk is that of making a yearly market for the producer. To produce milk of a certain quality and sanitation requires definite care and equipment, which causes extra labor and expense. It is impractical for a milk producer to be required to change his market to one which receives a lower class of milk. Not only is it impractical to change, but milk companies refuse to take on new patrons that are not expected to stay permanently.

The Surplus Problem.

The main cause of companies turning away short time patrons is the milk surplus problem. The policy in the past has been for the dealer to care for the surplus problem because of the stabilizing effect it has on his supply. His yearly supply is determined largely by the number of patrons necessary to meet his demand during the period of low production, which is also the period of greatest consumption. In order to be assured of his required amount during this period, he handles his patrons' supply during the rest of the year. Patrons that change to another market during this period of low production (usually because of higher price from another company) could not expect to change back when the dealer is well supplied. The same is true of the dealer who turns his patrons away during the surplus season. Under this condition producers find difficulty in locating a new market which often causes them considerable loss. Producers who have been handled in this manner are reluctant in patronizing such dealers.

Where producers are organized for the purpose of selling their milk, consideration should be given to the idea of caring for their own surplus. In some instances such organizations have been encouraged to assume entire responsibility for all surplus milk. This would then enable

the producer to furnish to milk distributing concerns the exact quantity of fluid milk which the market demands. Thus all loss on surplus, due to the lack of facilities for handling the same on the part of small dealers, would be eliminated. The author approves of the theory of producers caring for their own surplus. However, from observation of two of the largest milk producers' companies in the state and an intimate knowledge of one by having worked with it, the writer does not believe that they will be an entire success.

The Price of Milk to the Producer.

Not only must the producer of milk be assured a yearly market for his milk in order to continue his service of production, but he must also receive enough for his milk to be consistent with the quality, sanitation of his product, and the perpetuity of his service.

Cities efficiently administering their milk supply, require of the producer a certain standard of health, sanitation, and quality not required by condenseries, cheese factories, and creameries.

This market milk requirement may necessitate extra expense on the part of the producer in the form of extra labor in keeping his barn clean, extra expense in testing his herd for tuberculosis, frequent delivery, icing, and insulating during delivery, etc. Dealers must pay a premium to the producer in order to get the above service as required by the city. The producers' profit or loss at the end of the year, compared with the profit or loss of the other farm enterprises, determines to a large extent whether or not he will stay in the milk business.

There are three methods by which the farmer may analyze his business to aid him in determining whether or not he will continue to produce milk. These three methods are:

1. Cost of Production Method.
2. Opportunity Cost Method.
3. The Relative Profitableness Method.

Cost of Production of Milk.

From the year 1912 until after the war, cost of production of milk has played a very important part in the market milk industry of Michigan. During this time the idea that the farmer should get more than the cost of production of milk spread very rapidly. In 1914 so much interest was manifest in knowing, from a reliable source, what the cost of producing market milk really was that Mr. Riddell was sent to the territory producing market milk for the city of Grand Rapids to determine the costs. The figures obtained in this work aroused such interest that in the spring of 1916 the largest and most enthusiastic meeting ever held at the college for the purpose of marketing a single commodity was held in room 402 of the Agricultural Building. At this meeting the Michigan Milk Producers' Association was organized for the purpose of getting cost of production for their product. Previous to the time when the Milk Producers' Association became effective as a marketing agency, the difference in the price paid the farmer and the cost of production of milk was very great; following this time it was nearer as shown by the following table:

Table No. I. This table shows that the year previous to the influence of cost of milk production data and a milk producers' organization there was a 44 per cent loss; but during the two years immediately following the time the average yearly loss was 0.955 per cent in producing 100 pounds of milk.

Before Organization 1916 to 1917

Time	Cost to Produce 100 lbs. of Milk	Price Received per Hundredweight for Milk at Plant	Profit per cwt.	Loss per cwt.
March	$2.190	$1.526	.....	$0.664
April	2.204	1.440	.....	.764
May	1.625	1.236	.....	.389
June	1.389	1.112	.....	.277
July	1.830	1.224	.....	.606
August	2.314	1.331	.....	.983
September	3.184	1.447	.....	1.737
October	2.665	1.831	.....	.834
November	2.700	2.004	.....	.696
December	2.389	2.029	.....	.360
January	2.205	2.091	.....	.114
February	2.174	2.102	.....	.072
Winter Season	2.298	1.798	.....	.500
Summer Season	1.844	1.275	.....	.569
Yearly	2.147	1.625	.....	.524
Per Cent				24.41

After Organization 1917 - 18.

Time	Cost to Produce 100 lbs. of Milk	Price Received per Hundredweight for Milk at Plant	Profit per cwt.	Loss per cwt.
March	$2.236	$1.982	.....	$0.254
April	2.357	1.794	.....	.563
May	1.775	1.839	$0.064	.....
June	1.491	1.834	.343	.....
July	1.755	2.014	.259	.....
August	2.435	2.192	....	.243
September	2.300	3.155	....	.855
October	3.456	2.777	....	.679
November	3.418	2.785	....	.633
December	3.276	3.124	....	.152
January	3.275	3.178	....	.097
February	3.284	3.103	....	.181
Winter Season	2.911	2.592	....	.289
Summer Season	1.966	2.033	.067	....
Yearly	2.596	2.405	....	.191
Per cent				7.36

1918 - 19.

Time	Cost to Produce 100 lbs. of Milk	Price Received per Hundredweight for Milk at Plant	Profit per cwt.	Loss per cwt.
March	$3.584	$2.941	$.....	$0.643
April	3.429	2.524	.....	.905
May	2.302	2.104	.....	.198
June	1.704	1.835	0.131	....
July	2.182	2.239	.057	....
August	3.401	2.717	....	.684
September	4.498	3.050	....	1.448
October	3.820	3.294	....	.526
November	4.199	3.408	....	.791
December	3.919	3.562	....	.357
January	3.472	3.493	.021	....
February	3.279	3.337	.058	....
Winter Season	3.550	3.134	....	.416
Summer Season	2.603	2.343	....	.260
Yearly	3.249	2.881	....	.368
Per Cent				12.77

From the above table it is quite evident that with the price of milk below the cost of production, farmers still continued to produce milk. This leads one to believe that the farmer does not use an analysis of his business entirely to determine whether or not he will stay in the milk production business. It is quite evident that the personal element plays an important part in his decision.

At the same time the cost of production was playing such an important part in the supply of market milk, opportunity cost was also having its effect on the supply and price.

Opportunity Costs.

Opportunity costs arise from the fact that on most, if not on all occasions, one is confronted with more than one thing he can do or would like to do. During the war, farmers were confronted with many enterprises from which to choose, all of which were paying liberal returns. It took but slight provocation on the part of the city administrators during those times to change the entire outlook of the dairy supply of a city. Not only did the farmer limit his opportunity costs to deciding what he wanted to produce on his farm but he also decided between farming and other industries. During the period of high wages, many farmers quit farming entirely and went to the city as shown by the following figures taken from the 1920 Census report:

Table No. II. Showing change in number of farms in Michigan since 1900.

Date	Number of Farms
1900	203,261
1910	206,960
1920	196,447

Although both cost of production and opportunity costs methods had a very great effect on the market milk supply during and immediately preceding the war, undoubtedly the

relative profitableness method of figuring costs has had a greater effect on the market milk supply than either of the other two ideas.

Relative Profitableness Method.

The relative profitableness method undoubtedly is the logical way for a dairyman to analyze not only his farm enterprises, but his dairy enterprise within itself. It is the system of reasoning which decides the farmer to stay in the business, as well as to decide whether it is cheaper for him to send his milk to the condensery for a lower price, or meet the city requirements and send to the city for a higher price.

Possibly greater than the two afore mentioned reasons in influencing the supply of market milk are the generally considered secondary reasons which enable dairymen to stay in the business when average conditions are showing a loss. Relative profitableness brings out the advantage of labor distribution in favor of the dairyman, the advantage being in the ability of the dairy farmer to have a fairly constant labor requirement the year around. This same reasoning determines the unprofitable units in the dairy herd which enables the farmer to increase his profits over the average farmer as shown from the following table:

Table No. III. Showing the increased production for a herd of seven cows over a period of three years as a result of keeping individual records of each animal in his herd.

1914		1915		1916	
Milk lbs.	Fat lbs.	Milk lbs.	Fat lbs.	Milk lbs.	Fat lbs.
5816	374	6307	378	6814	423
7958	338	9473	396	10348	404
4605	246	5421*	311*	7319*	420*
4380	224	5862	320	7765	411
5516	238	8800	389	4200*	229*
2387	157	6623	410	7335	444
3252	179	8340	432	9827	549
** 33914	1756	50826	2636	53608	2880
*** 4646	250	7261	377	7658	411

* These animals replaced animals of the previous year.

** Totals

*** Averages

Not only does he analyze his dairy herd but also his method of handling the herd, such as: does the milking machine pay, does the silo pay, likewise, litter carrier, location of grain, arrangement of barn, etc.

As previously mentioned the personal element is a factor to consider. Undoubtedly many men will continue in the dairy business even though it shows a loss. In many cases this is due to ignorance as to returns on the enterprise. Often it is merely because of love for the dairy cow. Occasionally a farmer makes the dairy pure bred industry primary to milk production.

Part II.

The Distributor.

Frequently cities after much trouble in establishing an adequate supply of pure milk of a good quality find themselves confronted with another problem of equal importance. A satisfied consumer is every bit as important as a satisfied producer. Since the city milk consumer deals directly with the distributor, these problems are mostly settled through the distributor.

In order to efficiently administer to the city milk supply through the distributor, the consumer must be assured that the dealer renders most cheerfully and efficiently the necessary and needful service at as low a cost as may be consistent with the quality and perpetuity of his service.

In order for the distributor to be able to do this, his net financial returns must be such as to warrant his investment. The price of milk to the consumer has often been the subject of much controversy. Leaders of different city factions have made cheaper milk part of their campaign platform. Municipal milk plant campaigns are based almost entirely on the subject of cheaper milk to the consumer through centralized efficiency. When a city commission attempts to administer the price of milk to the consumers, they should first consider the distributor as a public servant that is very

desirable, because of the utility he creates. The public demands his service; and in order that it be maintained, his financial returns must be such as to warrant his investment.

Not only must his net financial returns be such as to warrant his investment, but he should be allowed sufficient spread in price to guarantee quality and sanitation of product. Clarification, pasteurization, refrigeration, and general sanitation - all of which are necessary for quality of product - cause a considerable added expense and must be considered when the city milk administration demands a quality and sanitary product. The greater the demand of the administration for quality and sanitation of product, the higher the price of milk must be to the consumer.

Not only must his financial returns be considered from the standpoint of investment, quality, and sanitation; but all processing charges must be allowed and distributing costs taken into consideration as well. These costs come under the following general headings.

Divisions of Labor, or Enterprises in the Distribution of Milk.

1. Receiving.

Weighing, testing and can washing.

2. Processing.

   Clarification, or filtration, pasteurization, and loss in pasteurization.

3. Bottling.

   Bottling, capping, bottle washing and sterilizing.

4. Refrigeration and power.

   Cooling, temperature room, machinery operation, pasteurization and sterilization.

5. Delivery, Salesmen and Collectors.

6. Advertising and Administration.

Receiving.

In order to assure quality of product, the receiving room is essential. It is here that the amount of milk delivered to the plant by each producer is recorded for payment at the end of the month. As important as the recording of amounts delivered by each patron is that of checking the quality and cleanliness of the product. It is here where the sweetness and keeping quality of the milk is determined, bacteria counts are made, and butter fat tests are run to encourage quality as well as a standard for payment. Dairy companies, in cities enforcing these sanitary and quality regulations, have large receiving rooms costs, amounting to as much as ten per cent of the total distributing costs. To better insure a sanitary product, milk companies must return to the farmer his cans in a clean sterile condition which necessitates can washing and sterilizing equipment. Also an occasional check is made on the quality of milk by running acidity tests and sediment tests. Receiving costs, where sanitation and quality are disregarded, are practically negligible.

Processing.

Processing costs also increase with the sanitary requirements. Although the ideal is to obtain milk as free from contamination as possible, it is always necessary to submit the milk to certain processes in order to put it on the market in a desirable condition. Sediment and small particles of dirt are bound to get into the milk under existing conditions. These must be removed and all unsanitary conditions corrected before it is allowed to go to the consumer. In order to accomplish this, the better dairies and city ordinances are requiring pasteurization and either clarification or filtration. The old idea of putting on the market milk as it was received from the producer saved the distributor approximately ten per cent of his costs. At the same time it caused considerable inconvenience and epidemics, as well as extra cost to the consumer because of the splendid possibility to spread disease through unsupervised milk.

Efficient pasteurization removes the danger from pathogenic organisms, where herds are not subject to inspection, but at the same time increases the cost of milk. Extra equipment is added which requires more labor, more power, and more steam, as well as loss of milk, which amounts to about twenty per cent of the pasteurization costs.

Bottling and Capping.

The old method of selling milk from a can by dipping or drawing into a measure and pouring into a container hung from the hitching post or sitting on the door steps is till in practice in some Michigan cities and in many of the towns. People interested in public health have long discriminated against this practice and have brought such pressure to bear that in the places where better milk administration is in order, the bottling of market milk is enforced. The requirement of a separate container for each customer's milk has added greatly to the expense of the milk dealer. The usual custom under these regulations is to deliver retail milk in glass bottles of quart, pint, and half pint sizes; and wholesale milk in cans of one, two three, five and ten gallon sizes. All of these containers after being delivered are exposed to all the various sources of contamination which may exist in the city. This necessitates thorough sterilization upon return to the plant. The filling of the bottles, their capping, washing, sterilization, breaking, losses in delivery, and cases for handling them add approximately fifteen per cent to the distributing cost of milk.

Refrigeration and Power.

Because of the great demand of some of our larger cities for an adequate supply of milk, it is necessary to go long distances into the country to obtain this milk. In the larger cities it is not unusual for milk to be three days distant from producer to consumer. Because of this condition and the extremely perishable nature of milk, refrigeration is one of the important phases of the modern milk industry. Plant refrigeration in most milk plants with over five delivery wagons is by mechanical means. This particular phase of the business requires over seventy-five per cent of the needed power of the plant. For this reason refrigeration and power are taken together. This division of milk plant management ranges from two to four times the cost of either receiving or processing. Milk received at the plant one day is processed and not delivered until the next morning. This requires a large cooling room where the milk must be stored over night in order that it is in a good condition to go on delivery the next day. Cooling the milk to a low temperature before bottling also requires a large amount of refrigeration.

Other power required to operate the plant is used in operating the can washer, bottle washer, bottler, and pasteurizer. These all require some steam as well as does the heating of the plant during winter months. In better arranged plants, the exhaust steam is used for these purposes.

Delivery Costs.

The delivery of milk from the milk plant to the door step of the consumer is the largest single cost item in the milk distributing business. From thirty to sixty per cent of the costs of the milk business can be accounted for by a study of the delivery system. There are three general causes which influence the costs of delivery.

1. Demand of the city.
2. Administration by the distributors.
3. Administration by the city.

The Demand of the City.

The demand of the city may be divided into two classes. First, the demand on delivery through the location and plan of the city that may effect efficiency of delivery. Second, the demands of the consumers themselves.

The arrangement of the city in delivery of milk plays a very important part in efficiency of delivery and also has a psychological effect on the consumer. Cities, which are badly cut by rivers or by many railroads passing through them, or cities which have centrally located large manufacturing plants, cause a large amount of detouring and extra travel on the main crossings. Many cities are laid out according to the topography of the country, or for certain landscape designs which often cause unnecessary driving or walking to deliver the milk. Large estates, houses far

apart, parks, and boulevard drives all extra time and labor to deliver milk.

Greater than the arrangement of the city in influencing the cost of milk, are the demands of the consumer. Although it is from the consumer that the complaints arise as to too great a duplication of deliver, it is the consumer that demands that another dealer serve him rather than the dealer who serves his neighbor. Many things influence the consumers to patronize different milk dealers. Individual tastes vary. Some prefer pasteurized milk flavor, some Holstein milk, some Jersey milk, some certified milk or grade A milk, while some who have been raised on farms where dairy methods are careless condemn milk as being flat and tasteless unless it has a dirty or cow barn flavor.

Dealers strive to serve these pecularities, but it is impossible for one dealer to carry milk which meets all the above requirements. This necessitates different dealers serving a single neighborhood, in order to supply the demands of the consumer. This extra service is not only due to peculiarities of taste and quality and sanitation, but many other personal reasons. Dealers who sell cheap milk obtain one class of people for their patrons. Some people desire credit dealers. Some prefer cash payments. Relatives or friends occasionally account for an extra distributor in a territory.

Difficulties between customer and dealer, such as misunderstanding in charges, returned bottles, stolen milk, stolen money, etc. cause people to demand the service of an extra dealer. Invalids and babies often call for a special milk. The writer has observed two milk men serving a single family because they wanted a certain class of raw milk for the baby, but preferred pasteurized milk for the rest of the family. Generally the consumer demands a great amount of service and the distributor makes a very great effort to meet the demand. Efficient administration on the part of the city would tend to regulate excess delivery by standardizing the product. This would limit the demands of the consumer. Also the service of the distributor should be regulated as shown later in this thesis.

Administration by the Distributor.

Every distributor makes an effort to deliver his milk efficiently. To accomplish this he strives to get greater efficiency out of his deliverymen. The efficiency of the deliveryman in handling his own route has more to do with the efficiency of delivery than any modification the city could make by handling the routes collectively. This being true, the city administration should first strive toward the efficiency of the deliveryman or the unit of delivery.

There are several things which stimulate efficiency of delivery, chief among these is the method of payment of the driver. Since it is the personal element which affects to a large extent the sales of a driver, anything which tends to improve this element tends toward greater efficiency. To this end, the paying of the driver a commission on his sales encourages him to do better work as well as more work. A peculiar feature of milk delivery is that the deliveryman is not the average laboring man, but must be considered as a salesman as well as deliveryman. This extra ability requires a higher class of labor. The following table will show the difference in sales between companies which pay their drivers on a commission plan and those which hire on a straight salary.

Table IV. Showing the monthly sales of forty-four drivers paid a commission and the monthly sales of forty-four drivers working on a straight salary.

Sales of Drivers Paid Commissions					Sales of Drivers on a Straight Salary				
Quarts Milk	Pints Milk	½ Pints Milk	½ Pints Whipping Cream	Quarts Butter-milk	Quarts Milk	Pints Milk	½ Pints Milk	½ Pints Whipping Cream	Quarts Butter-milk
9340	2385	1171	38	230	2790	2356	140	---	155
12551	3419	3472	102	223	3875	2945	357	9	62
11407	1192	704	31	88	4092	3596	837	---	78
12497	2342	1435	32	98	2635	1922	589	3	47
8172	2199	2175	27	113	4030	3007	186	---	140
13236	3495	1964	36	207	3162	4526	217	3	93
12453	2582	1672	102	127	3317	2356	558	---	31
13318	3499	1383	14	385	4309	1395	102	---	93
11267	2234	1138	13	382	6262	5890	310	37	---
13528	1279	519	39	186	6696	5270	2728	124	186
8680	1279	297	---	8	5270	3503	1705	248	62
14617	2053	386	17	537	7316	8897	558	155	---

Sales of Drivers Paid Commissions					Sales of Drivers on a Straight Salary				
Quarts Milk	Pints Milk	½ Pints Milk	½ Pints Whipping Cream	Quarts Butter-milk	Quarts Milk	Pints Milk	½ Pints Milk	½ Pints Whipping Cream	Quarts Butter-milk
10946	2683	695	28	217	5146	5673	744	31	---
10713	1702	593	23	202	8587	8897	961	31	62
6788	956	279	7	99	7471	6138	186	93	186
17125	1574	1240	--	3435	6324	5146	465	31	62
10645	1703	617	36	151	4247	2728	465	31	62
9056	1791	783	6	425	4464	5828	682	124	124
12562	3095	719	16	426	6107	9362	62	31	31
9004	1597	469	12	203	3317	1488	186	---	31
14264	695	508	---	1243	2325	1054	62	---	93
10587	265	279	9	434	5766	2635	1457	---	124
13031	2587	665	5	382	4340	1643	1395	713	---
9424	1402	389	90	425	6107	3658	1209	---	---
15440	629	398	3	620	5859	3441	----	---	---
11064	1128	333	5	649	6510	5456	651	---	---

Sales of Drivers Paid Commissions					Sales of Drivers on a Straight Salary				
Quarts Milk	Pints Milk	½ Pints Milk	½ Pints Whipping Cream	Quarts Butter-milk	Quarts Milk	Pints Milk	½ Pints Milk	½ Pints Whipping Cream	Quarts Butter-milk
10594	2612	2004	32	207	5301	3100	899	----	62
1042	1109	234	4	498	6479	1550	---	93	---
11479	2684	420	5	832	7006	1550	---	----	---
8753	1149	416	16	173	5332	4805	124	----	---
6953	94	74	5	341	4030	1736	---	----	---
7512	1856	350	44	189	2418	2914	465	----	93
11277	3221	503	46	1093	5952	4712	496	----	341
4021	12443	509	80	793	7905	5022	---	----	62
2542	10394	487	13	1001	5611	13950	465	----	---
4296	14189	974	67	822	4309	9393	775	----	---
4079	6067	164	49	667	5115	8338	310	----	---
2568	14378	722	98	522	2232	7068	310	----	---
5323	10979	523	71	1178	3379	3231	310	----	---
4278	11824	1493	35	938	2976	7254	186	----	---

Sales of Drivers Paid Commissions					Sales of Drivers on a Straight Salary				
Quarts Milk	Pints Milk	½ Pints Milk	½ Pints Whipping Cream	Quarts Butter-milk	Quarts Milk	Pints Milk	½ Pints Milk	½ Pints Whipping Cream	Quarts Butter-Milk
4596	11962	589	---	961	2511	2697	248	---	---
4960	4309	93	---	---	5084	7967	---	---	---
8184	8246	---	---	---	775	1488	62	---	---
6696	7998	---	---	---	2976	4216	---	---	---
* 410959	175279	33838	1256	21710	209715	199802	21462	1757	2253
** 9340	3984	769	29	493	4766	4541	488	40	51

* Totals

** Averages

Bottle Costs.

Another method of control of the cost of milk to the consumer through the delivery service is the payment of the driver for bottles returned, and in case of wholesale trade to charge for lost bottles. This gives the driver a better appreciation of the value of milk bottles. He takes more interest in his employer's business and has a greater incentive to gather more of the bottles which are a great expense to the dealer. The following table shows a difference in the number of bottles returned, where the driver is paid for returned bottles over the number of bottles returned by drivers on straight salaries. The following figures were taken from the books of the companies with which the writer worked, rather than by actual check at the unloading platform; this was done because when drivers discovered they were being checked on returns they made an extra effort to collect empties which almost invariably showed a greater number of bottles returned than were taken out. For this reason only those companies which checked returns are used in this table.

Table No. V. Showing the number of bottles returned monthly where the drivers are paid for returns and when not paid for returns.

Drivers Paid for Returns		Drivers not Paid for Returns	
Bottles Taken Out	Bottles Taken In	Bottles Taken Out	Bottles Taken In
13154	13315	6200	6014
19658	20018	8773	8525
13422	14131	9889	9827
16315	16353	6541	6324
12681	13497	10819	10261
20363	20448	7006	6820
16962	17462	7471	7347
18606	18700	14415	14291
15040	14552	17205	16802
15547	15954	12090	11749
10365	10588	18693	17980
18005	17318	13113	13206
14575	14213	30566	21080
13093	13707	15066	14911
8352	8726	12803	12431
23262	21790	8556	8742
13772	13810	11439	11129
12026	11906	16833	16771

Table No. V. (Continued)

Drivers Paid for Returns		Drivers not Paid for Returns	
Bottles Taken Out	Bottles Taken In	Bottles Taken Out	Bottles Taken In
16738	16554	11346	11160
11271	11161	17298	17391
17340	16984	14756	14539
11478	11616	5053	5053
16681	16333	4743	4557
11752	11876	18724	18352
17100	17732	17360	21204
13209	12903	21049	21142
15247	14957	12648	12369
12186	11555	19530	19499
15440	14787	18693	18507
10506	10554	19530	19592
7517	7675	18972	19127
9883	10256	20491	20243
16019	15746	16926	17205
* 477565	477177	464597	454150
** 14472	14460	14079	13762

* Total

** Average

The problem of bottles for the distribution of milk is of great importance in keeping down the distribution costs. Enormous losses have been caused by the loss of bottles either through the failure of the consumer to return bottles or breakage in distributing or bottling. Figures obtained by the writer of the loss of bottles are shown in the table on the following page. These figures were estimated by obtaining the number of bottles purchased in a year by all the distributors and checked with the figure obtained by finding the difference between the bottles taken out for delivery and those returned.

Not all of the bottles are an actual loss as some dealers charge for lost bottles. Some of the larger plants with bottling machines often sell to small merchants with hand cappers those bottles with chipped necks which do not work well in the capping machine.

The question often arises as to what becomes of the milk bottle. The writer in studying the situation has found them in many places. To begin with it should be remembered that there must be an empty and a full bottle in the home for practically every bottle delivered, and also that there must be three bottles in the plant or on the wagon for every bottle delivered. This represents five bottles in circulation for every bottle sold. The tremendous number of bottles needed by a city in which to deliver its milk is shown by the

Table No. VI. Showing loss of milk bottles for one year for the cities of Lansing, Kalamazoo, and Flint.

City	No. of Bottles Purchased by Dealers of City	Loss Per Capita of City Population	No. of Bottles Lost on Delivery	No. of Bottles Lost at Plants
Lansing	172800	3.01	157721	15079
Kalamazoo	174500	3.6	154744	19756
Flint	345600	3.5	288813	56787
Per Cent			86.8	13.2

table on the following page. Undoubtedly the greatest loss of these bottles is due to thoughtlessness on the part of the consumer. During the spring clean up, the writer has gathered on one milk route as many as three cases of bottles from rubbish placed on the street to be hauled away. One company with which the writer worked, hired men to gather bottles from the city dumps during this season of the year. The inconsiderate house wife takes advantage of a free container to put away for the winter certain canned goods. Many private garages find the milk bottles convenient for small amounts of different kinds of oil.

Another thing which causes a demand for extra milk bottles is the pint and half pint milk business. The containers for a quart of milk sold in pints and half pints cost more than the container for a quart of milk sold in a quart package. Not only do the containers cost more but the breakage is doubled and the losses are doubled. Not only on the cost of the container but when the price paid the producer for milk is excluded, the cost of placing a pint of milk on the door step of a consumer is practically the same as to place a quart there. For this reason there should be a difference in the price of quarts of milk when delivered in quart bottles over the price of a quart of milk when delivered in pint or half pint bottles. When this dif-

Table No. VII. Showing the number of bottles necessary to distribute a city's milk daily.

City	Sales of Milk in Terms of Bottles	Bottles In Homes	Bottles On Wagons	Bottles In Plant	Losses	Total Bottles in Use for Milk
Lansing	16186	32372	17230	40465	473	90495
Kalamazoo	14850	29700	16016	37125	406	83247
Flint	45442	90884	48629	113605	947	254065

ference is made the deliveryman is not subject to the criticism which sometimes occurs when he tries to reduce the number of bottles in his load.

Generally speaking, dealers have been doubtful about the advisability of making the change in the price of pints over quarts, but when once the change has been made there is never any question as to the advantage. There are some local conditions entering into the question but these are usually negligible when the larger distributors of the place agree to the policy. The following table shows some very interesting things relative to the subject. At the time the change in the price of quarts in quart bottles and quarts of milk sold in pint bottles was made, the sales were really affected, but they rapidly established themselves in favor of the distributor before the month had passed.

During the war when the price of milk steadily increased the tendency was to decrease consumption. It was generally supposed at this time that a change in the price of milk in pint and quart bottles would produce the same effect. Figures taken in the city of Flint which made the change at this time, prove the contrary. Milk which sold for fourteen cents for quarts and seven cents for pints was raised to fifteen cents for quarts and nine cents for pints. The consumers immediately cut down on their purchases so that some loads decreased as much as thirty per cent, while others remained about the same. For the entire city, the amount of

milk fell off about twelve per cent for the first week. This gradually changed so that by the end of the month the amount of milk sold was practically the same and any loss in sales was more than overcome by increase in profits on pints.

The city of Lansing made a difference in price of milk in pints and quarts on a lowering market in November, 1920. Milk was selling at fourteen cents for quarts and seven cents for pints. The first of December the price dropped to twelve cents for quarts and pints remained the same. The first few days the attitude of the people was to take a quart every other day instead of a pint, but apparently when they bought a quart they used it as they needed it and more often used a quart every day until at the end of the month, the total amount of milk sold had increased and this at a time when the city was going through an industrial slump.

Kalamazoo, the third city studied, was uninfluenced by economic conditions or change of population. The price of milk previous to December 10th, 1920 was fourteen cents for quarts, and seven cents for pints. This was then dropped to twelve cents for quarts and pints remained the same. After the change in price there was no marked change in amount of milk sold, although the proportion of pints to quarts changed greatly.

The following tables show what actually took place, not only for the city, but for each dealer in the three cities studied.

Table No. VIII. Showing the effect of changing the price of milk when sold in pint bottles and when sold in quart bottles.

Before Change in Price

City	Per cent sales	Per cent of milk sold in pints	Per cent of bottles pints	Proportion of pints to quarts
Lansing	100	45.96	62.97	1.701
Kalamazoo	100	48.75	65.54	1.9021
Flint	100	23.21	37.68	.6047

After Change in Price

City	Per cent sales	Per cent of milk sold in pints	Per cent of bottles pints	Proportion of pints to quarts
Lansing	101.46	17.87	30.33	.4353
Kalamazoo	101.95	28.24	44.05	.7872
Flint	100.71	13.09	23.15	.3012

Table IX. Showing the comparison of delivery of quarts and pints in city of Lansing by dealers before the change in price.

No. of Wagons	No. of Qts.	No. of Pts.	Proportion of Pts. to Qts.	Per cent of milk sold in Pts.	Per cent of pint bottles
11	2094.98	4045.85	1.931	49.12	65.88
1	155	216	1.393	41.07	58.22
1	121	75	0.6	23.41	38.27
1	122	208	1.705	41.59	63.33
5	706	1409	1.995	49.99	66.62
1	316	184	0.582	22.55	36.80
1	109	201	1.844	46.09	64.84
1	150	213	1.42	41.63	58.68
2	177	408	2.305	50.92	69.74
1	143	276	1.93	49.11	65.87
2	189	305	1.614	44.73	61.72
1	303	410	1.353	40.39	57.50
2	230	354	1.539	43.49	60.61
1	175	186	1.063	34.76	51.53
31	4991	8490	1.701	45.96	62.97

Table X. Showing the comparison of delivery of quarts and pints in city of Kalamazoo by dealers before the change in price.

No. of Wagons	No. of Qts.	No. of Pts.	Proportion of Pts. to Qts.	Per cent of milk sold in Pts.	Per cent of pint bottles
9	1524	1240	.8136	21.56	44.86
12	2358	2209	.9368	31.89	48.37
3	640	663	1.0360	34.12	50.88
1	107	48	.4486	18.32	30.96
1	75	34	.4533	13.04	31.19
2	326	138	.4233	17.47	29.74
2	386	229	.5932	22.87	37.23
1	210	176	.8381	29.53	45.59
1	171	100	.5848	22.62	46.90
1	209	50	.2392	10.68	19.34
1	226	50	.2212	9.96	18.12
1	172	155	.9011	31.06	47.40
1	130	56	.4308	17.72	30.10
1	78	94	1.2051	37.60	54.65
1	192	152	.7916	28.36	44.18
1	254	162	.6378	24.18	38.94
39	7058	5556	.7872	28.24	44.05

Table XI. Showing the comparison of delivery of quarts and pints in city of Flint by dealers before the change in price.

No. of Wagons	No. of Qts.	No. of Pts.	Proportion of Pts. to Qts.	Per cent of milk sold in Pts.	Per cent of pint bottles
31	15095	4647	.307	13.33	23.53
4	1242	273	.219	9.90	18.02
3	598	143	.239	10.68	19.29
2	239	118	.493	19.79	33.05
3	1149	239	.208	9.42	17.21
1		Sold Bulk Milk Only.			
2	337	160	.474	19.18	32.19
1	173	28	.162	7.48	13.93
2	288	153	.531	20.98	34.69
1	37	15	.405	16.85	28.84
1	180	60	.333	14.28	25.00
1	57	13	.228	10.23	18.57
1	286	80	.279	12.27	21.85
63	19681	5929	.3012	13.09	23.15

Part III.

Administration by the City.

From the preceeding tables one can easily see that the city administration should encourage a difference in price of milk sold in pints and quarts. Not only because of cheaper milk to the consumer but also because of a slight increase in comsumption of one of our most desirable foods. It should be quite evident from the above discussion that there is the possibility of a great deal of difference in the efficiency of distribution between the different distributors. The administration of the city milk supply has a very great effect upon the efficiency of the city milk distributing system. Those cities where there is no effort to control milk distribution show a great many wagons, much duplication and general inefficiency. It is usually these cities which are the strongest advocates of municipal milk plants, a franchised service corporation, centralized receiving and processing plants. The writer does not believe in any of the above ideas as a remedy for inefficiency in a poorly administered city. Where workable city ordinances are enforced, inefficiency is reduced to a minimum; and politics, shifted responsibilities, indifference through lack of competition, unsanitation, etc. are eliminated.

Salesmen and Collection.

Along with the expense of delivery are certain expenses which most of the larger concerns are subject to. As previously mentioned the driver is the salesman and collector for his company. Where there are over ten drivers in one company it is necessary to a route foreman over every seven drivers to keep the routes organized, to maintain closer contact between manager and men, to know the routes in case of sickness, to instruct new drivers in milk delivery and teach them the route, etc. These men also spend spare time drumming up new trade, collecting bad accounts or straightening out some of the many difficulties which may arise between driver and customer. Some of the larger companies employ men who do nothing but solicit patronage by obtaining new customers and straightening out trouble with established customers. In reality these men are part of the advertising campaign of the company.

Advertising.

Advertising dairy products that are under efficient sanitary supervision should be encouraged by the city. Men who have made a study of the subject have long maintained that milk and its products have a greater effect on the health and vitality of the general population than any other single food commodity. The success and development of any community depends to a large extent upon the health and vitality of its people. Advertising dairy products thus helps to build up the community. The first advertisement of dairy products should start with the dairymen themselves and the men who handle the product from producer to consumer. All of these people should believe in their product. With them as well as with all other people the advertising should be truly educational. It should be educational along the line of the value of dairy products on the general health and development of the individual and as an economical food. Deliverymen and salesmen, educated along these lines, have a big opportunity to increase the consumption of dairy products. The city itself should encourage greater consumption. It might be of advantage in some cities to make the license fee of dairymen high enough to finance an impartial advertising campaign to also increase the consumption. This can be done to good advantage by offering prizes for milk contests, such as answering questions by grown people, making posters by school child-

ren, gains in weight through drinking milk by children, etc. It should see to it that an adequate milk supply for the needs of all the inmates of public institutions is provided. Milk should be dispensed through the public schools at cost, so that at least one-half pint bottle (one glass) of milk can be placed within reach of every school child every day at school lunch hour. Prizes can be given for best records made in weight and height of every school child when it shows a relationship with the drinking of milk to undernourishment. Data secured on this subject emphatically demonstrates the vital importance of milk to the growing child and suggest the the great benefits which can be secured through systematic recording of the children's weight and height and steps to provide children with the milk required for their growing needs. In no other way can a city do so much for the welfare of its future citizens. There should also be established milk depots for the dispensing of milk for infants, for children under school age, for children of the poor, at a reasonable price. Parents should be encouraged and educated to the value of not less than a quart of milk daily for the use of every growing child in the family. This can be done through cooperation with women's clubs to pass down first hand information from woman to woman, the food value of milk as compared with other foods and the vital necessity of milk and other dairy products in the diet of the child, until every woman in

the city is familiar with all the dairy diet advantages. That there is need for this is shown by the following table on consumption of milk.

Table No. XIII. Showing the consumption per capita of milk for both city people and dairy farmers.

Consumption per Capita of Milk in Cities.

	Lansing	Kalamazoo	Flint
Quarts Consumed	14259	13481	25969
Consuming Population	57327	48487	100000
Consumption per capita Pints	.4975	.5561	.51938

Consumption per Capita of Milk on Dairy Farms.

County	Period of Time Studied	Families Studied	Consuming Population	Daily Consumption per Capita Pints
Kent	2 years	37	145	1.26
Livingston	3 years	40	179	1.36
Ingham	2 years	35	145	1.628
Macomb	2 years	33	138	1.32
Wayne & Monroe	2 years	36	156	1.42

The City Milk Ordinance.

The foundation of administering a city milk supply efficiently is a workable city milk ordinance insuring satisfactory settlement of all problems previously discussed. Such an ordinance when enforced, should assure an adequate supply of pure milk of good quality as well as encourage the dealer to give most cheerfully and efficiently the necessary and needful service at as low a cost as may be consistent with the quality and perpetuity of his service.

A workable city ordinance when enforced decreases the amount of delivery and improves the service. The requirement of sanitary methods, such as inspection, pasteurization, tuberculin test of cattle, recording thermometers, etc. is a direct service to the people, such as cannot be obtained in any other way. There are also many distributors under the old system whose ignorance is covered up, but when exposed by efficient inspection are forced out of business, thus decreasing the number of distributors and likewise the numbers of wagons. There is also a group of men who, when faced with the proposition of cleaning up their herds and barns, or pasteurizing, prefer quitting the business. Along with these men are those who are careless, indifferent, and carry on questionable practices. These dealers frequently

change their methods and stay in business when submitted to a new milk ordinance but even a few of these drop out. The final result of the adoption and enforcement of a workable city milk ordinance upon delivery is the culling or sorting out of the undesirable distributor and keeping only those desirable, as shown by the following table. This elimination decreases the number of dealers, thus decreasing the total investment. It aids in reorganizing the territory, making shorter drives and larger loads per wagon and so makes possible fewer wagons. It standardizes the product, which limits the consumer in demanding different dealers to come into the same territory. Dealers whose products are standardized are required by competition to hold their trade by giving service. The early morning delivery, the special delivery, the accommodating and cheerful deliveryman are all reflections of a standardized product.

Not only does a workable city ordinance, when enforced, decrease the amount of delivery and improve the service but it also raises the plane of competition. Instead of being a struggle for existence it becomes a dignified and legitimate competition. The small bottling plant in the kitchen or dark musty basement gives way to the well lighted sanitary milk plant. The small dealer with a horse and buggy or dilapidated covered wagon, carrying a few quarts, travel-

ing many miles and taking most of the day for delivery, gives way to the modern milk wagon, well kept, handling a sanitary package in convenient form, covered from dirt and dust and storm. The load is such as to give a full day's work for man and horse, and a minimum number of miles is traveled.

The business, to be effectively administered, must be open minded, with a forward outlook, adjustable to new demands of public, new growths, new discoveries, and inventions, and new conditions generally. But very little advancement could be expected in the line if the old order of things was maintained. The laboratories for inspection and scientific research for the improvement of the dairy business are possible only in the larger plants. Sterilizers, autoclaves, incubators, high powered microscopes, and high priced scientists are impossible to the one or two wagon basement establishment, which in general has no objective for which it is working.

Advertising campaigns, setting forth the value of good dairy products, are desirable to any city, educating the people to the value of sanitation and quality by opening the dairy plants to the public. It also helps to educate the salesmen along these lines. Thus advertising has a tremendous influence for the better on the majority of population and should be encouraged. This is only pos-

sible where the milk business is centralized.

The modern pasteurizers, sterilizers, bottling equipment, sanitary pumps, separators, filters, etc. are all developments as the result of a raised plane of business.

The special milk, cream, modified milk, commercial butter milk, special deliveries, before daylight and afternoon deliveries are demands from the consumers met only through the making possible of the larger distributors.

New conditions and demands can be expected of the market milk industry in the future. The best way to provide means to meet these conditions as they arise is through the competing companies themselves. The raising of the plane of competition establishes companies capable of meeting these conditions, companies with a forward outlook, desirable to the community and an advancement to the industry.

Modern dairy plants, such as are most desirable in the larger cities, are operated on a scientific basis. The handling of large quantities of such a perishable commodity as milk requires the service of a laborer with a special education or in general above the average intelligence. The managers of the different departments of such plants must be scientific specialists in order to produce quantity of products in an efficient manner and in a safe and modern way. The returns from the business must be such as to permit the employment of such men.

The problems so far discussed have dealt with some of the economic advantages of a workable city ordinance when properly enforced. However, these problems are secondary when the influence upon the health of the city is considered. A sanitary milk supply is a fundamental necessity to city health insurance. Many epidemics of disease in cities can be traced directly to the milk supply of the city. When disease menaces the general population of a city it is then a public problem to be controlled by law. To this end the city milk ordinance should be adopted and regulated.

Appendix.

In order to complete the thesis the following city ordinance is appended. After studying many ordinances, in order to formulate a suggested ordinance for the thesis, the following ordinance, with a few minor changes, was submitted to the writer for criticism. The completeness of the ordinance was such as to supersede the tentative ordinance of this thesis. So with the approval of the Head of the Dairy Department it has been used. Credit for this ordinance is due to the Dairy Department of the State Department of Agriculture, the State Attorney General's Office, and the Dairy and Bacteriology Departments of the Michigan Agricultural College.

A City Milk Ordinance.

An ordinance to regulate and control the sale of milk and milk products within the city of _____ and to provide for the inspection of dairy herds, dairies, milk plants and other plants where milk or milk products are produced, collected, manufactured, or sold. The city of _____ ordains:

Section 1. That for the purposes of this ordinance:

(a) Raw milk is milk in its natural state and which has not been treated by artificial means for the destruction of bacteria contained therein:

(b) Pasteurized milk is milk which has been heated to and held for thirty minutes at a temperature of approximately one hundred forty-five degrees (145°) Fahrenheit, never less than one hundred forty-two degrees (142°) Fahrenheit, and then promptly cooled to a temperature of fifty degrees (50°) Fahrenheit or lower; or milk treated for the destruction of bacteria contained therein by such other method as may be approved by the health officer or board of health.

(c) The words "milk" and "cream" when used unmodified in this ordinance shall be deemed to include milk and cream in their raw and pasteurized states:

(d) A milk plant or depot shall be deemed to be any place where milk is collected for the purpose of preparing it for distribution, delivery or sale.

(e) The word "person" shall hereinafter mean and include any individual, company, partnership, corporation, society or association.

Section 2. No person shall engage in the sale, delivery or distribution of milk or cream for consumption without first obtaining a license therefor as provided by this ordinance. Provided, That persons engaging in the business of delivering milk exclusively to any licensed milk plant within the city of _____ shall not be required to secure a license under this ordinance.

Section 3. Every person required to obtain a license as provided in Section 2 hereof shall apply for said license to the city clerk or other official authorized by the common council, such application to be in writing and in manner and form prescribed by the common council. The City Clerk or such other official shall upon recommendation of the Board of Health or some person designated by it to act in such cases, issue a license to any person complying with the provisions of this ordinance, upon payment of the following fees:

(a) For engaging in the sale, delivery or distribution of milk or cream, either wholesale or retail, the sum of $5.00 for each wagon or other vehicle used in said business:

(b) For maintaining a milk plant or depot within

the city of _____ the sum of $5.00.

(c) For selling or keeping for sale milk or cream at wholesale or retail in any store or restaurant the sum of $1.00.

Section 4. Every license issued hereunder shall expire on May 1st following the date of issuance unless sooner revoked as hereinafter provided. Licenses issued after November first shall be issued for one-half the regular fee.

Section 5. Every person applying for license under this ordinance shall present with his application the names and locations of all producers from whom he obtains milk and a written agreement that in case he shall thereafter obtain milk from producers other than those named, he will report their names to the board of health. The applicant shall also at the time he makes application for a license, or thereafter in case he obtains milk from producers other than those from whom he was obtaining milk at the time of application for license, present a written consent from each producer from whom he obtains milk, granting permission to the Board of Health or its representatives free and open access to his dairy or premises for the purpose of making an inspection of the premises, equipment and herds. Said producers' consent shall be substantially in the following form:

"I, _____, a producer of milk sold or to be sold in the city of _____, hereby grant permission to the board of health of said city, or its employees, free and open access to my dairy, herd, premises, utensils, wagons and conveyances for the purpose of making an inspection of the same so long as milk of my production shall be sold in said city."

Section 6. Raw milk, sold or to be sold in the city of _____, shall be from herds free from tuberculosis as determined by tests applied in a manner approved by the State Department of Agriculture.

Section 7. Persons selling pasteurized milk are not required to obtain their supply from tuberculin tested herds.

Section 8. No person shall sell or deliver, or have in his possession or custody with intent to sell or deliver, or bring or send into the city of _____ for sale or delivery:

(a) Milk or cream to which water or any foreign substance has been added, or which contains any visible sediment,

(b) Milk containing less than three per cent of butter fat or less than eight and one-half per cent (8½%) solids not fat, or cream containing less than eighteen per cent (18%) of butter fat,

(c) Milk or cream kept at a temperature higher than sixty degrees (60°) Fahrenheit.

(d) Milk or cream produced from diseased cows or from cows during the period of fifteen days (15) preceding parturition, or within such time thereafter as the milk is abnormal, or from cows which have been fed unwholesome food or have had access to contaminated water,

(e) Milk or cream which has been produced, stored, handled or transported in any unclean or unsanitary manner or has been ordered excluded from the city of _____ by the Board of Health or its representatives,

(f) Milk or cream which is placed in containers not properly washed or steamed,

(g) Milk or cream containing more than 200,000 bacteria per c. c. as shown by the standard method of milk analysis,

(h) Raw milk or cream which does not come from herds having been found to be free from tuberculosis,

(i) Milk which has had the cream line increased by artificial means,

(j) Raw milk which shows on three successive occasions a score of less than seventy (70) as determined by the Cooledge* hydrogen ion (pH) method,

(*) See Technical Bulletin No. 52, Michigan Agricultural College, East Lansing, Michigan.

(k) Pasteurized milk which shows a score of less than ninety (90) as determined by the Cooledge* Hydrogen ion (pH) method.

Section 9. Nothing in this ordinance shall be construed to prohibit the sale of skim milk, sour milk, sour cream, or buttermilk when properly labeled as such and handled in a sanitary manner.

Section 10. Milk or cream shall not be sold or offered for sale except in bottles or sealed cans. The cans shall not be less than one gallon capacity. Bottles or cans may be filled only at the dairy or such other place as the Board of Health has approved. The washing and sterilizing of all milk bottles and milk utensils shall be subject to the approval of the Board of Health.

Section 11. Bottles left at any place where there exists a contagious disease shall not be collected until after disinfection under the direction of the health officer.

Section 12. The Board of Health may purchase from time to time such equipment as may be necessary for the purpose of testing milk, cream or other dairy products.

Section 13. The Board of Health may make such rules and regulations from time to time as are necessary for carrying into effect the provisions of this ordinance, and shall have power to exclude from the city of _____ milk or cream found impure and unfit for human consumption.

Section 14. The Board of Health may suspend or revoke for cause any license or permit granted hereunder. Before such action is taken, however, the person holding said license shall be given an opportunity for hearing before the Board of Health.

Section 15. Any producer or distributor of milk or cream shall upon request sell a sample of milk or cream not to exceed one quart, to any official designated by the Board of Health to collect samples for testing and examination.

Section 16. The Board of Health shall on or before _____first_____ of each year appoint a milk inspector who, unless sooner removed by said Board of Health shall hold office until _____first_____ following his appointment and until his successor is appointed and has qualified. He shall receive such compensation as may be fixed by the Board of Health the same to be paid out of the annual Board of Health appropriation and shall perform such duties and shall have such powers and authority in the making of inspections under this ordinance as may from time to time be prescribed by the Board of Health.

Section 17. The act, omission, or failure of any officer, agent or any other person acting for or employed by any individual or any partnership, corporation, society or association within the scope of his employment or office shall in every case be also deemed to be the act, omission

or failure of such individual, corporation, partnership, society or association, as well as that of such officer, agent or other person.

Section 18. Any person violating any of the provisions of this ordinance or of the rules and regulations of the Board of Health adopted hereunder, shall upon conviction be punished by a fine of not more than _____ dollars or by imprisonment of not more than _____ days in the county jail, or by both such fine and imprisonment in the discretion of the court.

Section 19. This ordinance shall take effect _____ 192_.

Approved _____, 192_.

_____
Mayor

The following are suggested as suitable rules and regulations to be established by the City Boards of Health, health officers, or other local officials invested with authority to promulgate rules and regulations under provisions of Ordinance No. _____, City of _____, State of Michigan.

"State of Michigan,
City of _____.
By virtue of the power conferred on the undersigned by the provisions of Ordinance No. _____, City of _____, governing the production of milk sold or offered for sale at any point within the city of _____, the following rules and regulations are hereby promulgated effective at once.

Milk.

1. Milk, as defined in the ordinance above cited, shall not be sold or offered for sale within said city which is unwholesome, watered, or otherwise adulterated, or which is from cows suffering from disease or that are kept in connection with any family in which there is an infectious or contagious disease.

2. The utmost cleanliness must be observed in the production of milk sold or offered for sale within the City, including the cleaning of flanks, udders and teats of cows

with a sufficiently damp cloth before each milking.

3. All stables in which cows are kept and from which milk is produced and sold within the city of _____ shall be subject to the following requirements:

(a) Ceilings must be kept tight.

(b) The interior of the cow stable must be kept clean; free from cobwebs and accumulation of dust; and the walls and ceiling must be whitewashed once within each twelve months unless the interior of the stable is properly painted.

(c) Manure shall be removed every day to a distance of at least 25 feet from the stable. .

(d) An average of at least 300 cubic feet of air space must be provided within the cow stable, for each animal kept therein.

(e) No animals, other than cows, shall be kept in cow stables where milking is done.

(f) The cow stable must be supplied with windows to provide an average of at least one square foot of window light for each stanchion.

(g) If a controllable flue system of ventilation is not provided, windows must be hinged at the bottom and constructed so as to tip inward from the top and be boxed in at the sides to provide a means for ventilation control.

Milk Houses.

(1) All milk houses in which milk is kept that is offered or exposed for sale in the city of _____, shall be constructed so as to be rat and vermin proof; inclosed on all sides; provided with windows to supply plenty of light; with doors and windows properly screened; and of adequate size to contain a cooling tank or milk cooler; rack upon which to store empty cans, pails, etc., and with sufficient space to strain and handle the milk, must be provided. The milk house shall be located where it is free from contaminating conditions and is readily accessible from the cow stable.

(2) A cooling tank (preferably of cement), of sufficient depth and capacity to hold and keep cold all milk produced on the premises, must be provided within the milk house.

(3) All milk sold or offered for sale shall be strained through a flannel or cotton pad strainer, and if flannel is used it shall be thoroughly washed and boiled after each time it is used.

Toilets.

Toilets must be kept clean and sanitary.

IN WITNESS WHEREOF, I herewith set
my hand in the City of _____,
day of _____, Nineteen
Hundred Twenty-two.

Official Title."

In making rules and regulations it is just as important that they be made to suit the particular city as it is in framing an ordinance. This ordinance especially provides for rules and regulations and by changing the rules and regulations to fit local conditions the ordinance can be adopted in practically any city, except possibly two or three of the larger cities in the State.

In the smaller cities where farm inspection is impossible, the rules concerning the production of milk should be largely omitted, as it would be useless to establish rules affecting the cow stable, etc., and then not do any farm inspection. It would not be advisable to require milk houses unless farm inspection is provided for, and then it might be best to only require milk houses where milk is bottled on the farm. The very small city or village which can only afford a limited amount of inspection should be content with a few requirements that can be enforced, rather than have a large number of regulations which could only partially be enforced. A village with very limited funds can regu-

late the pasteurization temperature, take samples occasionally for testing, and require that raw milk come from tuberculin tested cattle, etc.

It shouldbe remembered that the State law may be used by any local inspector or other individual and that the State law covers in a general way the sanitary production of milk and cream, establishes a standard for milk, cream, ice cream, butter, etc. A city ordinance should, therefore, be framed merely to add requirements to affect the milk supply of the local city or village.

Pocket has: 1 Map &
3 Suppls.