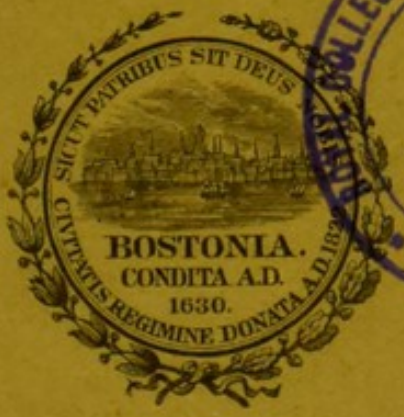
Twenty-ninth annual report of the Inspector of Milk and Vinegar : from January 1, 1887, to December 31, 1887.

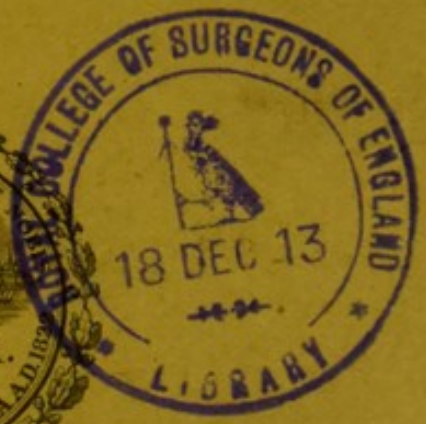
TWENTY-NINTH ANNUAL REPORT

OF THE

INSPECTOR OF MILK AND VINEGAR,

FROM JANUARY 1, 1887, TO DECEMBER 31, 1887.





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CITY OF BOSTON.

TWENTY-NINTH ANNUAL REPORT

OF THE

INSPECTOR OF MILK AND VINEGAR,

FROM JAN. 1, 1887, TO DEC. 31, 1887.

Office of the Inspector of Milk and Vinegar,
1151 Washington Street.

To His Honor the Mayor and the Board of Aldermen of the City of Boston: —

Can there be any crime more detestable than the mercenary villany which would rob the sick and feeble of the indispensable elements of life? Those who are disposed to think lightly of milk-adulteration will do well to consider the two cases which follow: —

Case I.

In the latter part of November, a poor woman, Mrs. McN——, called at the Milk Inspector's office, bringing with her a quart can of milk. She stated that she had a little one, six months old, sick at home, for whom the milk was supplied by a certain milkman at seven cents a quart; she had consulted the dispensary doctor, being too poor to employ any other, and the physician had reported that the infant, poor and emaciated, must have pure milk, or it would not live. She said that she had repeatedly spoken to the milkman about his milk, and had told him that she had a sick child and must have good milk. The milk-

man had assured her that the milk was "one cow's milk," and that it was the very best that could be obtained; still her child continued to fail, and to set all doubts at rest she had brought the milk, delivered that morning, to the office to have it tested.

The milk proved to be a heavily watered specimen, skimmed and colored. Upon the information thus received the inspector visited the house in Oswego street and waited for the arrival of the milkman. At length he came, left his milk and started to drive of, when, to his surprise, the inspector, who had been waiting in the woman's kitchen, called him back and informed him that he would take some of his milk for inspection. The following conversation took place between the milkman and the inspector.

MILKMAN. — What's the matter? The milk is all right, ain't it?

INSPECTOR. — I don't know — we are trying to find out.

MILKMAN. — It's just as I get it. I guess I'll take a sealed sample. Say, has the woman been kicking about her milk?

INSPECTOR. — There has been a complaint — Yes.

MILKMAN. — It's funny she never said anything to *me* about it. If there is anything wrong about the milk I didn't know it. It's just as I get it.

The milk, on analysis, showed only eight and a quarter per cent. of milk solids, one and a half per cent. of fat, annotto-color and thirty-three per cent. of added water. The following day the milkman called at the office and said that he *knew* the milk was not right, but he was short of milk.

CASE II.

The following letter was received from a well-known physician in the city of Boston: —

No. 252 ——— Street, Feb. 4, 1887.

DEAR SIR, — There is at No. 6 ——— street a day nursery, of which I am the medical attendant. The milk used is supplied by ———, of Somerville. Within a few days I have had the milk examined, and find that it has been diluted one-fifth with water. We shall change milkman at once, and shall begin on Monday. I wish, however, that you would take the matter up and see if the law will have any effect upon him. I am,

Yours truly,

———, M.D.

This letter is only one of many which might be produced; but what a situation does it present! A charitable in-

stitution, a day nursery where poor people, unable to employ a servant, and obliged to work for a living, may leave their young children in the morning and return for them at night after their day's work is over. And here is a man, if he may be called such, who is willing to cheat these poor children — is willing to steal the food from their lips, and all for a few cents of extra profit. Language fails to properly characterize, and laws are inadequate to properly punish, such a villain.

The year 1887 has been an eventful one in the department of milk and vinegar inspection. The quantity of milk sold has increased 2,100 gallons per day over the amount sold in 1886; the number of milkmen and milk routes has been considerably reduced, — many smaller routes having been absorbed by some of the larger and more reliable dealers; the percentage of adulterated samples for the year has fallen to 12.54 per cent., — a lower figure than at any previous time in the twenty-nine years since the office was established; colored milk and milk impaired by so-called "preservatives," as boracic and salicylic acids, has been almost wholly suppressed, — a result due in great measure to improvements in detecting these substances made in laboratory of the department; many cases have been prosecuted, and convictions of some of the most notorious milk adulterators obtained, notwithstanding the most determined opposition of eminent counsel; the annual attempts of these men before the legislature to lower the legal standard of milk, and otherwise make it difficult or impossible to secure convictions, have signally failed; questions of law carried to the Supreme Judicial Court in several important cases have resulted in decisions favorable to the department; fraudulent sales of oleomargarine are now confined to a comparatively few dealers, although there has been neglect and carelessness on the part of perhaps one quarter in number of the retail dealers in regard to marking their packages as required by statute; vinegar adulteration has been reduced, and certain brands of fraudulent goods driven from the market; the expenditures of the department have been kept within the amount of the appropriation, and the income from licenses (paid to the city) and from fines (paid to the county) have been equal to 80 per cent. of the expenses.

The details of these results are as follows: —

LICENSES.

The Inspector is required on the first day of May, or within thirty days thereafter, to license all persons who convey milk in carriages or otherwise for the purpose of selling the same within the city, the license fee being fifty cents, and renewed annually.

To keep a record of the name, residence, place of business, number of carriages or other vehicles used, the name and residence of every driver or other person engaged in carrying or selling milk, and the number of the license.

To require the owner's name, number of his license, and place of business to be legibly placed on each outer side of all carriages or vehicles used in the conveyance and sale of milk.

To register the name of every person selling or offering milk for sale in a store, "booth, stand, or market-place" within the city; the license fee, fifty cents, not being required to be renewed.

To register in like manner the name of every person selling or offering for sale oleomargarine, or butterine, within the city. This license fee, being fifty cents, is required to be renewed annually.

MILK LICENSES.

Number of yearly milk licenses issued to dealers conveying milk from place to place, by carriages or otherwise	694
Number of licenses issued to store-keepers not previously registered	512
Total number of milk licenses issued	1,206

OLEOMARGARINE LICENSES.

Number of oleomargarine licenses issued to store-keepers	112
Total number of licenses (milk and oleomargarine) issued	1,318
Fees received for the same and paid to the City Collector	$659.00

INSPECTIONS.

It is the duty of the Inspector to enter all places where *milk* is stored or kept for sale, and to take samples, which he shall cause to be analyzed, or otherwise satisfactorily tested.

To take samples of *butter*, *oleomargarine*, and *cheese* for the same purpose.

To examine samples of *vinegar*, for strength, purity, and freedom from deleterious substances.

Number of milk inspections	9,973
Number of oleomargarine inspections . . .	779
Number of vinegar inspections	775
Total number of inspections . . .	11,527
Number of warnings issued to store-keepers: —	
For milk not of standard quality . . .	826
For oleomargarine not properly marked . .	31
For vinegar not of standard quality . . .	179
Total number of warnings . . .	1,036

COMPLAINTS.

The Public Statutes provide penalties: —

For neglecting or refusing to license or register for the sale of milk: in the case of a milk peddler, a fine of not less than thirty nor more than one hundred dollars; in the case of a store-keeper, a fine not exceeding twenty dollars.

For selling, exposing for sale, or having in possession with intent to sell, adulterated milk, or milk not of good standard quality, or milk to which water or any foreign substance has been added, or milk from sick or diseased cows, or cows fed on the refuse of distilleries: for a first offence a fine not less than fifty nor more than two hundred dollars; for a second offence a fine not less than one hundred nor more than three hundred dollars; and for a subsequent offence a fine of fifty dollars and by imprisonment in the house of correction for not less than sixty nor more than ninety days.

For selling, exposing, etc., as pure milk, milk from which any part of the cream has been removed. Penalties as above.

For selling, exposing, etc., skimmed milk except from cans or other vessels marked as required by statute. Penalties as above.

For selling, exposing, etc., skimmed milk containing less than nine and three-tenths per cent. of milk solids exclusive of the fat. Penalties as above.

For obstructing in any manner the Milk Inspector or his assistants, in the performance of their duties: a fine

of not less than one hundred nor more than three hundred dollars, or by imprisonment for not less than thirty nor more than sixty days.

For neglecting or refusing to register for the sale of oleomargarine: a fine not exceeding twenty dollars.

For selling, exposing, etc., oleomargarine unless marked as required by statute: for a first offence a fine of one hundred dollars, and for a second and each subsequent offence a fine of two hundred dollars.

For erasing, cancelling, etc., any marks provided by statute, or in any manner falsely labelling any packages so marked. Penalties as above.

For selling, exposing, etc., any oleomargarine marked with the words "dairy" or "creamery." Penalties as above.

For selling, exposing, etc., as cider vinegar, vinegar not made exclusively of apple cider: a fine not exceeding one hundred dollars.

For selling, exposing, etc., vinegar containing any artificial coloring matter, or containing any preparation of lead, copper, sulphuric acid, or any ingredient injurious to health: a fine of not less than fifty nor more than one hundred dollars.

For selling, exposing, etc., any vinegar not of standard quality, *i.e.*, containing less than four and one-half per cent. of absolute acetic acid, or, in the case of cider vinegar, containing less than two per cent. by weight of cider-vinegar solids: a fine not exceeding one hundred dollars.

The Public Statutes provide that it shall be the duty of the Inspector to make complaint for any of the offences thus enumerated which may be brought to his notice, as the result of his analyses of samples, or upon the information of any person who lays before him satisfactory evidence upon which to sustain such complaint.

Municipal Courts.

Number of complaints entered in the District Courts	209
Boston	95
South Boston District	28
Roxbury District	55
Charlestown District	17
East Boston District	10
West Roxbury District	4
Complaints tried in District Courts	184
Complaints pending in District Courts	25

The one hundred and eighty-four complaints tried in the District Courts were disposed of as follows: —

Number of convictions	157
Number of cases dismissed	13
Number of cases placed on file, on payment of costs	7
Number of cases *nol. pros'd*	3
Number of complaints quashed	2
Number of complaints in which warrants returned with "no service"	2

Of the one hundred and fifty-seven complaints in which convictions were obtained in the District Courts there were settled in the lower courts	74
Appealed	78
Sent to the Grand Jury	5

Superior Court.

Number of complaints before the Superior Court	84
Carried up on appeal	78
Awaiting action of Grand Jury	4
Indicted by Grand Jury	2
Cases disposed of	72
Cases pending	12

Of the seventy-two cases disposed of in the Superior Court the results were as follows: —

Number of convictions	37
Number of cases placed on file, on payment of the costs	29
Number of cases in which verdict was Not Guilty,	3
Number of cases *nol. pros'd*	3

Supreme Judicial Court.

Number of cases carried up on exceptions	4
Number of cases waiting decision	3
Number of cases waiting decision at date of last report	3
Number of cases in which exceptions were overruled	4
Number of cases in which exceptions were sustained	0

Old Cases of 1886 settled during the Year.

At the date of the last report there were pending in the District and Superior Courts, seven cases.

These have been settled as follows: —

Number of convictions	3
Number in which warrant returned no service	2
Number *nol. pros'd*	1
Number dismissed	1

General Summary of Results of Cases in the District and Superior Courts for the Year 1887.

Whole number of cases	210
Whole number disposed of	173
Whole number now pending	37

The dispositions of cases have been as follows: —

Number of convictions	108
Number placed on file on payment of costs	36
Number of cases dismissed	16
Number of cases *nol. pros'd*	6
Number of complaints quashed	2
Number of cases awaiting decision of Supreme Court	3
Number of cases in which warrant returned no service	2

The two hundred and ten cases complained of were for the following: —

For violations of milk statutes	163
For violations of oleomargarine statutes	46
For violations of vinegar statutes	1

For violations of the statutes relating to milk and oleomargarine there have been paid in fines, exclusive of the costs, the sum of $6,100.

STATISTICS.

	1886.	1887.
Number of milk routes in the City of Boston,	664	[1] 632
Routes of 1 to 5 cans	178	163
Routes of 5 to 10 cans	84	83
Routes of 10 to 25 cans	117	115

[1] This figure does not include the whole number of licensed dealers, some of whom sell less than one can daily.

	1886.	1887.
Routes of 25 to 50 cans	177	150
Routes of 50 to 100 cans	78	88
Routes of 100 to 200 cans	17	16
Routes of 200 cans	7	9
Routes exceeding 200 cans	6	8
Number of drivers employed	529	543
Number of wagons employed	592	559
Number of cows kept within the city limits, whose milk is sold	1,619	1,668
Approximate number of cows required to furnish the daily supply of milk	25,000	26,000
Estimated number of quarts for average daily supply of the City		189,040
Estimated number of quarts for yearly supply		69,000,000
Estimated annual consumption *per capita*		43 gallons
Estimated daily cost to consumers		$11,342
Estimated annual cost to consumers		$4,140,000
Estimated increase of value of milk sold over the value in 1886		$185,627
Estimated annual cost *per capita*		$10.35
Annual cost *per capita* for inspection in the City of Boston		2 cents.

Quantity of Milk daily supplied to City of Boston, as per Inspector's Reports, from 1862 to 1887: —

1862	15,000 gallons.
1863	16,000 "
1864	16,595 "
1865	15,733 "
1866	16,129 "
1867	17,125 "
1868	17,493 "
1869	19,686 "
1870	20,948 "
1871	23,316 "
1872	24,009 "
1873	25,282 "
1874	26,329 "
1875	34,578 "
1876	34,670 "
1877	30,388 "
1878	27,400 "
1879	28,256 "
1880	29,000 "
1881	33,084 "

1882	33,084 gallons.
1883	35,646 "
1884	36,000 "
1885	44,708 "
1886	45,140 "
1887	47,260 "

A careful compilation of statements of milk-dealers made at the time of the issue of their licenses shows that of this quantity there are supplied to families 24,570 gallons, and to stores and hotels 22,690 gallons.

Table showing the Ratio of Milk Supply to Population.

Year.	Population.	Gallons.	Gallons per 1,000 of Population.
1862	183,000	15,000	81.9
1865	192,318	15,733	81.3
1870	250,526	20,948	83.6
1875	341,919	34,578	101.1
1880	362,839	29,000	79.9
1885	390,393	44,708	114.5
1887	400,000	47,260	118.1

The Massachusetts State Board of Health, in their Annual Report for 1886, in commenting upon the figures as shown in the above table, say : —

A marked downward fluctuation occurred from 1876 to 1878, undoubtedly due to financial depression. In the census year of 1880, the ratio appears to have been about 80 gallons per thousand of the population, with a tolerably uniform rate of increase from that time to 1884, when the ratio was 93.7 gallons per thousand of the population. In the next year appears a very marked increase to 114.5 gallons per thousand inhabitants. A reasonable explanation of the change may be found in the thorough enforcement of the laws relative to the inspection of milk, in consequence of which the population are now receiving pure milk in the place of milk largely diluted, a proportionately larger quantity being required for the purpose.

More than ninety per cent. of the milk supplied to the city is brought in by the railroads and sold by milk-contractors to the milk-peddlers who distribute it to customers. A small percentage is collected by milk-peddlers from farmers in their neighborhood, while a very insignificant portion is actually raised by the milk-peddlers.

The following table shows the location of the stables of milk-dealers selling ten cans and upwards : —

City of Boston	312
City proper	26
Highland District	74
Charlestown District	67
South Boston District	42
Dorchester District	42
Jamaica Plain	23
Brighton	17
East Boston	14
Mattapan	6
Neponset	1
Somerville	61
Waltham	16
Dedham	15
Brookline	15
Everett	14
Cambridge	13
Lexington	13
Milton	11
Arlington	8
Chelsea	6
Winthrop	5
Quincy	5
Norwood	3
Needham, Medford, Newton, and Malden, each	2
Lincoln, Belmont, Squantum, Weston, Watertown, Stoneham, and Hingham, each	1

Results of Inspection.

A very striking contrast is presented when the quality of the milk supply of Boston at the present time is compared with that of the previous five years. Since July, 1885, there has been kept at this office a monthly percentage record of the samples of milk below the legal standard. The records for stores and wagons are kept separately, and also a record of results of the total milk from both sources. These results are as follows: —

Table showing the Percentage of samples of Milk not of Standard Quality as sold in stores in the City of Boston from July, 1885, to December, 1887.

	1886.	1887.
January	16.72 per cent.	18.80 per cent.
February	20.39 "	17.37 "
March	28.30 "	16.01 "
April	25.08 "	23.30 "

	1885.	1886.	1887.
May		37.50 per cent.	15.01 per cent.
June		20.77 "	8.35 "
July	61.42 per cent.	39.90 "	27.67 "
August	61.54 "	26.64 "	13.15 "
September	62.08 "	23.27 "	7.86 "
October	33.68 "	14.83 "	11.76 "
November	38.14 "	10.92 "	5.22 "
December	24.63 "	11.08 "	4.89 "

Table showing the Percentage of samples of Milk not of Standard Quality as sold from wagons in Boston from July, 1885, to December, 1887.

	1885.	1886.	1887.
January		7.25 per cent.	10.40 per cent.
February		8.42 "	9.90 "
March		4.05 "	12.23 "
April		7.68 "	23.32 "
May		8.20 "	12.36 "
June		6.25 "	2.05 "
July	30.20 per cent.	22.12 "	14.15 "
August	18.20 "	17.28 "	6.35 "
September	9 26 "	30.81 "	2.67 "
October	10.45 "	13.02 "	2.30 "
November	4.97 "	4.50 "	2.84 "
December	4.83 "	10.93 "	1.97 "

Table showing the Percentage of samples of Milk not of Standard Quality as sold from both wagons and stores in Boston from May, 1885, to December, 1887.

	1885.	1886.	1887.
January		13.86 per cent.	17.22 per cent.
February		16.75 "	16.01 "
March		16.56 "	16.37 "
April		18.01 "	23.30 "
May	38.60 per cent.	23.98 "	13.61 "
June	39.22 "	14.72 "	5.22 "
July	39.24 "	34.00 "	20.90 "
August	22.42 "	24.37 "	9.92 "
September	25.67 "	26.03 "	7.86 "
October	24.03 "	14.28 "	7.42 "
November	14.34 "	8.85 "	4.12 "
December	18.05 "	10.71 "	4.22 "

The general result for each of the years 1885, 1886, 1887, shows that: —

For the year 1885 the percentage of poor samples was 30.64.

For the year 1886 the percentage of poor samples was 18.55.

For the year 1887 the percentage of poor samples was 12.54.

Previous to the year 1885 no exact percentage record of poor samples of milk was kept by this office, but, from the figures as given in the annual reports of the Massachusetts State Board of Health, it appears that the percentage of adulterated samples in Boston, in 1884, was over 40 per cent., while in the year 1883 it was more than 60 per cent.

These results are shown in a more striking manner in Plates I., II., III., IV.

EXPENSES.

From January 1, 1887, to December 31, 1887.

For Salaries of Inspector, clerk, laboratory assistant, and three collectors of samples	$7,439.75
Printing	219.44
Chemical apparatus, glassware, and laboratory supplies	286.05
Chemicals for Laboratory	180.81
Advertising	42.38
Telephone service	120.00
Postage	50.00
Stationery, including type-writer	173.43

Incidental expenses, viz.: —

Samples purchased and expenses of collectors	$154.77	
Carriage-hire	122.50	
Extra services	63.00	
Bottles for samples	36.15	
Copies of Supreme Court Decisions,	20.00	
Other items	48.26	
		444.68
Total		$8,956.54

INCOME.

From January 1, 1887, to December 31, 1887.

From milk licenses	$603.00
From oleomargarine licenses	56.00
From fines as the result of complaints . .	6,100.00
Total	$6,759.00

DETAILS OF METHOD OF INSPECTION.

Collection of Samples.

The general features of the means adopted for carrying on the inspection of the food products with which this office is charged are substantially the same as those given in earlier reports, but are here repeated with some additions.

Section 1 of Chapter 318 of the Acts of 1886 provides that Inspectors of Milk "may, with the approval of the Mayor or the selectmen, employ suitable persons to act as collectors of samples, who shall be sworn before entering upon their duties." Under this section three collectors of samples have been employed during the year. These collectors are authorized by the statute to enter all places where milk is stored or kept for sale and all carriages used for the conveyance of milk, and to take samples for analysis from all such places or carriages. Samples taken by the collectors are put into clean and dry cans, each can being provided with a wooden stopper. Each can is numbered by being stamped upon the handle. At the time of collection a tag is filled out with the date, hour, name of dealer, locality, and all other necessary particulars, and is securely fastened to the handle of the can by means of a twisted wire. Each collector is provided with a small leather hand-bag holding ten cans, which is the number of samples procured at a single trip. As the statute requires that return sealed samples shall be given, if requested, it is necessary that the collectors shall carry materials for this purpose. The sample bags are accordingly provided with compartments holding small glass bottles, etc.

The full list of articles which must be carried by the collectors on every trip is as follows: Ten sample cans with stoppers, ten bottles fitted with corks, bunch of tags for marking cans, bunch of tags for marking sealed samples, wires for fastening tags to samples, sealing-wax, seal, spirit-lamp, matches, lead-pencil, and receipt-book for signature of drivers receiving sealed samples. Thus provided the col-

lectors visit different sections of the city at an early hour of the morning, sometimes starting out as early as 2 o'clock A.M., and await the arrival of the milk-peddlers supplying the locality. When the collectors have obtained the requisite number of specimens they report at the office, and deliver their samples to the Inspector or his laboratory assistant, by whom the necessary examinations and analyses are made. The person receiving the sample is required to place his initials upon the tag attached to the sample. Specimens of the various cards used, showing the manner of filling out, are given in the Appendix.

Each collector is required to make a daily report of the number of trips made, time of commencement and finishing each trip, number of samples obtained, expenses, etc. All samples brought to the office are submitted to a preliminary examination, by which is ascertained the specific gravity of the sample, and approximately the percentage of fat. By means of these data many of the specimens are shown to be of undoubted good quality, and are set aside; other specimens, *i.e.*, all doubtful ones, are submitted to chemical analysis.

The results of the analyses are recorded by the record clerk, being copied from the figures placed by the analyst upon the back of the tag accompanying each sample. No tag is removed from the sample can until the examination or analysis is completed.

The tags after removal furnish original memoranda from which, in case of complaint in the courts, the witness, whether collector or analyst, may refresh his memory. All tags are eventually filed away in suitable drawers, where, arranged alphabetically according to the names of the various dealers, they furnish a valuable card-catalogue which will at a glance show what sort of milk each dealer is carrying and during any period of time. There is now in this office a card-catalogue of this description, containing the results and all the details of more than 30,000 inspections. This catalogue at the same time shows the names of all drivers, license numbers, amount of milk sold by every dealer, and many other particulars. The system thus described is applied also to specimens of oleomargarine, butter, and vinegar.

Colored Milk.

Watered or skimmed milk has a peculiar blue color, when a thin layer is observed, and particularly that portion of the upper surface which is next to the sides of the containing vessel. This appearance is so noticeable, and the cause so

well known, that dishonest milkmen have found it necessary to color such milk, by adding something to give a rich, creamy, yellow color. The coloring of milk is a practice of long standing; Dr. Normandy in his Commercial Hand-book of Chemical Analysis mentions it as early as 1850, and it had probably at that time long existed. It was common with Boston milkmen more than twenty years ago, and is frequently referred to by Mr. Henry Faxon, Milk Inspector of Boston, in his annual reports (1864, 1867, 1868, 1870, etc.).

The use of color at that time was so general, that many whose milk was otherwise good felt obliged to use color when brought into competition with unscrupulous dealers whose watered product, disguised by color, appeared richer than their own pure article. One of the largest milk-contractors in Boston has informed the writer that he formerly required farmers who sent him their milk to color it, and he not only instructed them how to do it, but sent them the color prepared for use.

The extent of this practice may be learned from the following extract from the Twenty-first Annual Report of the Milk Inspector of the City of Boston, in 1880, Hon. Martin Griffin: —

> The use of colored or doctored milk is very general, at least in our city and its surroundings. It is an old custom, and the only surprise is that so little has been said or known about it. The public has been so long accustomed to this false article that it is now difficult to know the color of honest milk, and very rare to have the opportunity of looking upon it. Attention was first called to this matter by observing the milk as it came from the country, and then seeing a different color in the milk as sold. The secret was soon known. The milk was pure in the first instance, and doctored or colored in the other. Dealers make no secret in the matter; indeed, many of them complain that they are forced into the practice by their customers, who insist upon the colored being pure, and the white the impure; and that they have lost customers by leaving a pure, uncolored milk. Nor is this surprising; for people have so long been accustomed to this color, and been educated to the belief that the colored, creamy, brownish milk is the only good article, that they turn with disgust from the whitish, bluish tint of the pure product. By turning to the description of milk as given by Hassal, it will be found to be of a milky-white or bluish tint; hence any liberty taken with it exposes the spoliation of cream or the addition of water, and its poverty is apparent in the thin, watery appearance and bluish tint which are inevitable in milk thus treated. The adulteration is easily seen, and hence the purpose of coloring, to conceal the fraud by giving an artificial richness and color to hide the bluish tint.
>
> It is very effective for the purpose, and has done its work well. Some claim that they color only to please the customer, and that no adulteration is practised; there may be such, but they are very few in numbers.
>
> The sole use of coloring milk is to deceive and mislead the customer, and, as such, its speedy suppression is desirable. . . . The law

forbids this coloring, under the clause of "foreign substance," and wisely, for it acts a double part, — it adulterates, and then deceives.

Whatever may be said of coloring, in the nature of excuse, is idle, for there is no excuse or apology for it. It is no excuse to say that it is harmless, because the materials of it are not injurious to health, and that the color does not injure the milk, for the reason that the milk is comparatively worthless, and the coloring is to give it a false character, and thus impose upon the innocent. . . .

It is a cheat and a fraud on the public, and is never used but with that intent. It has been said by some that it improves the milk; but how, they fail to show. . . . There is no secret about it: its purpose is direct and plain; and, unfortunately, is all but common in use. Some accuse the public for the responsibility of this; but very unjustly, for the dealers alone are to blame for teaching the custom in the first instance, and continuing the cheat until it was almost impossible to detect or check it. They have created a false taste and judgment, have reaped the benefit, and should be held to the responsibility.

The milk color at first used was prepared from molasses or brown sugar, and sometimes from honey. The application of heat to these substances converts them into a substance known chemically as caramel, and this body dissolved in water produces a dark-brown solution which forms sugar-color. It is still extensively used for producing fine, old (?) brandy or whiskey from inferior goods, and for making so-called white-wine vinegar into cider (?) vinegar. About 1879 another preparation was manufactured, and has since been sold in large quantities, which consisted of a solution of annotto-color in potash or soda. The nature of this preparation, and the dishonest purposes it was intended to serve, may be gathered from the following letters from a manufacturer which came into the possession of the Massachusetts State Board of Health: —

———, Mass., Nov. 8, 1884.

Dear Sir, — I would like to call your attention to ———, for which I am the agent. It is the article which all milkmen in Boston and vicinity use to improve the quality of their milk, and to help them out when milk is scarce. It is perfectly harmless, and the milk inspectors and State Board of Health cannot detect it in the milk. The amount of water you can add to your milk in one day without detection will pay for ——— enough to use three months. If you have any friends in the business, please tell them of this.

Yours truly,

——— ———.

———, Mass., Nov. 8, 1884.

Dear Sir, — Yours received. Sent by Adams' express one bottle of "Benefit." Give it a good trial. Don't be afraid of the color, taste, or smell, as you will find it to be all right when in the milk. A sample of milk taken from a batch put up with "Benefit" and analyzed will prove to the inspector to be all right, as the "Benefit" counteracts the chemicals they have to use in the analysis.

DIRECTIONS FOR "BENEFIT."

Take a two-gallon can of cold water and add ——— of salt, ——— of brown sugar, and ——— of "Benefit." Shake it up so as to dissolve the salt and sugar, and then add ——— of water to ——— quarts of milk. If you take off cream from the milk add a trifle more "Benefit." Some use sugar only when sticking their milk pretty hard. It gives a good body, however.

Yours truly,

——— ———.

A bottle of this so-called "Benefit" was procured, and proved on analysis to contain a solution of annotto. It had a very offensive smell, and a nauseous taste. The label on this bottle is significant. It is as follows: —

BENEFIT. KEEP STRICTLY IN THE DARK — Use according to judgment — Keep corked. Prepared by ——— ———, P.O. Address, Pollard Square, Somerville.

The addition of such materials to milk, whether injurious or not, had long been prohibited. An act which became a law June 28, 1868, declared it to be unlawful to add "any foreign substance" to milk, and the Food and Health Act of 1882, in defining adulteration in articles of food, specified the addition of any color "whereby damage is concealed, or the article made to appear better than it really is," as one form of adulteration. These enactments have never been enforced, and it is not known that any attempt had been made to enforce them, but the Inspector was so fully persuaded that if the coloring of milk could be prevented, it could but have a marked effect in reducing the quantity of watered and skimmed milk, which had hitherto been sold, that, after mature consideration, it was decided to notify all dealers that they would be liable to complaint if colored milk or milk containing any foreign substance, intended for sale, was found in their possession. The announcement of the decision of the department to enforce the law was received with considerable opposition. Several of the largest and most respectable dealers visited the Inspector and declared that "the idea was impracticable; the color could not be detected; and the attempt to enforce the law would result in failure." Many milkmen, however, at once conformed to the requirements; but some persisted in doing otherwise, so that it became necessary to make complaints against a considerable number. Many of these complaints were most stubbornly contested, but finally resulted in a conviction in every case except one, where the jury disagreed. The de-

fendant in this case, however, pleaded *nolo contendere*, and paid his fine in a subsequent complaint.

The reform so successfully commenced has been continued to the present time, so that colored milk in Boston is now a thing of the past. True, we still occasionally find it in a badly watered milk, but its general and almost universal use, as formerly, has ceased.

It would have been useless, however, to have attempted this radical measure until some better methods than those formerly in use for the detection of annotto and caramel had been devised. This problem was undertaken by the Inspector with entire success. The process finally adopted is fully detailed on another page of this report.

So far as known, this is the first attempt to overcome this phase of milk adulteration, in any country, and Boston is the first city where convictions for the sale of colored milk have been obtained.

The general result has been what was anticipated, for the percentage of adulterated samples has been very materially reduced, having been, for the year 1887, as stated elsewhere, only 12.50 per cent. of the total number examined, while in the year 1885 the percentage was 30.64.

A part, at least, of this result is due to the steady enforcement of the law against the sale of colored milk.

ANNOTTO AND ITS DETECTION IN COLORED MILK.

Annotto is the name given to a dye-drug prepared from the seeds of a tropical shrub, known to botanists as the *bixa orellana*. The plant, originally a native of South America, was used by the natives as a dyestuff at the time of the discovery of America, and was made known in Europe soon after the conquest of Mexico by the Spaniards. Thomson, in his "Chemistry of Organic Bodies," describes the preparation of annotto as follows: "The fruit of the plant is a coccus containing thirty or forty seeds smaller than a pea, and having a vermilion red color. To extract this coloring matter the grains are rasped down, water is added, and the whole allowed to remain for some days. A sort of putrid fermentation takes place. The whole is thrown on a drain, and the water which holds the coloring matter in suspension is collected. The coloring matter gradually subsides." Dr. Thomson describes annotto as having no taste; but a disagreeable smell resembling that of putrid urine, and he adds in a foot-note, "This smell is not natural, but is communicated to it in the magazines by adding to it urine from time to time, in order to keep it moist and improve its color."

Dr. F. Crace-Calvert in his work on "Dyeing and Calico Printing" says: "It is imported from Mexico, Brazil, the Antilles, and especially from Cayenne, in masses varying in weight from 5 to 20 pounds, which are usually covered with banyan leaves or reeds. It is also imported as a homogeneous mass in casks weighing 4 or 5 cwt. The paste has a repulsive oder of urine, which is added by those who store it, to keep it moist and impart to it a brighter hue."

For many years preparations of annotto have been used for coloring butter, those persons using it being in all probability ignorant of its sources and the disgusting means employed in its manufacture. A microscopic examination of paste annotto, or of the alkaline solution of it as employed for coloring milk, shows, as Dr. Davenport has recently reported, the presence of innumerable *bacteria*, a necessary result of the putrefactive changes through which the coloring matter has passed. It is not surprising, therefore, that milk to which even the smallest quantity of annotto coloring has been added should sour much more rapidly than pure milk, — a fact which has long been known to milkmen, and many times acknowledged to the writer by milkmen of whom inquiries have been made.

The only method hitherto described in the books for the detection of annotto consists in the evaporation of 200 to 500 c.c. (one-half pint to one pint) of the milk, and the extraction of the nearly dried residue with alcohol. The alcoholic solution is then evaporated to dryness, and the solid portion thus obtained (containing the annotto color, if present, and some sugar of milk) tested for the production of the color reactions of annotto. This process is open to many objections. The evaporation of so large a quantity of milk by the slow method of the water-bath makes it impossible to examine any considerable number of samples in a single day; the color reactions of annotto are either impeded or modified by the presence of the sugar of milk which is invariably present; and the delicate and unstable coloring-principles are extremely liable to be injured or destroyed by the long-continued high temperature to which they are subjected during the evaporation of the water and the alcohol.

Two methods for the detection of annotto have been devised in the laboratory of the department. The first method to be described is adapted to the preliminary testing of a large number of samples of milk, and is most simple and practical in its application; it can, however, be employed only upon samples of sweet milk. The second method is applicable to either fresh milk or milk which has been kept

for months, as in case of sealed samples, and by its means may easily be prepared highly satisfactory exhibits if it becomes necessary to present evidence of annotto to a jury.

The methods about to be described have now been in use in the city laboratory for more than a year, and are thoroughly reliable and satisfactory.

First Method. — One hundred cubic centimeters of milk rendered alkaline by the addition of five cubic centimeters of solution of carbonate of soda (1 of carbonate of soda to 3 of water) are poured into a glass jar about one and a half inches in diameter and four to five inches in height. Into this jar is placed a strip of white filtering-paper (Schleicher and Schull's, extra heavy, No. 598) about five and a half inches long and one-half inch wide. The jar is then set aside in a place not exposed to the light, for twelve hours, or over night; at the expiration of this time the strip of paper is withdrawn and washed by running water, when, if annotto be present, the paper appears a pale salmon color, which is best seen when the moist strip is laid upon a piece of white filter-paper. The still moist strip of paper dipped into a solution of stannous chloride develops a decided pink color. By this means a mere trace of annotto coloring matter (one part of the solution as ordinarily used by milkmen to one hundred thousand of milk) is distinctly perceptible. With the quantity of annotto solution ordinarily used to color milk (one teaspoonful to eight cans, each can holding eight quarts) the pink color is very strongly developed.

It is essential that the milk be made strongly alkaline during the time the paper is immersed, for if the milk sours, the annotto coloring matter being insoluble in acid solutions is precipitated, and in this condition is not absorbed by the fibre of the paper. The size of the paper for the quantity of milk taken should not be very much larger than in the relative proportion given above, otherwise the coloring matter being spread over a larger surface is less distinctly noticeable.

It is a convenient method of distinguishing the various specimens to write the name of the dealer with pencil on each strip of paper before immersing it in the milk. By the process as above given it has been found possible to make as many as fifty tests for annotto in as many specimens of milk, in a single day. The strips of paper are put into the milk as soon as the samples are brought to the office, and examined the following morning.

The coloring principle of annotto (bixin) is, by the means described, perfectly separated from all other substances present in the milk, and may be further tested upon the paper

itself by any of the color reactions of annotto. The pink color produced by stannous chloride may be changed to the original salmon color by immersing the colored strip in dilute solution of sodium carbonate. The strip should be well washed, to remove excess of alkali, and carefully dried without heat; it may then be further tested by sulphuric acid, which produces a bluish color more or less intense according to the depth of the original color. In the case of a mere trace of annotto the color may be only a pale greenish shade. To prevent the acid from having too powerful corrosive action on the fibre of the paper, it is advisable to dilute the acid with one-half its volume of water, employing the diluted acid only when the mixture has become cold. The reaction of sulphuric acid is best seen under the conditions of the test to be presently described.

The process as above given is best adapted to the preliminary examination of a considerable number of samples, but for the separation of the annotto in a form adapted to preservation and of any desired intensity of color it is necessary to adopt a modified method.

Second Method. — Four fluid ounces of milk are coagulated by the aid of heat with a few drops of acetic acid. The coloring matter of the annotto being insoluble in acids is thus precipitated together with the caseine. The coagulum is separated from the serum by straining through a piece of coarse cotton cloth and the excess of liquid pressed out. The caseine, which scarcely shows any indication of coloring matter, is transferred to a porcelain mortar and triturated with one or two fluid ounces of sulphuric ether, which is added in small portions at a time, and is finally decanted from the readily subsiding caseine, and poured into a small globular separatory apparatus, having a glass stopper at the top and stopcock at the lower portion of the apparatus. Five or ten c.c. of dilute solution of caustic soda (1 of soda to 100 of water) are added, and the stopper being inserted the apparatus is given a vigorous shaking for a few seconds. The separatory funnel is then set aside to allow the liquids to separate, which takes place after the expiration of a few minutes. The lower layer of liquid, which consists of the solution of soda holding the annotto color in solution, is then carefully drawn off from the supernatant liquid and placed in a small flat-bottomed porcelain capsule of about one inch in diameter and one-half inch in depth, or the alkaline solution of annotto is divided into two equal portions, each of which is placed in a small capsule of such size that the depth of liquid is not less than about one-quarter of an inch.

Into each of the capsules containing the annotto solution

is then placed a small disc of heavy filter-paper, five-eighths of an inch in diameter. These discs may be conveniently cut by means of a cork borer. The capsules with their contents are then set aside in a dark place for twelve hours. The paper discs are then removed and washed by soaking in fresh water. Where annotto is present the paper is found to be dyed, and presents a more or less deep orange or buff color. One of these discs is then dipped into a weak solution of sodium carbonate (otherwise the action of the air alters the shade), and the other well-washed disc is immersed in solution of stannous chloride and becomes thereby changed in color to a rich pink. These discs dried on bibulous paper without heat may then be mounted upon suitable cards and preserved as exhibits. Starch paste freshly prepared is suitable for mounting and does not alter the color of the specimens, which is liable to be the case if ordinary paste or mucilage is employed. In addition to the two discs employed, it is desirable, if the sulphuric-acid test is to be used, to dye a small piece of paper of firmer texture, as being less liable to the corrosive action of the acid; a piece of paper one-quarter of an inch square is of sufficient size for this purpose. This is dyed at the same time with the discs. I have found Whatman's heavy drawing-paper to be the best.

As small a quantity of milk as 10 c.c. may be tested in this way with results as satisfactory as when a larger quantity of milk is used, but the paper discs must be of proportionately smaller diameter. This test may be employed in any condition of the milk and in specimens of any age likely to be tested. As an experiment, a portion of milk not exceeding one-half of a fluid ounce which had been sealed in a bottle November 10, 1886, was tested for annotto on June 2, 1887 (nearly seven months old), with perfectly satisfactory results. The diameter of the discs in this case was one-quarter of an inch. No other coloring matter with which I am acquainted, treated with ether and the subsequent agitation of the ether with soda solution, gives the series of reactions peculiar to annotto, *i.e.* —

1. A buff color on paper dyed in alkaline solution.
2. The buff color changed to pink by solution of stannous chloride, alum, or any acid, the color produced by the stannous chloride being the most brilliant.
3. The pink color thus produced changed to the original buff by alkaline solutions.
4. The well-washed and dried paper dyed of a buff color changed to a transitory blue, or in the case of mere traces, a greenish blue by application of a drop of concentrated sulphuric acid.

Moreover, the coloring matter of carrot or squash, while soluble in ether, is not taken up when agitated with soda solution. Saffron (crocus) yields very little yellow color to ether, while no buff color can be obtained from it by dyeing upon paper which is changed to a pink by solution of tin. The same is true of safflower. Turmeric gives a deep brownish red color with alkalies, which is by tin solution restored to its original yellow.

Diagrams giving the shape and size of the jar and strips of paper employed in the first process may be found on Plate V., and a fac-simile of a card with mounted discs, as used in this office, together with illustrations of the color reactions of annotto on paper, as above described, are given on Plate VI. It is, of course, impossible to produce the exact shades of color by printer's inks, and the colors on the plate must be regarded only as approximate.

The processes which have been described are applicable to the detection of annotto in butter or oleomargarine. The butter or oleomargarine to be tested is heated with an equal volume of dilute solution of caustic soda, and the aqueous layer, after the separation of the fat by rising, is drawn off and the paper dyed by the method already described.

CARAMEL OR BURNT SUGAR AND ITS DETECTION IN COLORED MILK.

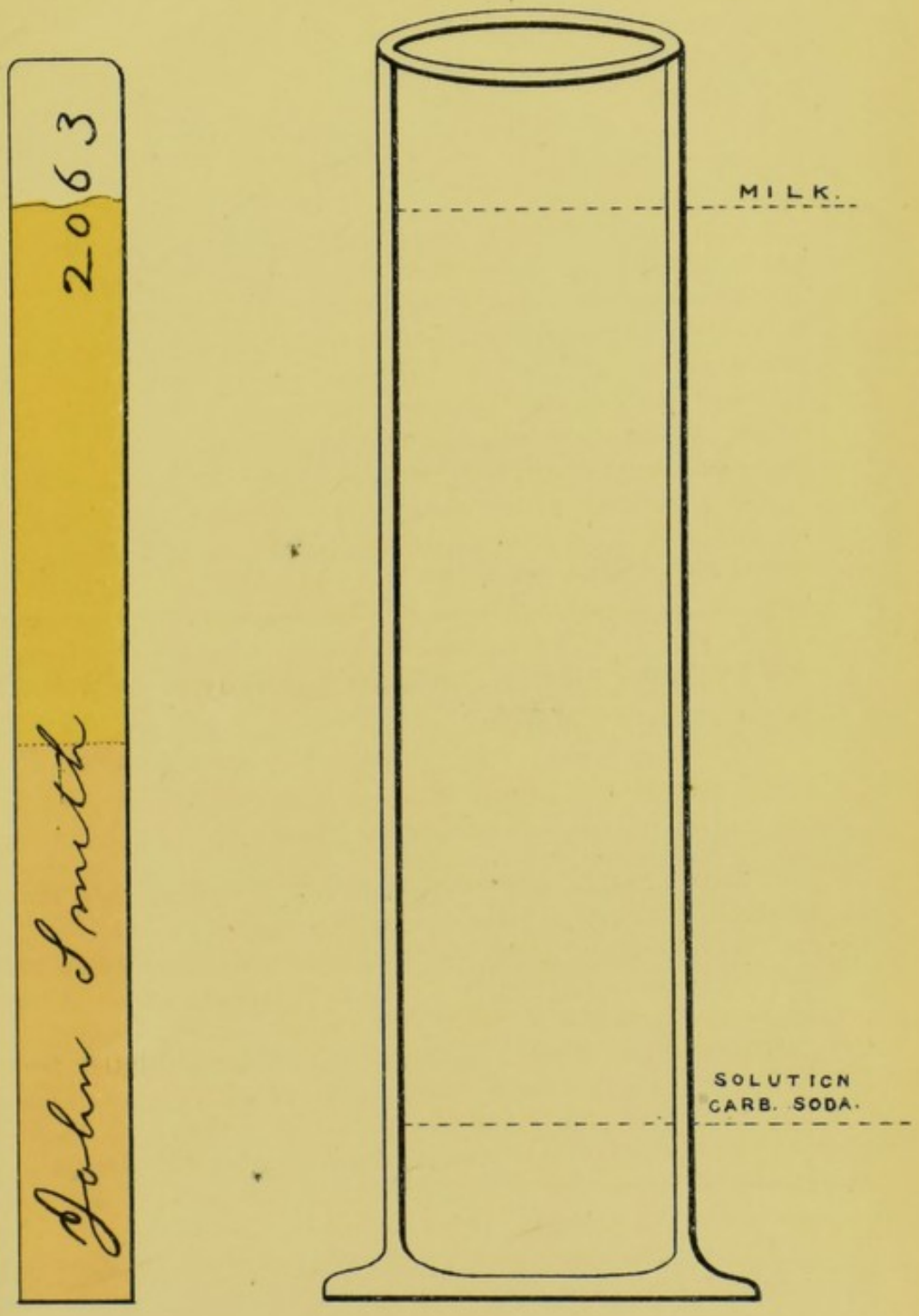
When sugar in any of its varieties is melted, and the heat gradually raised to a temperature of 400° to 420° F., each molecule of sugar loses two molecules of water, and a brown, deliquescent, and nearly tasteless mass remains, which is known as caramel, — the French name of burnt sugar.

Caramel is soluble in water; it is precipitated from its concentrated solution by very strong alcohol; a small portion, however, always remains in solution, while with alcohol of fifty per cent. sufficient is retained to give the liquid a deep brownish color. Solution of sub-acetate of lead precipitates caramel of a chocolate-brown color.

The method we have most effectual for the detection of caramel in milk is the following, which is now given for the first time: —

A certain quantity of milk, about four to eight fluid ounces (a smaller quantity may be used if necessary), is mixed with an equal volume of ninety-five per cent. alcohol; the milk should be poured into the alcohol, and not the alcohol into the milk, by which the caseine is nearly all precipitated in a form which may be very easily separated by filtration, while

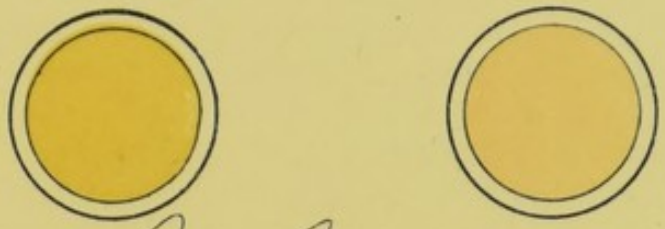
PLATE V.



SIZE OF PAPER AND GLASS
USED IN TESTING MILK COLORED BY ANNATTO

COLOR TEST.

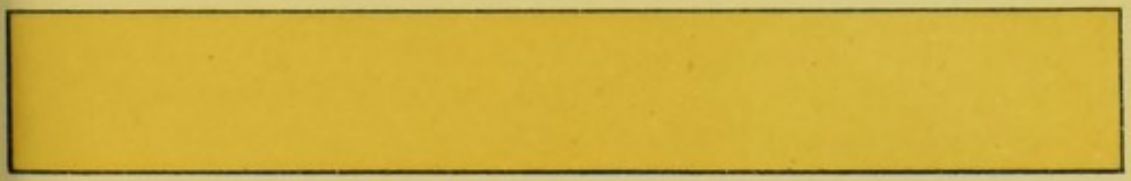
Annatto.



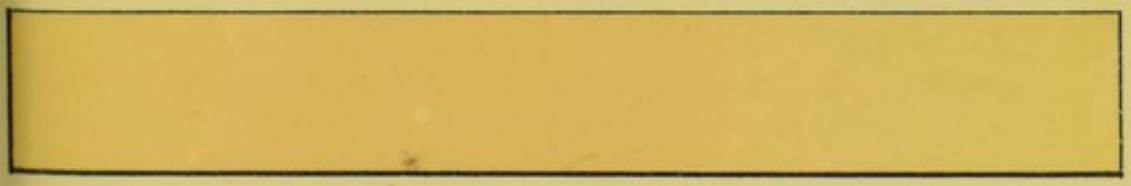
Name, J. Carson.

Date, June 26th 1887. No. 1512.

METHOD OF MOUNTING PAPER DISCS DYED WITH ANNATTO COLOR OBTAINED FROM MILK.



CARBONATE OF SODA.



CHLORIDE OF TIN.

CONCENTRATED SULPHURIC ACID.

ANNATTO COLOR REACTIONS ON DYED PAPER.

the caramel, if present, passes into the alcoholic solution. The filtrate is perfectly clear and brilliant. Sometimes the first portions of the filtrate are more or less opaque, but by returning them to the filter the liquid which passes through at length becomes absolutely clear. This filtrate has a more or less deep yellow color, according to the season of the year, and in the spring and summer time has a decided grass-green color, especially when the liquid is observed by looking downwards through a considerable depth of it contained in a glass tube one-half inch in diameter and about twelve inches in length; the greenish liquid obtained from pure milk in the summer-time has a strongly marked fluorescence. The presence of any amount of caramel sufficient to color the milk modifies this color, making it more orange with sometimes a slight brownish shade, so that by the color alone when observed under these conditions the presence of caramel may be determined with considerable certainty. The comparison is best made by the simultaneous observation of the filtrate from pure milk and from milk to which a small portion of caramel has been purposely added.

To confirm the presence of caramel 100 c.c. of the filtrate obtained from milk suspected to contain burnt sugar are precipitated by not more than 2 c.c. of solution of sub-acetate of lead of specific gravity 1.23. The *Liquor Plumbi Sub-acetatis* of the pharmacopœia is of the proper strength for the purpose. The solution of lead throws down certain albuminoids and whatever of caseine remains after the first addition of the alcohol and also the caramel. The precipitate is flocculent, and except in cases where mere traces only of caramel are present shows a very slight brownish tint. The precipitate is carefully filtered and washed with distilled water; it is then dried upon the filter. Where caramel is present the well-dried precipitate has a more or less deep chocolate color, according to the amount of caramel which was originally present. Pure milk gives under these circumstances a precipitate which, when dried, has a light yellow color with no shade of brown, or in certain seasons it may be almost colorless. Comparative experiments made with pure milk and with milk to which caramel has been added show very marked differences in the color of the dried precipitate, even in cases where the proportion of caramel does not exceed one part in ten thousand.

It sometimes happens that milk which is in process of testing for caramel contains also annotto. In such cases the filter-paper through which the original alcoholic solution has been passed shows a pinkish color after remaining in contact with the moist caseine overnight.

PRESERVATIVES, BORACIC ACID, SALICYLIC ACID, AND THEIR DETECTION.

Within a few years it has become a practice with many milk-dealers to add to their milk certain so-called "preservatives," for the purpose of preventing it from becoming sour. These preservatives are for the most part mixtures of boracic acid or its compounds. One preparation consists of boracic acid dissolved in glycerine; another contains a mixture of boracic acid and biborate of soda. Salicylic acid is sometimes though rarely used. The addition of these or any similar preparations to milk is not only a violation of the milk statutes, but is highly objectionable on the ground that the addition of any antiseptic substance to milk which retards those changes natural to it will, in like manner, interfere with the processes of digestion when the "preserved" milk is taken into the human system. The extent of the interference in many cases may possibly be slight, but it may become a very serious matter in the case of infants and invalids. Pure bicarbonate of soda is probably the least objectionable material which can be used in milk to prevent souring; this substance, however, is not an antiseptic, as this term is ordinarily understood.

Boracic acid, free or in combination, may easily be detected in the ash which has been obtained in the process of quantitative milk analysis. The amount of ash from five grammes of milk is quite sufficient for this purpose. The ash still remaining in the platinum capsule, after it has been weighed in the ordinary process of ash determination, is moistened with one or two drops of strong sulphuric acid, and after a few minutes there are added thirty to sixty drops of ninety-five per cent. alcohol; the capsule is then removed to a dark closet and the alcohol ignited. The outer edges of the alcohol flame, when boracic acid is present, are tinged with a peculiar and characteristic apple-green color. After a short time, and as the capsule becomes heated, the alcohol flame changes to a yellow or orange (sodium or calcium), and the green tint due to the boracic acid is much obscured or altogether concealed. In such case the flame is extinguished and the alcohol rekindled by the flame of a Bunsen burner, held a short distance above the capsule, but still as far away from it as possible, so that the flame may act upon the vapor which is still rising from the heated alcohol. At the first flash of the ignition of the alcohol the green color is very strongly developed. Previous to the ignition of the alcohol the presence of boracic acid may be tested by dipping a small piece of turmeric paper into the acid alcoholic solution, when, if boracic acid is pres-

ent, the paper on drying without heat changes from its ordinary yellow to a characteristic red color. Both the flame and the turmeric-paper tests should be applied to each specimen. These tests have been long known as the usual qualitative tests for boracic acid, but I am not aware that it has been before pointed out that the quantity of ash which remains after the ordinary analysis of milk is sufficient to make a satisfactory test for boracic acid. We have found, however, that boracic acid rarely fails of detection in this manner, and with this quantity of material. In cases of doubt, or to confirm previous results, a larger quantity (25 to 50 grammes) is evaporated to dryness on the water-bath, with the addition of one-half gramme of carbonate of soda. The dried residue is ignited and treated as already described.

Salicylic acid may be detected in milk by separating the serum by filtration after the addition of a few drops of hydrochloric acid. The serum should have a strongly acid reaction, and should be shaken up with a small quantity of ether, which removes salicylic acid if present. The solution may be tested by the addition of a few drops of neutral ferric chloride, which produces a strong violet coloration.

Analysis of Milk for Total Solids, Solids not Fat, Fat, and Ash.

The method employed by this department for the determination of the total solids, solids not fat, fat, and the ash of milk, is the same as that described in a previous report. The percentage of *milk solids* is ascertained by the evaporation of five grammes of milk in a platinum capsule, at a temperature of 212° F., until the residue ceases to lose weight.

The weight of the residue, after the extraction of the fat with benzine of 75° to 80° Baumé, gives the *solids not fat:* the difference between this and the weight of the total solids, the *fat.* The *ash* is determined by ignition of the solids not fat.

The Preliminary Examination of Milk, and the Approximate Determination of the Total Solids from the Estimation of the Specific Gravity, and the Fat as ascertained by Feser's Lactoscope.

While the chemical analysis of milk is the only means whereby the amount of total solids or of fat can be determined with accuracy, there yet exist means by which per-

sons having no chemical knowledge — farmers, milk-peddlers, store-keepers — may ascertain, with very little trouble, whether a given sample of milk is probably up to the legal standard, and, in most cases, may *know* whether it is or is not.

No single instrument can determine this. The lactometer in its various forms has long since been shown to be wholly unreliable when used *alone*, and its indications unchecked by other tests. The lactometer gives the relative weight of the milk when compared with an equal volume of water; sometimes the lactometer is graduated so that its figures give the specific gravity, and sometimes the graduation is arbitrary, as in the case of the so-called New York State Board of Health lactometer, where the range is from 120 downwards, or in the Orange County lactometer, from 25 downwards.

It is well known that the higher the percentage of fat in any sample of milk the lower is the specific gravity, and that a lactometer placed in cream will falsely indicate, according to the lines of some instruments, that the sample is much poorer than ordinary milk. On the other hand, the greater the percentage of the other constituents of the milk, — caseine, sugar, etc., — the higher the specific gravity. It is possible, therefore, if we know the weight percentage of fat, and at the same time the specific gravity, to determine, within a very small margin of error, the total solids which the milk contains.

The most simple instrument for the rapid determination of the weight percentage of fat contained in milk is Feser's lactoscope. This instrument in its operation depends upon the fact that, under ordinary conditions, the richer the milk in fat the greater is the number of fat globules in a given space, and hence a greater opacity. The instrument consists of a small glass cylinder, in the lower part of which is a small rod of white glass, ruled with a few black lines. Upon the outer cylinder is a scale, indicating the percentage of fat. Four cubic centimeters of milk are put into the cylinder, and then water is added until the black lines upon the white glass at the bottom can be distinguished, without being too distinctly visible. The level of the water, as shown upon the scale on the large cylinder, gives the percentage of fat by weight. It cannot be claimed that the lactoscope determines the fat in all cases with a high degree of accuracy, but in any ordinary sample of tolerably fresh milk it gives the percentage within one quarter of one per cent. of the correct figure, as shown by chemical analysis. With milk several days old, and particularly in cases where the cream has risen and remained undisturbed for

such a length of time, or with milk which has travelled a long distance and has been considerably shaken in transit, the lactoscope reads abnormally low. Such instances are, however, the exception. It is to be observed that the dealer, milkman, or milk-producer who employs the lactoscope is always upon the side of safety, for, while a milk may by the lactoscope *seem* to be deficient in fat, when it is in fact of fair quality (such instances being, as before stated, unusual), it is never the case that the analysis of milk shows the sample to be poorer in fat than the indications of the instrument, within the limit of the graduation of the instrument, *i.e.*, one-quarter of one per cent.

The lactoscope is more liable to error in judging a very rich milk than in the case of a poor or considerably skimmed specimen. If the indications of the lactometer are taken, *i.e.*, the specific gravity, ascertained by a comparison of the degrees as given in a suitable table, or, preferably, by an instrument giving the specific gravity direct, and then the approximate amount of fat, as shown by the lactoscope, we have data of sufficient accuracy to show beyond question whether a given sample of milk may be passed as probably good, or whether it is doubtful or positively bad.

All specimens of milk brought to the city laboratory are first tested by this method; doubtful specimens are analyzed, but no further examination is necessary in cases where both the specific gravity and the fat are within certain limits.

Experiments have shown that in an emulsion of fat and water each per cent. of butter fat *reduces* the specific gravity by .001. An emulsion of 99 parts of water with 1 part of butter fat has a specific gravity 0.999, water being 1.000; and in like manner an emulsion of 97 parts of water and 3 parts of butter fat has a specific gravity 0.997.

It has also been shown that each per cent. of solids not fat dissolved in water *increases* the specific gravity .00375, as, for example, a solution of 2 parts of milk solids not fat in 98 parts of water has specific gravity 1.0075.

Suppose, now, a specimen to have been tested, and to show:

Specific gravity by lactometer . .	1.0295
Per cent. of fat by lactoscope . .	2.5

The specific gravity of water is 1.000. Each per cent. of fat reduces this .001, therefore 2.5 per cent. of fat will reduce the specific gravity $2.5 \times .001 = .0025$, *i.e.*,

1.0000 — .0025 = .9975. This figure represents the specific gravity of water holding 2.5 per cent. of butter fat.

The actual specific gravity of the specimen 1.0295 is .0320 in excess of the figure representing the specific gravity of the water and butter fat alone. Now, as each per cent. of solids not fat increases the gravity .00375, the actual per cent. of solids not fat in the specimen, in which the increase of gravity by their presence is .0320, is found by dividing the greater of these values by the other. In this case .0320 ÷ .00375 = 8.53, which is the per cent. of solids not fat.

We have then fat	2.50	per cent.
Solids not fat	8.53	"
Total solids	11.03	

To determine the total solids from specific gravity and the per cent. of fat, we deduce the following rule: —

Multiply the per cent. of *fat* as observed by the lactoscope by .001.

Subtract the product thus obtained from 1.000.

Subtract the remainder thus obtained from the specific gravity.

Divide this last remainder by .00375. The quotient is the percentage of *solids not fat*. Add the percentages of *solids not fat* and of *fat*, and the sum is the percentage of *total solids*.

Reducing the above rule to general terms we have the formula: —

$$\frac{S - 1.000 + [F \times .001]}{.00375} = \text{per cent. of solids not fat.}$$

S = specific gravity.

F = per cent. of fat.

From this we deduce the following short rule: —

I. From the specific gravity subtract 1.0000.

II. Multiply per cent. of fat by .001, and add to above remainder.

III. Divide the sum by .00375. The quotient is the *solids not fat*.

IV. Add the fat and solids not fat; the result is the *total solids*.

To save the trouble of calculation in each instance the table given on the succeeding page may be used.

Table showing the Total Solids in Milk according to Specific Gravity and the Lactoscope.

	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00
1.028	10.00	10.31	10.63	10.95	11.26	11.58	11.90	12.21	12.53
1.0285	10.13	10.45	10.76	11.08	11.40	11.71	12.03	12.35	12.66
1.029	10.26	10.58	10.90	11.21	11.53	11.85	12.16	12.48	12.80
1.0295	10.40	10.71	11.03	11.35	11.66	11.98	12.30	12.61	12.93
1.030	10.53	10.85	11.16	11.48	11.80	12.11	12.43	12.75	13.06
1.0305	10.66	10.98	11.30	11.61	11.93	12.25	12.56	12.88	13 20
1.031	10.80	11.11	11.43	11.75	12.06	12.38	12.70	13.01	13.33
1.0315	10.93	11.25	11.56	11.88	12.20	12.51	12.83	13.15	13.46
1.032	11.06	11.38	11.70	12.01	12.33	12.65	12.96	13.28	13.60
1.0325	11.20	11.41	11.83	12.15	12.46	12.78	13.10	13.41	13.73
1.033	11.33	11.65	11.96	12.28	12.60	12.91	13.23	13.55	13.86
1.0335	11.46	11.78	12.10	12.41	12.73	13.05	13.36	13.68	14.00
1.034	11.60	11.91	12.23	12.55	12.86	13.18	13.50	13.81	14.13
1.0345	11.73	12.05	12.36	12.68	13.00	13.31	13.63	13.95	14.26
1.035	11.86	12.18	12.50	12.81	13.26	13.45	13.76	14.08	14.40

It is perhaps unnecessary to observe that the specific gravity must be taken at a standard temperature (60° F.), or, if necessary, reduced to such before making the calculation.

A comparison of the results of actual analysis with those obtained by employing the method above given shows, in the great majority of cases, an agreement sufficiently close to enable any person of ordinary intelligence, by the aid of a lactometer, a lactoscope, and the table of results here given, to *know* whether his milk will pass the inspection of this office.

The following are the results of the analysis of a number of samples in comparison with the figures obtained by calculation from the specific gravity obtained by the lactometer and the fat as given by Feser's lactoscope : —

Comparison of the Results obtained by Analysis and by Calculation of the Composition of Low Grade or Partly Skimmed Milks.

ANALYSIS.		CALCULATION FROM THE FAT AND GRAVITY.	
		Lactoscope.	Specific Gravity.
Fat	2.90 per cent.	3.00 per cent.	1.033
Solids	12.64 "	12.60 "	
Fat	2.72 "	2.75 "	1.0335
Solids	12.40 "	12.41 "	
Fat	3.00 "	3.25 "	1.0285
Solids	11.88 "	11.71 "	
Fat	3.06 "	3.00 "	1.0285
Solids	11.60 "	11.53 "	
Fat	2.60 "	2.50 "	1.028
Solids	10.64 "	10.63 "	
Fat	1.96 "	2.00 "	1.0315
Solids	10.96 "	10.93 "	
Fat	2.74 "	2.75 "	1.0295
Solids	11.38 "	11.35 "	
Fat	2.10 "	2.25 "	1.032
Solids	11.10 "	11.38 "	
Fat	3.10 "	2.75 "	1.030
Solids	11.96 "	11.48 "	
Fat	2.70 "	2.75 "	1.032
Solids	11.98 "	12.01 "	
Fat	3.20 "	3.00 "	1.0285
Solids	11.70 "	11.40 "	
Fat	3.00 "	2.75 "	1.033
Solids	12.50 "	12.28 "	
Fat	3.48 "	3.50 "	1.028
Solids	11.84 "	11.80 "	
Fat	3.48 "	3.50 "	1.0285
Solids	11.94 "	12.03 "	
Fat	2.80 "	2.50 "	1.028
Solids	10.94 "	10.63 "	
Fat	1.66 "	1.50 "	1.0325
Solids	10.40 "	10.30 "	
Fat	2.56 "	2.50 "	1.0315
Solids	11.66 "	11.56 "	
Fat	3.00 "	2.75 "	1.0325
Solids	12.26 "	12.15 "	
Fat	2.60 "	2.50 "	1.033
Solids	12.00 "	11.96 "	
Fat	2.88 "	2.75 "	1.032
Solids	12.02 "	12.01 "	

Comparison of the Percentage of Fat given by the Lactoscope and by Chemical Analysis.

Lactoscope.	Analysis.	Lactoscope.	Analysis.	Lactoscope.	Analysis.
2.75	2.78	2.25	2.28	2.50	2.44
2.75	2.96	2.75	2.98	2.75	2.86
3.25	3.30	1.75	1.90	1.75	1.84
2.25	2.26	2.75	2.88	2.00	2.20
2.00	2.02	3.00	3.38	2.75	3.06
2.50	2.62	2.50	2.78	2.75	2.98
2.75	2.92	2.50	2.50	3.00	3.06
2.75	3.06	2.75	2.76	1.50	1.58

IMPURE AND UNWHOLESOME MILK, ARISING FROM CAUSES OTHER THAN ADULTERATION.

Milk may be rendered impure and unfit for use from a variety of causes not connected with the adulteration of this article on the part of the milk-dealer, and the dangers to the public health arising from these sources are far more serious, not to say alarming, than most persons are aware of.

These dangers are due to two principal causes: —

I. Milk produced from cows whose condition, as to time of calving, disease, improper stabling or feeding, renders it injurious to health.

II. Milk from healthy and properly fed cows which has been improperly or carelessly treated after being drawn (imperfect cooling, uncleanliness in milking, storing in foul atmosphere, etc.), by which the milk, originally good, undergoes certain changes capable of rendering the milk positively injurious.

Experiments with milk, drawn from animals affected with certain diseases, show that such milk, taken as food, will produce similar diseases in the human subject. Among the more important of these diseases may be mentioned tuberculosis (consumption), apthous fever (foot and mouth disease), anthrax (malignant pustule), and certain inflammatory diseases of the udder.

Tuberculosis. — The leading pathologists of the world have demonstrated experimentally the infectious nature of tuberculosis. Billings, in his work entitled "Relation of Animal Diseases to the Public Health," says: "Too many sad cases of death from tubercular consumption have been unquestionably traced to the influence of expired air from

persons having the disease, upon nurses and others around them, even in cases where any inherited disposition to the disease could be excluded beyond all question."

Gerlach, of Berlin, asserts that the production of tuberculosis with milk by inoculation and ingestion can no longer be denied, and he asserts that his experiments prove "that the milk from cows with tuberculosis is not only harmful, but that it also contains elements of a specifically dangerous character; it is capable of generating elements of a similar character."

Kammerer, City Physician of Vienna, addressed a report to the magistrates of that city on the dangers to the health and life of its citizens through animals affected with tuberculosis. "The milk of cows with tuberculosis," he says, "acts as an unconscious vaccination upon adults and children who partake of it; and, in the case of the latter, the seed of tuberculosis is being imperceptibly sown amongst thousands in the great towns." Infection by this channel he regards as being quite as fruitful a source of the disease amongst the young as inherited tendencies, to which it is usually attributed. — *British Medical Journal, August 26, 1882.*

Johne, of Dresden, maintains that the tuberculosis of cattle is identical with human tuberculosis, and he considers it well proved that the milk of tuberculous cows is as capable of conveying the disease to man as it is to their own offspring.

Wiedman asserts that he has seen a pneumonia anatomically identical with the bovine form, produced in children by the use of milk from cows suffering from this disease. Esser is decided in his opinion of the communicability of tubercle by the means of milk.

Billings, in his work above quoted, writing of the milk from uberculous cows, says: "As the statistical results of experiments which have been made unquestionably go to prove that such milk does contain elements of a specifically infectious character, there is no question that laws should be made, and executed also, so as to prevent the sale of such milk for human consumption, either by itself or mixed with other milk in no matter how small quantities."

Anthrax is the name of a highly infectious febrile disease, known to be due to a specific form of bacteria. The blood of the animal affected has been found to contain the germ of the disease, and to produce it in other animals. Fleming says, in reference to the milk of cows affected with anthrax: "Gohier mentions that he has known a case in which a man was attacked with severe diarrhœa, from consuming the milk of a cow affected with anthrax. He has also witnessed the same occurrence in a family of five persons. Morris reports

a similar occurrence. Chisholm gives the case of a girl, three years old, who presented all the symptoms of anthrax from drinking the milk of a diseased cow. Desplas has given some instances, noted during an outbreak of anthrax at Quercy, in which the malady was transmitted to other creatures by the milk." — *George Fleming, in "Manual of Veterinary Sanitary Science."*

Apthous fever. — The propagation of apthous fever (foot and mouth disease) by milk has been known for a long time, and was the first pointed out by Sagar as early as 1765. Subsequently, in 1834, several German pathologists and veterinarians, Wernberburg, Tilgner, Hertwig, Mann, and others, observed cases, and by direct experiment proved the transmission of the disease by milk.

Thorne, in his report on this subject to the Privy Council, gives many cases. Other instances are reported in the British Medical Journal, Vols. II. and VI.

Billings writes: "The danger from the consumption of milk of cows afflicted with this eruption is most emphatically demonstrated by the fact that young animals fed upon the same frequently perish in consequence of gastritis, *i.e.*, inflammation of the stomach and bowels. For man, milk from such cows, to which ninety per cent. normal milk has been added, is still dangerous when consumed. Cooking the milk destroys its infectious qualities." The milk from cows suffering from various inflammatory diseases of the udder, or from cows which have recently calved, acts as a powerful laxative when taken by children, and is capable, doubtless, when consumed in larger quantities, of developing severe intestinal troubles.

It is seldom, perhaps, that milk from animals affected with certain of the diseases which have been mentioned is sold by itself, and the quantity produced is checked during many acute diseases; but there is reason to believe that there has been criminal recklessness and carelessness on the part of some milk-producers who, unwilling to lose the sale of an extra can of milk, have mixed milk which they dared not sell by itself with the product of the whole dairy, and sent it to market. One such case is within my own personal observation. Probably in many cases milk-producers are ignorant of the extent to which such milk may prove injurious.

When it is considered that the most serious consequences are possible as the result of the wholesale distribution of milk from such sources, is it not strange that laws for the protection of the great public from these dangers are so limited in their scope and operation?

Massachusetts has no provision whatever in her statutes as to the sale of milk from cows which have recently calved, and in this respect is behind some of her sister States. The milk law of New York declares that "milk drawn from cows within fifteen days before and five days after parturition shall be declared unclean, unhealthy, impure, and unwholesome milk." We observe, also, from a recent issue of a well-known agricultural journal, that the New York Condensed Milk Co. make their contracts with milk-producers in such terms as enable them to refuse any milk from cows that have calved within twelve days, or from any cow that will come in inside of sixty days. Some provision of this character should be incorporated into the Massachusetts statute.

Our statutes, it is true, prohibit the sale of "milk from sick or diseased cows;" but how is this feature of the law to be enforced under the present system? The microscope may in some cases determine the fact that a given specimen of milk is from a diseased animal, but this means fails in most cases and is too remote and uncertain to be of much real security to the public.

We believe there exists the greatest necessity for some sort of regular and systematic periodical inspection of *dairies* producing the milk which is distributed for consumption in the large cities of the Commonwealth, and particularly in the city of Boston. To this end there should be a law authorizing the appointment of not less than three competent and trustworthy veterinary inspectors whose duties should be to visit all dairies in the State at regular intervals, and see that diseased animals are isolated and their milk destroyed, or, at least, not sent to market for human consumption.

Such veterinary police, if they might be called such, should be paid by the State, and might be made responsible to the Board of Health. They should be charged with making complaint and prosecuting offenders guilty of allowing *any portion* of the milk from a sick or diseased cow to be sold or mixed with other milk intended for the market. The penalties for this crime — a crime far more dangerous than mere adulteration — should be largely increased.

Milk from healthy and well-fed cows may, by improper or careless treatment after milking, produce serious sickness. Many epidemics of typhoid fever, scarlet fever, and diphtheria have been traced to the milk supplied by some particular dairy or milk-peddler. The evidence of this has been carefully noted in very many instances in England and in several cases in the United States. We briefly refer to the following, repeating in part some of the instances mentioned in the Report for the year 1885: —

1870. Islington. Dr. Ballard, health officer, found that an epidemic of typhoid fever, which had attacked one hundred and seventy-five persons in a part of his district, coincided with the use of milk from a particular dairy where shortly before there had been cases of this disease. — *Medical Times and Gazette, Nov., 1870.*

1873. Marylebone. Two hundred and forty-four cases were investigated, and it was found that two hundred and eighteen were in households which consumed milk from a single dairy.

Four cases were reported in the London medical journals — one at Mosely, near Birmingham, traced by Dr. Ballard; one at Leeds, by Dr. Robinson (*British Medical Journal, Jan. 18, 1873*); one at Armley, near Leeds; and one at Parkhead, in Glasgow, by Dr. Russell. — *Medical Times and Gazette, March 15, 1873.*

1875. Crossbells. Out of forty-two families using the milk from one dairy fourteen cases of typhoid fever occurred; while in forty families in the same neighborhood using condensed milk there was not a single case.

1883. Dundee. In the investigation of this epidemic it was found that three of the children belonging to a milkman were sick with typhoid fever in the room adjoining the dairy. Thirty-six cases occurred among the customers supplied by the milkman. — *London Lancet, Oct. 27, 1883.*

1883. St. Pancras. In this epidemic there were four hundred and thirty-one cases occurring in two hundred and seventy-six houses, and two hundred and twenty cases were traced to a dairy which supplied most of the houses with milk. — *London Lancet, Oct., 1883.*

1883. Allegheny City. In this epidemic forty-eight cases of typhoid fever occurred among the customers of one milkman. There was but one case in the city which could not be traced through this man. It was also discovered that a son of the milkman had been sick with typhoid fever. As there was no dairy-building on the premises, it is supposed that the milk was kept in the house where the sick boy lay. — *Pittsburg Medical Journal, Oct., 1883.*

1883. Port Jervis. During the latter part of the year there were one hundred and forty-eight cases of typhoid fever in this village. The cases occurred among the customers of one milkman who had sickness of typhoid fever in his family. Eighty-seven per cent. of the cases were traced directly to this source. — *Fourth Annual Report, State Board of Health of New York.*

1884. Aberdeen. Sixteen cases of typhoid fever in nine families were traced back to the milk from a dairy farm where there were cases of the disease. — *London Lancet, Jan., 1884.*

Penzance. More than thirty cases of typhoid fever originated in a single case in the family of a milk-dealer. — *London Lancet, Jan., 1884.*

1885. Newport. In November there was a sudden, almost simultaneous, outbreak of scarlet fever, and it was discovered that three of the patients had been supplied with milk by a dealer in whose family two children were convalescing from the disease. — *First Annual Report of the Board of Health of the City of Newport, R.I.*

Storage of milk in stables. —The system of delivery of milk followed by many dealers in Boston is not calculated to lessen the dangers of the transmission of disease from infected milk. We have shown elsewhere that not five per cent. of the milk sold in Boston is produced by the milk-peddlers. The greater part of all the milk distributed in this

city is brought in by the steam railroads from districts in Central Massachusetts and the southern and south-eastern portions of New Hampshire. These trains, with one exception, arrive too late to allow of the distribution of the milk to families the same day, unless it be done in the afternoon, and the *milk is in most cases taken by the milk-peddler to his stable*, where the smaller (family) cans are filled. Some of these stables are small and dirty, and the manner in which cans are washed and dried in some of these establishments and their general surroundings is most objectionable.

Milk is of all fluids one of the most capable of absorbing all kinds of odors, and the exposing of it, even for the shortest possible time, to the emanations of the stable should be most severely condemned. *The milk should never be carried to the stable*, but should be distributed the day that it is received. This will, however, be done only when the public demand it, and this they will doubtless do when they become fully aware of the facts.

The unsuspecting customer imagines that his milkman keeps cows; that the milk delivered to him in the morning is fresh from the milking of the evening previous, and is delivered direct from the animal, when in reality the milk-peddler keeps only horses. The milk is distributed in very many cases from thirty-six to forty-eight hours after milking, twelve to eighteen of these hours being occupied in the unnecessary storage of the milk in situations with most objectionable surroundings.

Milk not properly cooled after being drawn. — It is well known that when freshly drawn milk is put into a tight vessel and deposited in a warm place a very disagreeable odor and taste is developed. Professor Vaughan, of the University of Michigan, has discovered that an extremely poisonous body, to which he has given the name of tyrotoxicon, is liable to be developed under these circumstances, and that the effects of this poison closely agree with those of cholera infantum. Professor Vaughan has published certain rules concerning the care necessary to prevent milk from undergoing this change, which are so important that we quote them entire: —

RULES TO BE OBSERVED IN THE CARE OF COWS AND OF MILK.

1. The cows should be healthy, and the milk of any animal which seems indisposed should not be mixed with that of perfectly healthy animals.
2. Cows must not be fed upon swill, or the refuse of breweries, or glucose factories, or upon any other fermented food.
3. Cows must not be allowed to drink stagnant water, but must have access to pure, fresh water.
4. Cows must not be heated or worried before being milked.

5. The pasture must be free from noxious weeds, and the barn and the yard must be kept clean.

6. The udders should be washed, then wiped dry, before each milking.

7. The milk must at once be thoroughly cooled. This is best done in the summer by placing the milk-can in a tank of cold water or ice-water, the water being the same depth as the milk in the can. It would be well if the water in the tank could be kept flowing; indeed, this will be necessary unless ice-water is used. The tank should be thoroughly cleaned each day to prevent bad odors. The can should remain uncovered during the cooling, and the milk should be gently stirred. The temperature should be reduced to 60 F. within an hour. The can should remain in the cold water until ready for delivery.

8. In summer, when ready for delivery, the top should be placed on the can, and a cloth wet with cold water should be spread over the can, or refrigerator cans may be used. At no season should the milk be frozen; but no buyer should receive milk which has a temperature higher than 65 F.

9. After the milk has been received by the consumer it should be kept in a perfectly clean place, free from dust, and at a temperature not exceeding 60 F. Milk should not be allowed to stand uncovered, even for a short time, in living or sleeping rooms. In many of the better houses in the country and villages, and occasionally in cities, the drain from the refrigerator leads into a cesspool or kitchen drain. This is highly dangerous; there should be no connection whatever between the refrigerator and any receptacle of filth.

10. The only vessels in which milk should be kept are tin, glass, or porcelain. After using, the vessel should be scalded, and, if possible, exposed to the air.

OLEOMARGARINE.

There were registered in this office, during the year 1887, the names of 112 persons as dealers in oleomargarine in Boston. Five of these persons were registered previous to the 1st of May, and did not renew their license at that time and are now out of business. There are at the present time the names of 107 persons registered as dealers in oleomargarine in the city. The Massachusetts law makes no distinction, as to registration, between wholesale and retail dealers, but from information obtained from Mr. John E. Fitzgerald, U.S. Collector of Internal Revenue for this district, it appears that there are 11 wholesale dealers and 96 retail dealers.

The effect of the United States revenue tax law has been to very largely diminish the number of dealers in the city, probably on account of the high special tax imposed, — $48 for retailers and $480 for wholesalers. During the year 1886 there were registered in this office the names of 583 dealers; this has been reduced to less than one-fifth of that number during the past year.

It does not appear, however, that the quantity of oleomargarine sold has correspondingly diminished, but the trade is in fewer hands.

There have been during the year 46 complaints against the proprietors or clerks in 33 stores. In 6 of these cases complaints were made against persons selling without being registered, and in probably 6 of the remaining cases the violations were the result of carelessness or negligence without criminal intent. In the other cases, being 21 stores, the goods were sold as butter (that being called for), or were sold in packages not marked as required by statute, or the goods were exposed for sale in packages not marked.

The 46 cases were as follow: —

For Selling in an unmarked wrapper	12
Selling with mark on wrapper folded inside so as to conceal the name, with probable fraudulent intent	12
Exposing for sale in tub not marked on top, side, and bottom	10
Selling without being licensed	6
Selling with mark covered by outside wrapper, with probable fraudulent intent	4
Exposure for sale not in the original package and not marked as required	2
Total	46

By far the greater part of the oleomargarine sold in Boston is sold honestly for what it is, and not as butter; this is probably true without exception in the case of manufacturers and wholesale dealers, but there is a small number of retail dealers who are disposed to evade the law, — in fact, sell the article as butter, or at least take no pains that the customer shall be made aware of its true character, and yet do so in such a manner (that is, they so far comply with the law) as to make a conviction by a jury difficult or impossible. Labels with the word "oleomargarine," which should be upon the *outside* of the packages containing retail sales, and in a conspicuous place, are folded so as to be upon the *inside* whenever opportunity offers; labels are marked, in some cases, with a pale ink closely corresponding in color with that of the paper; the word "oleomargarine" is marked upon the outside of a paper bag, near its top, and the end of the mark twisted together when the goods are sold so as to conceal the mark. These and other petty evasions are constantly practised by a few small dealers.

The State law is in some respects imperfect, but may easily be made perfectly satisfactory. There is now no law prohibit-

ing the sale of oleomargarine as butter, and when butter is called for, provided the wrapper is marked.

One of the largest retailers in Boston, who has been several times before the courts, recently said to me: "The Massachusetts law does not interfere with my trade. I sell it as butter, although I always sell it in marked wrappers. My customers seldom notice the mark, or, if they do, I tell them that we sell oleomargarine as well as butter, and that we mark *all* our papers so that we may not make any mistake, as the law is very strict, if we should happen to send it out unmarked. This generally satisfies them, and they come back as regular customers, and we sell it to them as butter right along"

Such cases are the exception and not the rule, but they exist in more instances than one. My opinion is that there should be a statute, as in Connecticut, requiring the seller to verbally inform the customer in every instance that the article sold is not butter, but is oleomargarine. There should be also a penalty for selling oleomargarine as butter.

Mr. Jos. S. Miller, in his report as Internal Revenue Commissioner, recommends, in order to more fully protect customers, that manufacturers and retailers should use only packages of a permanent bright red color; and he further suggests the use of a label to be attached to goods exposed for sale at retail not less than 2 inches wide and 18 inches long, of a bright red color, on which shall be painted the word "oleomargarine" in black or gilt letters, not less than 1 inch square, so as to be distinctly seen by any one who sees the oleomargarine.

The leading manufacturers and wholesalers are believed to be favorable to any legislation which will ensure the sale of "oleo" for what it is, as they claim it will increase the sale of their goods.

I have no doubt that 90 per cent. of the oleomargarine now sold in Boston is sold honestly; but there always will be a certain number of retailers who will cheat, if they have an opportunity.

The Internal Revenue Commissioner of the United States, in his report for the fiscal year ending June 30, 1887, gives the total number of wholesale and retail dealers in the different collection districts of the Union, by which it appears that there are a larger number of dealers in the third Massachusetts collection district, which includes Boston, than in any other collection district except the first Illinois, Chicago.

WHOLESALE AND RETAIL DEALERS IN OLEOMARGARINE IN THE PRINCIPAL COLLECTION DISTRICTS OF THE UNITED STATES.

Collection District.	Wholesalers.	Retailers.
First Illinois	11	321
Third Massachusetts . . .	14	209
Rhode Island	6	208
First Michigan	6	111
Connecticut	2	66
Sixth Missouri	4	49
First Ohio	1	70
Tenth Massachusetts . . .	2	36

As the third and tenth collection districts comprise the whole of Massachusetts, the total number of dealers in the State appears to be 263, divided into 247 retailers and 16 wholesalers. The number of dealers in the State of Massachusetts is about one-sixth of the total number in the Union, while the number in the three States of Massachusetts, Rhode Island, and Connecticut form more than one-third of the number in the United States.

The sanitary aspects of oleomargarine. — There is but little which can be added to what has already been written and said by scientists in regard to the healthfulness of oleomargarine. It is now generally accepted as a scientific fact that oleomargarine is not open to the slightest objection on the ground of being in any way injurious to the public health.

I have yet to meet any unprejudiced person or any scientist competent to pronounce an opinion (except in a few cases where politics compels certain officials to preach the "acceptable doctrine," *i. e.*, anti-oleo) who believes that these goods are injurious. Interested parties have told more lies about oleomargarine than some of them can ever answer for. Perhaps the most conclusive testimony as to the character of oleomargarine in its relations to public health is to be found in the report of the United States Commissioner of Internal Revenue, previously alluded to.

The Commissioner has published letters from his deputies in many of the districts where oleomargarine factories are established, having, as he states, "exacted monthly reports,

as to the kind and character of the ingredients used in the manufacture of oleomargarine, from each of the collectors in whose districts oleomargarine factories are located."

The following letter, from the Chicago district, is but a sample of the unanimous testimony of all: —

UNITED STATES INTERNAL REVENUE,
COLLECTOR'S OFFICE, FIRST DISTRICT ILLINOIS,
CHICAGO, October 6, 1887.

SIR, — Referring to your department letter of September 4, relative to ingredients used in the manufacture of oleomargarine in this district that are deleterious to the public health, I have the honor to report as follows: I find upon careful investigation that the materials used in this district in the manufacture of oleomargarine consist of the very best selected fats from the slaughtered animal, and, as a rule, not to exceed a day old, and that the methods employed in the manipulation of these fats are cleanly in the highest degree.

The factories themselves are as clean and sweet as the abundant use of hot and cold water, soap and scrubbing-brushes, can possibly keep them.

I cannot ascertain that there is anything used in this district in the manufacture of oleomargarine that can possibly be construed as being deleterious to the public health, either in themselves or in the manipulation, and from the reports of deputies, from time to time, I am satisfied that I am correct in saying that there are no articles used in the manufacture of oleomargarine in this district deleterious to the public health.

Very respectfully,

R. STONE,
Collector.

HON. JOSEPH S. MILLER,
Commissioner of Internal Revenue, Washington, D.C.

Other letters are given from districts in Pennsylvania, New York, Ohio, Indiana, etc., and the Commissioner, in referring to them, says: —

The foregoing uniformly favorable testimony of sworn United States officers, whose positions guard them from bias, toward either the manufacturing interest, on the one hand, or the dairy interest, on the other hand, and the entire absence of complaint under section 14 of the law, leads this office to conclude that the manufacturers of oleomargarine, upon whose products the internal revenue stamps and brands appear, are earnestly endeavoring to render their products not deleterious to the public health.

In another place in his report (page 143), in giving the results of the chemical analyses of one hundred and thirty-one samples of substances submitted to his office for examination, under the provisions of sections 14 and 15 of the oleomargarine act, he writes: —

Of all the samples submitted, twenty-one were found to be oleomargarine, and one hundred and ten were found to be butter, or, at least, not oleomargarine as defined by law. It is true that

many of these samples were found to be mixtures of butter fat with chemicals, intended for the most part to destroy rancidity, and to make that which was old and stale appear new and fresh; *but as the only fat employed was butter fat*, this office was compelled to decide that the article was not oleomargarine.

These statements and reports of the authority best qualified to judge, and having the best and fullest opportunities of judging, ought to be taken as conclusive in regard to the healthfulness of oleomargarine, and a complete answer to those who, without knowing, have so loudly claimed that the fats used in oleomargarine were refined by chemicals, since it appears that the only chemicals found by the United States Commissioner were discovered in butter.

VINEGAR.

During the year 1887 there were analyzed in the laboratory of this department 775 samples of vinegar obtained from store-keepers in the city of Boston. Of these, 76.90 per cent. were of the quality and strength required by the statute. This result is a considerable improvement over that of the years 1885 and 1886, the percentage of poor samples for those years being —

Percentage of poor samples of vinegar in Boston for 1885	38.00
Percentage of poor samples of vinegar in Boston for 1886	32.52
Percentage of poor samples of vinegar in Boston for 1887	23.10

The same course has been pursued as in former years in regard to complaints, that is to say, it has been the practice to send warnings to store-keepers in whose possession vinegar not of standard quality has been found, with the result that such vinegar was returned to the manufacturers and standard vinegar obtained in its place. A very large proportion of the poor vinegar sold in Boston can be traced to a comparatively small number of wholesale dealers and manufacturers, and these are sending out a much better article than formerly. There are several brands of spurious cider vinegar which were extensively sold in this city a few years ago, which have entirely disappeared from this market.

There are three kinds of vinegar commonly sold in this city, viz.: Cider vinegar, the so-called White Wine vinegar, and Malt vinegar.

Cider vinegar. — Cider vinegar, as its name implies, is the

result of the acetification of cider, which, as every one knows, is the fermented juice of the apple. The following analyses from Hassal are the results of the examination of cider : —

	Alcohol by Volume.	Malic Acid.	Acetic Acid.	Sugar.	Total Solids.	Ash.
1	5.90	0.364	0.086	3.63	5.76	0.27
2	6.10	0.328	0.111	3.96	6.14	0.53
3	5.95	0.329	0.118	3.75	5.38	0.22
4	6.25	0.368	0.119	1.72	2.67	0.29
5	6.10	0.310	0.133	3.83	5.18	0.24
6	6.10	0.343	0.111	3.91	5.33	0.22
Average . . .	6.06	0.343	0.113	3.46	5.12	0.29

Girard gives the following as the average composition of cider : —

Alcohol by volume	5 to 6 per cent.
Solid extract dried to 212° F. . . .	3.00 "
Ash	0.28 "

The ash of cider (except about 10 per cent., consisting of insoluble phosphates and silica) is soluble in water, and consists to the extent of about 65 per cent. of its weight of potassium carbonate.

By the absorption of oxygen in consequence of long exposure to the air, or by its more rapid action in the so-called vinegar generators, and in presence of a ferment, called by Pasteur *mycoderma aceti*, the alcohol of the cider is transformed into acetic acid, while a portion of the organic matter ("mother") settles to the bottom of the cask containing the vinegar. In theory 100 parts of alcohol by weight produce 130 parts of crystallizable or absolute acetic acid ; in practice, however, there is a loss of alcohol amounting to about 10 or 15 per cent. by the old-fashioned method, so that it appears that an average cider containing 5 to 6 per cent. by volume, or 4 to 4.8 per cent. by weight, of alcohol will yield a vinegar containing from $4\frac{1}{2}$ to $5\frac{1}{2}$ per cent. of absolute acetic acid. As some ciders contain as high as 9.5 per cent. of alcohol, we may have cider vinegars which reach about this same percentage of acetic acid.

The following analyses of cider vinegar by Davenport were made of specimens obtained from the Weld farm in West Roxbury, and represent different pressings from the

year 1869 to 1882. The analyses were made in the fall of 1882.

Age.	Pressing.	Acetic Acid.	Residue.
1 month	1882	0.70	13.75
1 year	1881	1.50	4.63
2 years	1880	5.20	3 62
3 years	1879	7.50	5.10
4 years	1878	6.40	2.18
5 years	1877	7.40	2.65
6 years	1876	6.95	3.32
7 years	1875	6.10	3.80
8 years	1874	8.00	2.51
9 years	1873	7.65	3.40
10 years	1872	7.90	3.20
11 years	1871	8.90	4.95
12 years	1870	7.40	4.50
13 years	1869	6.40	3.45
Average, exclusive of years 1881 and 1882 .		7.15	3.55

Characteristics of Cider Vinegar made from pure Apple Cider of average quality not less than two years old.

I. An acidity equivalent to not less than 4.5 per cent. of anhydrous acetic acid by weight.

II. A residue on drying at 212° F. not less than 2 per cent. by weight.

III. The residue should be free from any substance having an acrid or pungent taste. It should be distinctly sour, from the presence of malic acid. The residue should be of a dark reddish-brown color; any blackening of the residue renders it probable that the sample contains free mineral acid.

IV. The vinegar should by the addition of a small quantity of solution of sub-acetate of lead yield, either at once or on the expiration of about ten minutes, a flocculent precipitate of a dirty brown color.

This precipitate consists of malic acid in combination with organic and coloring matters, and after a time forms a considerable sediment at the bottom of the vessel. It is, in partic-

ular cases, of a decidedly brilliant pinkish-red color, depending probably upon the variety and condition of the apple.

V. Chloride of barium or nitrate of silver in solution should give at most a very slight cloudiness (mere traces of sulphates and chlorides).

VI. A portion of the dried residue upon the end of a platinum wire held in the flame of a Bunsen burner should give a flame of a clear violet color (potassium).

Determination of the percentage of acetic acid. — Although the statute requires that all vinegar shall have an acid strength of not less than 4½ per cent. by *weight*, it is more convenient in practice to measure the vinegar. The results by this means are a very slight fraction too high; but the difference is scarcely appreciable, and the error is in favor of the sample. Accordingly, 6 cubic centimeters of the vinegar to be tested are measured by means of a pipette, and transferred to a small glass placed over a piece of white paper. The vinegar is then neutralized by a volumetric solution of caustic soda contained in a burette, from which it is allowed to flow drop by drop. The volumetric solution of soda is prepared according to the directions of the United States Pharmacopœia. A 1 per cent solution of phenol-phthalein in diluted alcohol is used as an indicator. The whole number and tenths of divisions of the burette (cubic centimeters) employed is the per cent. of absolute acetic acid in the specimen.

Determination of the amount of vinegar solids. — For this purpose 10 cubic centimeters of the vinegar are measured into a platinum capsule and evaporated upon the water-bath. The weight of the residue in grammes after full evaporation, multiplied by 10, gives the percentage of vinegar solids.

It was formerly the practice, in estimating the strength of vinegar, to state the results in grains of bicarbonate of soda or of bicarbonate of potassium, *i.e.*, the number of grains of these substances required to neutralize one troy ounce of vinegar, and it is sometimes desirable to translate these old commercial terms into the more modern percentages of absolute acetic acid. For convenience in rendering calculation unnecessary, the following tables in the Appendix may be useful: —

Table I. gives the percentage of absolute acetic acid corresponding to any given number of grains of bicarbonate of soda.

Table II. gives the percentage of absolute acetic acid corresponding to any given number of grains of bicarbonate of potassium

Table III. gives the number of grains of bicarbonate of

soda and of potassium required to neutralize one troy ounce vinegar having the percentage of absolute acetic acid given in the first column.

Adulteration of cider vinegar. — The direct addition of sulphuric or other mineral acids to cider vinegar is now seldom practised. What is sold as cider vinegar is frequently a cheap acetic-acid vinegar, or a so-called white-wine vinegar, colored by caramel, and to which a certain quantity of cider jelly, or boiled cider, is added; sometimes an extract is made by boiling the residue left after the pressing of cider, and added to the vinegar to give it the necessary percentage of solids. Such vinegar is always deficient in malic acid and generally shows excess of sulphates.

Cider vinegar of weak acidity is sometimes strengthened by the addition of commercial acetic acid; but any quality of this acid likely to be employed for this purpose contains impurities, *i.e.*, traces of sulphuric or muriatic acid, which betray the addition. Cider vinegar made from cider originally preserved by salicylic acid or by sulphite of lime, or vinegar to which such cider has been added, shows these substances on application of proper tests; and as the statute requires that cider vinegar shall be composed *exclusively* of apple cider, the presence of these bodies causes a vinegar to be rejected when it might otherwise pass as good.

Vinegar which has been used for pickles is not infrequently mixed with cider vinegar, but is easily detected by the presence of salt, which is nearly always present.

White-wine vinegar. — White-wine vinegar is produced in France and Germany by the acetification of white wines; but the so-called white-wine vinegar of this country is so only in name; it is in fact vinegar produced from diluted alcohol or whiskey, or from solution of glucose which is passed through vinegar generators. In the case of glucose the weak syrup is, of course, first caused to undergo alcoholic fermentation. Alcohol or spirit vinegar is nearly pure acetic acid, and is colorless; glucose vinegar gives abundant evidence of the presence of sulphate of lime, which is always present in commercial glucose. White-wine vinegar is sometimes colored and sold as cider vinegar, but the residue on evaporation is small (0.1 or 0.2 per cent.), and has none of the characteristics of the residue from cider vinegar.

Malt vinegar. — Malt vinegar is the common vinegar in use in Great Britain, but is sold only in very limited quantity in this vicinity. It is prepared from an infusion of malted grain, and treated in generators in the same manner as glucose or alcohol vinegar.

Good malt vinegar contains from 5 to 7 per cent. of abso-

lute acetic acid and from 2.5 to 5 per cent. of residue. The following is an analysis of a specimen of malt vinegar from Crosse & Blackwell: —

Analysis of Malt Vinegar.

Water	90.43	per cent.
Absolute acetic acid	6.16	"
Solid extract	3.05	"
Ash	0.36	"
Total	100.00	"

Analysis of the Ash of Malt Vinegar.

Potash	36.50	per cent.
Soda	9.10	"
Lime	1.60	"
Magnesia	3.25	"
Phosphoric acid	34.40	"
Silicic acid	10.25	"
Sulphuric acid	1.70	"
Chlorine	3.20	"
	100.00	"

Unlike cider vinegar, vinegar from malt gives a considerable precipitate with chloride of barium and with nitrate of silver (phosphates, sulphates, and chlorides).

The operation of the Massachusetts statute in relation to vinegar is generally satisfactory, but we think that there should be some provision inserted in it, as in New York State, requiring every manufacturer of vinegar to brand on the head of the cask, barrel, or keg containing it, his name, residence, date of manufacture, and the kind of vinegar.

I have given in the Appendix to this report the text of several recent decisions of the Supreme Judicial Court, a digest of decisions relative to the milk laws of the Commonwealth, copies of the laws governing the inspection of milk, butter, oleomargarine, and vinegar, together with tables and other matters of general interest.

Respectfully submitted,

JAMES F. BABCOCK,
Inspector of Milk and Vinegar.

Boston, December 31, 1887.

APPENDIX.

ORGANIZATION OF THE DEPARTMENT OF MILK INSPECTION FROM 1859 to 1887.

Inspectors of Milk.

Henry Faxon, 1859–1879.
Martin Griffin, 1879–1884.
Bennet F. Davenport, M.D., 1884.
James F. Babcock, 1885–.

Chemists employed by the Department.

Dr. A. A. Hayes, 1859.
Dr. Charles T. Carney, 1859–1862.
Dr. James C. White, 1862–1869.
Prof. James F. Babcock, 1869–1873.
Prof. John M. Merrick, 1873–1879.
Prof. Chas. E. Avery, 1879–1880.
Prof. James F. Babcock, 1879–1884.

ORGANIZATION OF THE DEPARTMENT FOR THE INSPECTION OF MILK, BUTTER, AND VINEGAR FOR THE YEAR 1887.

Inspector of Milk, Butter, and Vinegar.

James F. Babcock, 1885.

Clerk.

William W. Griffin, 1885.

Assistant in Laboratory.

James O. Jordan, 1885.

Collectors of Samples.

John Killeen, 1885.
John T. Mullen, 1885.
John J. Ryan, 1887.

DECISIONS OF THE SUPREME JUDICIAL COURT OF MASSACHUSETTS IN RELATION TO THE LAWS RELATIVE TO THE SALE AND INSPECTION OF MILK.

COMMONWEALTH *v.* CHARLES E. KENDALL.

SUFFOLK, ss. FEBRUARY TERM, 1887.

Complaint under Sect. 8, Chap. 352, Acts of 1885, to the Municipal Court of the City of Boston, that the defendant on the thirteenth day of October, 1886, had in his possession skimmed milk containing less than nine and three-tenths per cent. of milk solids exclusive of fat, with intent unlawfully to sell the same.

At the trial in the Municipal Court, the defendant filed a motion to quash the complaint, and in the Superior Court, before the jury was impanelled, he renewed the motion. Mason, J., overruled the motion. The jury returned a verdict of guilty, and the defendant alleged exceptions.

James A. McGeough, for the defendant.

Attorney-General, for the Commonwealth.

OPINION.

DEVENS, *J.* The contention of the defendant is that as the complaint in the case at bar was brought under Sect. 8, Chap. 352, Acts of 1885, the penalty for the offences described in which was provided by reference to Pub. Stats., Chap. 57, Sect. 5, and further, that as at the time of the alleged offence, Sect. 5, Chap. 57, Pub. Stats., had been repealed by substitution of Sect. 2, Chap. 318, Acts of 1886, there was therefore no offence for which any legal penalty had been provided, and thus no prosecution could be maintained. Commonwealth *v.* Kenneson, 143 Mass. 418; Comm. *v.* Kelleher, 12 Allen, 480.

If we give the defendant the full benefit of his contention that Sect. 5, Chap. 57, Pub. Stats., is repealed by necessary implication, the result that there is no legal offence under Sect. 8, Chap. 352, Acts of 1885, for which any penalty has been provided by no means follows. When the Statute of 1885, Chap. 352, Sect. 2, enacts that "whoever violates the provisions of this section shall be punished by the penalties in Sect. 5 of Chap. 57 of the Pub. Stats.," it describes the penalties by reference to that section. They are different, as the offence may be a first, second, or subsequent one, and without recapitulating them in detail they are thus imported into the Statute of 1885.

If different penalties are from time to time afterwards imposed for the offences described in the Public Statutes, such penalties would not be imposed for the offence described in the Statute of 1885, unless there was some legislation which then applied to it.

The penalties which are imposed by the Public Statutes as they then existed are the penalties imposed by the Statute of 1885, and for the purpose of defining them the later statute incorporates with

itself the earlier one, so far as it relates to them. When a prior act, or, as in the case at bar, part of a prior act is incorporated with a subsequent act, it is the same thing as if the words of the first act had been repeated in the second act, so that the repeal of the first act will not take away the effect of the words which are so repeated in the second act by means of this incorporation. Reg. *v.* Stock, 8 A. & E., 405; Reg. *v.* Merionethshire, 6 Q. B., 343; Reg. *v.* Smith, T. R., and Q. B., 146; Reg. *v.* Inhabitants of Brecon, 15 Q. B., 813.

Difficulty may sometimes be experienced in determining whether a former act or a portion of it is incorporated in the later one. Borden *v.* Smith, 18 L. J., 121. But it does not exist in this case. We are of opinion that the penalties imposed by Sect. 5, Chap. 57, Pub. Stats., are made a part of the latter act, Sect. 8, Chap. 352, Acts of 1885, as clearly as if they were written out at length and in terms recited in it.

Exceptions overruled.

COMMONWEALTH *v.* BENJAMIN F. HOLT.

SUFFOLK, ss. JUNE TERM, 1887.

Complaint to the Municipal Court of the City of Boston, alleging that the defendant, on the 23d day of April, 1887, "did sell to Robert Rooney one pint of milk not of good standard quality, that is to say, milk containing less than 13 per cent. of milk solids."

At the trial before Brigham, C. J., Superior Court, it appeared that the defendant made a special contract with the wife of said Robert Rooney, by which he was to deliver to her one quart, each day, of the milk of one dairy; that he fulfilled his part of the contract; that said contract was authorized by said Robert Rooney; that at the date of the contract, and for some months after, he had no knowledge of the existence of the husband; that he dealt with and gave credit to the wife only; that the charges on his book of account, and in his bills, were to "Rooney;" that the wife paid all bills presented under said contract by the money of her husband, except one or two of such bills, which were paid by the husband, but it also appeared that during this time said Robert Rooney lived with his wife, and by his earnings only, his family was supported.

On the morning of the said 23d day of April, after the milk had been delivered by the defendant's agent, as aforesaid, said Rooney, without any notice of his intention to the defendant, or his agent, carried the milk thus delivered to the Milk Inspector for inspection. The Milk Inspector caused a sample of the same to be analyzed, and brought this complaint, which he signed and prosecuted in the usual way. The defendant had no notice or knowledge of these proceedings until summoned into Court to answer to this complaint. About five weeks after the trial in the lower Court, but before the trial in this Court, the defendant called upon the Milk Inspector with a letter requesting a portion of the milk in question; but the remainder of the milk had not been preserved, nor had the Inspector reserved and sealed a por-

tion of the same before making the analysis, and the defendant received no portion of the milk.

It appeared from the evidence that the milk contained less than 13 per cent. of milk solids, and was not of good standard quality.

The defendant asked the Court to rule, —

First. That, as this was a special contract for the milk of one dairy, it was immaterial what the quality of the milk might be. If delivered by the defendant as he received it from the dairy he would not be guilty.

Second. That, as the defendant and his agent were deprived of the opportunity of requesting a portion of the sample of the milk at the time it was taken, no request was necessary, and the results of the analysis were not admissible in evidence.

Third. That, under the circumstances, the defendant's subsequent request was sufficient, and the analysis was inadmissible.

Fourth. That the analysis was inadmissible, because the provisions of Sect. 4 of Chap. 310 of the Acts of 1884 had not been complied with.

These rulings the Court refused to make, and the defendant excepted. The case was submitted to the jury with proper instructions not excepted to, and the jury returned a verdict of guilty.

James A. McGeough, for the defendant.

Attorney-General, for the Commonwealth.

OPINION.

FIELD, *J.* Statute 1886, Chapter 318, Section 2, prohibits under a penalty the sale of milk which is not of good standard quality, and the alleged contract was immaterial. Indeed, the contract would be held to mean that the milk delivered should be such as could be lawfully bought and sold. The testimony of the Milk Inspector to the results of the analysis was properly received in evidence; the milk was delivered to the Milk Inspector for analysis by the purchaser of the milk, and was not taken from the possession of the defendant pursuant to Stat. 1886, Chap. 318, Sect. 1.

In cases where the milk analyzed has not been taken under the provisions of statute, the competency of evidence is to be determined by the common law, and the testimony of any person who had sufficient skill to analyze milk, and who had analyzed some of the milk which was shown to have been sold by the defendant, was admissible. Comm. *v.* Spear, 143 Mass., 172.

Exceptions overruled.

COMMONWEALTH *v.* GRIDLEY B. ROWELL.

Complaint brought in the Municipal Court, where John A. Lawrence was discharged and Gridley B. Rowell was adjudged guilty and fined, from which he appealed to the Superior Court. At the trial in the Superior Court, before Bacon, J., the defendant was convicted and alleged exceptions.

Francis A. Perry, for the defendant.

Attorney-General, for the Commonwealth.

OPINION.

MORTON, *C. J.* The first count of the complaint charges that "Gridley B. Rowell and John A. Lawrence, copartners in trade," had in their possession, with intent to sell it, milk not of good standard quality; the second count, upon which alone the defendant was convicted, charges that "the said Rowell and the said Lawrence, copartners as aforesaid," had in their possession, with intent to sell it, milk to which a foreign substance had been added.

The Court refused to rule that it was necessary for the government to prove that Rowell and Lawrence were copartners, and the defendant excepted. The rule is that mere surplusage will not vitiate a complaint or indictment, and need not be established by proof. The complaint must allege all the material elements which constitute the offence charged, and they must be proved. And if the complaint alleges anything which is descriptive of the identity of the offence, it must be proved as alleged.

But any allegations not descriptive of the identity of the offence, which can be omitted without affecting the charge against the defendant and without detriment to the complaint, may be treated as surplusage and need not be proved.

Commonwealth *v.* Pray, 13 Pickering, 359.
Commonwealth *v.* Cooley, 10 Pickering, 37.
Commonwealth *v.* Lewis, 1 Metcalf, 151.

In the case at bar, the allegation that the defendants are copartners in trade is entirely immaterial.

If it be stricken out, the complaint is good and the same offence is charged. It is not one of the elements of the offence that they were copartners, and the allegation may be rejected as surplusage and need not be proved.

The rulings of the Court upon the subject were correct.

The Court also correctly ruled that the fact that the defendant Rowell was upon the wagon under the circumstances stated in the testimony in the case was competent evidence for the jury upon the issue whether he was in possession of the milk with intent to sell it.

Exceptions overruled.

DIGEST OF SOME OF THE MORE IMPORTANT OPINIONS OF THE SUPREME JUDICIAL COURT IN RELATION TO THE MILK LAW.

Pub. Stats., Chap. 57, Sect. 2, so far as it authorizes inspectors of milk to enter all carriages used in the conveyance of milk, and, whenever they have reason to believe any milk found therein is adulterated, to take specimens thereof for the purpose of analyzing or otherwise satisfactorily testing the same, is constitutional.

Commonwealth *v.* Carter, 132 Mass., 12.

1. A person may be convicted of selling adulterated milk, under Pub. Stats., Chap. 57, Sect. 5 (Gen. Stats., Chap. 49, Sect. 151), although he did not know it to be adulterated; and an averment in the indictment that he had such knowledge may be rejected as surplusage.

2. It is not necessary, in such indictment, to aver that the milk was cow's milk.

3. An indictment alleging a sale of adulterated milk to a woman is not defeated by proof that she was married and was acting as agent for her husband, if the seller had no notice, express or implied, of these facts.

4. An indictment, under Pub. Stats., Chap. 57, Sect. 5 (Gen. Stats., Chap. 49, Sect. 151), which charges that the defendant sold a certain quantity of "adulterated milk, to which a large quantity, that is to say, four quarts, of water had been added," is not bad for duplicity.

Commonwealth *v.* Farren, 9 Allen, 489.

1. An indictment which alleges that the defendant "did unlawfully keep, offer for sale and sell," adulterated milk, charges but one offence.

2. In support of such indictment, one who in a great many instances has used a lactometer for the purpose of testing the quality and the purity of milk, may testify to the result of an experiment made by him with the same lactometer upon the milk in question, although no evidence is offered as to the character of the instrument.

Commonwealth *v.* Nichols, 10 Allen, 199.

1. At the trial of an indictment on Pub. Stats., Chap. 57, Sect. 5 (Statute of 1868, Chap. 263), for selling "adulterated milk, there was evidence that the defendant [who was a son of the owner of a milk-route], with a companion who was in the same employment with himself, knowingly adulterated milk on its way for distribution to his father's customers, and then, having charge, with his companion, of its distribution from the wagon on which it was conveyed upon the route, caused a can of it to be delivered to one of the customers by the hand of his companion. *Held*, that he had no ground of exception to instructions to the jury, that, in the absence of proof of any previous contract to supply milk to the customer, the delivery might be deemed an act of sale; nor to an instruction framed on a supposition that the jury might find that he was in the employment of his father, although there was no averment in the indictment to that effect."

Commonwealth *v.* Haynes, 107 Mass., 194.

A person may be convicted of selling adulterated milk, upon a complaint under Pub. Stats., Chap. 57, Sect. 5 (Statute of 1880, Chap. 209, Sect. 3), without allegation or proof that he knew it to be adulterated.

Commonwealth *v.* Evans, 133 Mass., 11.

A complaint, under Pub. Stats., Chap. 57, Sect. 5, alleging that the defendant, at a time and place named, had in his possession a certain quantity, to wit, one pint, of adulterated milk containing less than thirteen per cent. of milk solids, with intent then and there unlawfully to sell the same, is sufficient, without further alleging that the milk was analyzed, and found on analysis to contain less than thirteen per cent. of milk solids. At the trial of a complaint, under Pub. Stats., Chap. 57, Sect. 5, alleging that the defendant had in his possession adulterated milk, to wit, milk containing less than thirteen per cent. of milk solids, with intent to sell the same, it is immaterial in what manner the quantity of milk solids has been reduced below thirteen per cent., if the intent is to sell the milk as pure milk, and not as skimmed milk.

Commonwealth *v.* Bowers, 140 Mass., 483.

Pub. Stats., Chap. 57, Sect. 9 (Statute of 1880, Chap. 209, Sect. 7), providing that "in all prosecutions under this act," for selling adulterated milk, "if the milk shall be shown upon analysis to contain more than eighty-seven per centum of watery fluid, or to contain less than thirteen per centum of milk solids, it shall be deemed for the purpose of this act to be adulterated," is constitutional.

Commonwealth *v.* Evans, 132 Mass., 11.

A complaint, under the Pub. Stats., Chap. 57, Sects. 5, 9, alleging that the defendant, at a time and place named, had in his custody and possession a certain quantity, to wit, one pint, of adulterated milk, to wit, milk then and there containing less than thirteen per cent. of milk solids, with intent then and there unlawfully to sell the same, is sufficient.

Commonwealth *v.* Keenan, 139 Mass., 193.

A complaint, under the Pub. Stats., Chap. 57, Sect. 5, alleging in one count that the defendant, at a time and place named, sold a certain quantity, to wit, one pint, of adulterated milk, to wit, milk containing less than thirteen per cent. of milk solids, and in another count, alleging that the defendant, at the same time and place, had in his possession a certain quantity, to wit, one pint, of adulterated milk, to wit, milk containing less than thirteen per cent. of milk solids, with intent then and there unlawfully to sell the same, is sufficient, without further alleging that the milk was analyzed, and found on analysis to contain less than thirteen per cent. of milk solids.

The Pub. Stats., Chap. 57, Sect. 10, do not prohibit any person not an inspector of milk from making a complaint for a violation of the provisions of the chapter.

A complaint, under the Pub. Stats., Chap. 57, Sect. 5, alleging that the defendant sold one pint of adulterated milk, to wit, milk containing less than thirteen per cent. of milk solids, is not sup-

ported by proof that he sold the milk as skimmed milk out of a tank marked as required by Sect. 7, although the milk was watered.

A complaint, under Pub. Stats., Chap. 57, Sect. 5, alleging a sale of adulterated milk, to wit, milk containing less than thirteen per cent. of milk solids, is supported by proof of a sale of milk which, by the removal of a part of the cream, has been reduced in solids below thirteen per cent., unless the milk was sold as skimmed milk, and out of a vessel, can, or package marked as required by Sect. 7; and it is not necessary that a complaint charging such an offence should be drawn under Sect. 6.

Commonwealth *v.* Tobias, 141 Mass., 129.

At the trial of an indictment on Pub. Stats., Chap. 57, Sect. 5, charging the defendant with having adulterated milk in his possession, with intent unlawfully to sell the same, an analyst in the employ of the Inspector of Milk may testify to the result of his analysis of the milk taken from the defendant from memory, using a memorandum made by him at the time of analysis to refresh his memory, without further proof that the requirements of the Pub. Stats., Chap. 57, Sect. 2, as amended by the Statute of 1884, Chap. 310, Sect. 3, have been complied with.

Commonwealth *v.* Spear, 143 Mass., 172.

At a trial of an indictment on the Pub. Stats., Sect. 5, charging the defendant with having adulterated milk in his possession, with intent unlawfully to sell the same, an analyst in the employ of the Inspector of Milk, who analyzed the milk taken from the defendant, testified that he reserved a portion of the milk so taken, by putting it into a bottle, which he corked and sealed. A chemist, to whom the analyst delivered the portion of milk so reserved, testified, for the defendant, that the bottle was not sealed. The defendant asked the Judge to rule, that, if the bottle was corked only, it was not a compliance with the requirement of the Statute of 1884, Chap. 310, Sect. 4, as to the sealing of such reserved portion. The Judge declined so to rule, and instructed the jury that they might consider the evidence as bearing upon the credibility of the government witness.

Held, that the defendant had no ground of exception.

If, at the trial of an indictment on the Pub. Stats., Chap. 57, Sect. 5, charging the defendant with having adulterated milk in his possession, with intent unlawfully to sell the same, an analyst in the employ of the Inspector of Milk of a city testifies that he added, for the purpose of preserving it, a few drops of carbolic acid to the sample reserved from milk delivered to him for analysis, it is a question of fact for the jury whether the reservation of the sample was in accordance with the requirement of the Stat. of 1884, Chap. 310, Sect. 4.

Commonwealth *v.* Spear, 143 Mass., 172.

At the trial of a complaint, under Pub. Stats., Chap. 57, Sect. 5, alleging that the defendant had in his possession adulterated milk, with intent unlawfully to sell the same, the evidence showed that a wagon with the defendant's name and number on it was standing upon a public street in a city at an early hour of the morning; that the defendant's servant was on the wagon, and there were several eight-quart cans in the wagon; that a collector of samples in the employ of the Inspector of Milk for the city took a sample of milk from one of the cans, which was not marked "skimmed milk;" and that an analysis of the milk taken showed that it was below the legal standard.

Held, that there was evidence of an intent on the part of the defendant to sell the milk, which was properly submitted to the jury.

Commonwealth *v.* Smith, 143 Mass., 169.

A complaint on the Stat. of 1886, Chap. 318, Sect. 2, alleging that on the first day of July, 1886, the defendant had in his possession "one pint of milk not of good standard quality, that is to say, milk containing less than thirteen per cent. of milk solids, with intent then and there unlawfully to sell the same within this Commonwealth," is sufficient, without negativing the exception of the months of May and June.

The Stat. of 1885, Chap. 352, Sect. 6, provides that Sect. 9 of the Pub. Stats., Chap. 57 (which relates to the sale of adulterated milk), "is hereby amended so as to read as follows." The Stat. of 1886, Chap. 318, Sect. 2, provides that Sect. 9 of the Pub. Stats., Chap. 57, "is hereby amended so as to read as follows." In each section, after the words quoted, there follows a sentence which covers the whole subject of the original section. *Held*, that the Stat. 1886, Chap. 318, Sect. 2, was a valid enactment.

The Stat. of 1884, Chap. 310, Sect. 4, providing for the reservation and sealing, before commencing the analysis, of a portion of the sample of milk taken for analysis, is impliedly repealed by the Stat. of 1886, Chap. 318, Sections 1 and 3.

Commonwealth *v.* Kenneson, 143 Mass., 418.

THE LAWS OF MASSACHUSETTS

RELATING TO THE

SALE AND INSPECTION OF MILK.

[CHAPTER 57, PUBLIC STATUTES.]

SECTION 1. The mayor and aldermen of cities shall, and the selectmen of towns may, annually appoint one or more persons to be inspectors of milk for their respective places, who shall be sworn before entering upon the duties of their office. Each inspector shall publish a notice of his appointment for two weeks in a newspaper published in his city or town, or, if no newspaper is published therein, he shall post up such notice in two or more public places in such city or town.

SECT. 2. (*As amended by Section 1 of Chapter 318 of the Acts of 1886.*) Such inspectors shall keep an office, and shall record in books kept for the purpose the names and places of business of all persons engaged in the sale of milk within their city or town. Said inspectors may, with the approval of the mayor or the selectmen, employ suitable persons to act as collectors of samples, who shall be sworn before entering upon their duties. Said inspectors, or the collectors employed and qualified as aforesaid, may enter all places where milk is stored or kept for sale, and all carriages used for the conveyance of milk, and the said inspectors or the collectors may take samples for analysis from all such places or carriages, and at the same time a portion of each sample so taken shall, if the person taking the same be requested so to do, be sealed and delivered to the owner or person from whose possession the same is taken, and a receipt given therefor to the person taking the same. The inspectors shall cause the samples of milk so taken to be analyzed or otherwise satisfactorily tested, the result of such analysis or test they shall record and preserve as evidence. The inspectors shall receive such compensation as the mayor and aldermen or selectmen may determine.

SECT. 3. In all cities and in all towns in which there is an inspector of milk, every person who conveys milk in carriages or otherwise, for the purpose of selling the same in such city or town, shall annually, on the first day of May, or within thirty days there-

after, be licensed by the inspector or inspectors of milk of such city or town to sell milk within the limits thereof, and shall pay to such inspector or inspectors fifty cents each to the use of the city or town. The inspector or inspectors shall pay over monthly to the treasurer of such city or town all sums collected by him or them. Licenses shall be issued only in the names of the owners of carriages or other vehicles, and shall, for the purposes of this chapter, be conclusive evidence of ownership. No license shall be sold, assigned, or transferred. Each license shall record the name, residence, place of business, number of carriages or other vehicles used, the name and residence of every driver or other person engaged in carrying or selling said milk, and the number of the license. Each licensee shall, before engaging in the sale of milk, cause his name, the number of his license, and his place of business, to be legibly placed on each outer side of all carriages or vehicles used by him in the conveyance and sale of milk, and he shall report to the inspector or inspectors any change of driver or other person employed by him which may occur during the term of his license. Whoever, without being first licensed under the provisions of this section, sells milk or exposes it for sale from carriages or other vehicles, or has it in his custody or possession with intent so to sell, and whoever violates any of the provisions of this section, shall, for a first offence, be punished by fine of not less than thirty nor more than one hundred dollars; for a second offence, by fine of not less than fifty nor more than three hundred dollars; and for a subsequent offence, by fine of fifty dollars and by imprisonment in the house of correction for not less than thirty nor more than sixty days.

SECT. 4. Every person before selling milk or offering it for sale in a store, booth, stand, or market-place in a city or in a town in which an inspector or inspectors of milk are appointed, shall register in the books of such inspector or inspectors, and shall pay to him or them fifty cents to the use of such city or town; and whoever neglects so to register shall be punished for each offence by fine not exceeding twenty dollars.

SECT. 5. (*As amended by Section 2 of Chapter 318 of the Acts of 1886.*) Whoever, by himself or by his servant or agent, or as the servant or agent of any other person, sells, exchanges, or delivers, or has in his custody or possession with intent to sell or exchange, or exposes or offers for sale or exchange, adulterated milk, or milk to which water or any foreign substance has been added, or milk produced from cows fed on the refuse of distilleries, or from sick or diseased cows, or milk not of good standard quality, shall, for a first offence, be punished by fine of not less than fifty nor more than two hundred dollars; for a second offence, by fine of not less than one hundred nor more than three hundred dollars, or by imprisonment in the house of correction for not less than thirty nor more than sixty days; and for a subsequent offence, by fine of fifty dollars and by imprisonment in the house of correction for not less than sixty nor more than ninety days.

SECT. 6. Whoever, by himself or by his servant or agent, or as the servant or agent of any other person, sells, exchanges, or delivers, or has in his custody or possession with intent to sell or exchange, or exposes or offers for sale as pure milk, any milk from which the cream or a part thereof has been removed, shall be punished by the penalties provided in the preceding section.

SECT. 7. (*As amended by Chapter 352, Acts of 1885.*) No dealer in milk, and no servant or agent of such a dealer, shall sell, exchange, or deliver, or have in his custody or possession with intent to sell, exchange, or deliver, milk from which the cream or any part thereof has been removed, unless in a conspicuous place above the centre upon the outside of every vessel, can, or package from or in which such milk is sold the words **"SKIMMED MILK"** are distinctly marked in uncondensed Gothic letters not less than one inch in length. Whoever violates the provisions of this section shall be punished by the penalties provided in section five.

SECT. 8. (*As amended by Chapter 310, Acts of 1884.*) Any inspector of milk, and any servant or agent of an inspector, who wilfully connives at or assists in a violation of the provisions of this chapter, and whoever hinders, obstructs, or in any way interferes with any inspector of milk, or any servant or agent of an inspector in the performance of his duty, shall be punished by fine of not less than one hundred nor more than three hundred dollars, or by imprisonment for not less than thirty nor more than sixty days.

SECT. 9. (*As amended by Section 2 of Chapter 318 of the Acts of 1886.*) In all prosecutions under this chapter, if the milk is shown upon analysis to contain more than eighty-seven per cent. of watery fluid, or to contain less than thirteen per cent. of milk solids, or to contain less than nine and three-tenths per cent. of milk solids exclusive of fat, it shall be deemed for the purpose of this act to be not of good standard quality, except during the months of May and June, when milk containing less that twelve per cent. of milk solids shall be deemed to be not of good standard quality.

SECT. 10. It shall be the duty of every inspector to institute a complaint for a violation of any of the provisions of this chapter on the information of any person who lays before him satisfactory evidence by which to sustain such complaint.

SECT. 11. Each inspector shall cause the name and place of business of every person convicted of selling adulterated milk, or of having the same in his possession with intent to sell, to be published in two newspapers in the county in which the offence was committed.

SECT. 12. (*Section 8 of Chapter 352 of the Acts of 1885.*) No person shall sell, exchange, or deliver, or have in his custody or possession with intent to sell, exchange, or deliver, skimmed milk containing less than nine and three-tenths per cent. of milk solids exclusive of fat. Whoever violates the provisions of this section

shall be punished by the penalties provided in section five of chapter fifty-seven of the Public Statutes.

SECT. 13. (*Section 3 of Chapter 318 of the Acts of 1886.*) If the said inspector or collector, after being so requested, shall refuse or neglect to seal and deliver to the owner or person from whose possession the same is taken, as provided in section two, a portion of the sample taken as aforesaid, no evidence shall be received in any court of the results of the analysis or test of the same, which may have been recorded and preserved as aforesaid.

SECT. 14. (*Section 4 of Chapter 318 of the Acts of 1886.*) Whoever makes, uses, or has in his possession any imitation or counterfeit of any seal used by any milk inspector or his agents, and whoever changes, or in any manner tampers with, any sample taken or sealed as provided in section two, shall be punished by fine not exceeding fifty dollars, or by imprisonment in the house of correction not exceeding ninety days.

LAWS OF MASSACHUSETTS

RELATING TO THE

INSPECTION AND SALE OF OLEOMARGARINE.

[SECTIONS 17, 18, 19, 20, AND 21 OF CHAP. 56 OF THE PUBLIC STATUTES, AS AMENDED BY CHAP. 310 OF THE ACTS OF 1884, AND CHAP. 352, ACTS OF 1885, AND CHAP. 317 OF THE ACTS OF 1886.]

SECTION 17. (*As amended by Section 1 of Chapter 317 of the Acts of 1886.*) Whoever, by himself or his agents, sells, exposes for sale, or has in his possession with intent to sell, any article, substance, or compound, made in imitation or semblance of butter or as a substitute for butter, and not made exclusively and wholly of milk or cream, or containing any fats, oils, or grease not produced from milk or cream, shall have the words **"IMITATION BUTTER,"** or if such substitute is the compound known as **"OLEOMARGARINE,"** then the word **"OLEOMARGARINE,"** or, if it is known as **"BUTTERINE,"** then the word **"BUTTERINE,"** stamped, labelled, or marked, in a straight line, in printed letters of plain, uncondensed Gothic type, not less than one-half inch in length, so that said words cannot be easily defaced, upon the top, side, and bottom of every tub, firkin, box, or package containing any of the said article, substance, or compound. The said stamp, label, or mark shall contain no other words. And whoever, by himself or his agents, exposes or offers for sale any of the said article, substance, or compound not in the original package, shall attach to the said article, substance, or compound, in a conspicuous place, a label bearing the words **"IMITATION BUTTER," "OLEOMARGARINE,"** or **"BUTTERINE,"** as the article may be, in printed letters of plain, uncondensed Gothic type, not less than one-half inch in length. And in cases of retail sales of any of said article, substance, or compound not in the original packages, the seller shall, by himself or his agents, attach to each package so sold, and shall deliver therewith to the purchaser, a label or wrapper bearing in a conspicuous place, upon the outside of the package, the words **"IMITATION BUTTER," "OLEOMARGARINE,"** or **"BUTTERINE,"** and no other words, in printed letters, in a straight line of plain, uncondensed Gothic type, not less than one-half inch in length.

SECT. 18. Whosoever, by himself or his agents, sells, exposes for sale, or has in his possession with intent to sell, any article, substance, or compound, made in imitation or semblance of cheese, or as a substitute for cheese, and not made exclusively and wholly of milk or cream, or containing any fats, oils, or grease not produced from milk or cream, shall have the words **"IMITATION CHEESE,"** stamped, labelled, or marked, in printed letters of plain, uncondensed Gothic type, not less than one inch in length, so that the words cannot easily be defaced, upon the side of every cheese-cloth or band around the same, and upon the top and side of every tub, firkin, box, or package containing any of said article, substance, or compound. And in cases of retail sales of any of said article, substance, or compound not in the original packages, the seller shall, by himself or his agents, attach to each package so sold, and shall deliver therewith to the purchaser, a label or wrapper bearing in a conspicuous place upon the outside of the package the words **"IMITATION CHEESE,"** in printed letters of plain, uncondensed Gothic type, not less than one inch in length.

SECT. 19. (*As amended by Section 2 of Chapter 317 of the Acts of 1886.*) Whoever sells, exposes for sale, or has in his possession with intent to sell, any article, substance, or compound made in imitation or semblance of butter or cheese, or as a substitute for butter or cheese, except as provided in the two preceding sections, and whoever, with intent to deceive, defaces, erases, cancels, or removes any mark, stamp, brand, label, or wrapper provided for in such sections, or in any manner shall falsely label, stamp, or mark any box, tub, article, or package marked, stamped, or labelled as aforesaid, shall for every such offence forfeit to the city or town where the offence was committed one hundred dollars, and for a second and each subsequent offence two hundred dollars.

SECT. 20. Inspectors of milk shall institute complaints for violations of the provisions of the three preceding sections when they have reasonable cause to believe that such provisions have been violated, and on the information of any person who lays before them satisfactory evidence by which to sustain such complaint. Said inspectors may enter all places where butter or cheese is stored or kept for sale, and said inspectors shall also take specimens of suspected butter or cheese, and cause them to be analyzed or otherwise satisfactorily tested, the result of which analysis or test they shall record and preserve as evidence; and a certificate of such result, sworn to by the analyzer, shall be admitted in evidence in all prosecutions under this and three preceding sections. The expense of such analysis or test, not exceeding twenty dollars in any one case, may be included in the costs of such prosecutions. Whoever hinders, obstructs, or in any way interferes with any inspector, or any agent of an inspector, in the performance of his duty, shall be punished by a fine of fifty dollars for the first offence, and of one hundred dollars for each subsequent offence.

SECT. 21. For the purposes of the four preceding sections the terms "butter" and "cheese" shall mean the products which are usually known by these names, and are manufactured exclusively from milk or cream, with salt and rennet, and with or without coloring matter.

[CHAPTER 317 OF THE ACTS OF 1886.]

SECT. 3. Whoever, by himself or his agents, sells, exposes for sale, or has in his possession with intent to sell, any article, substance, or compound made in imitation or semblance of butter, or as a substitute for butter, and not made exclusively and wholly of milk or cream, or containing any fats, oils, or grease not produced from milk or cream, contained in any box, tub, article, or package marked or labelled with the word "dairy" or the word "creamery," shall for every such offence forfeit to the city or town where the offence was committed one hundred dollars, and for a second and each subsequent offence two hundred dollars.

SECT. 4. Every person who conveys any imitation butter, oleomargarine, or butterine in carriages or otherwise, for the purpose of selling the same in any city or town, shall, within thirty days of the passage of this act, and annually on the first day of May, or within thirty days thereafter, be licensed by the inspector or inspectors of milk of such city or town, to sell the same within the limits thereof, and shall pay to such inspector or inspectors fifty cents to the use of the city or town. The inspector or inspectors shall pay over monthly to the treasurer of such city or town all sums collected by him or them. In towns in which there is no inspector of milk, licenses shall be issued by the town-clerk. Licenses shall be issued only in the names of the owners of carriages or other vehicles, and shall, for the purposes of this chapter, be conclusive evidence of ownership. No license shall be sold, assigned, or transferred. Each license shall record the name, residence, place of business, number of carriages or other vehicles used, the name and residence of every driver or other person engaged in carrying or selling imitation butter, oleomargarine, or butterine, and the number of the license. Each licensee shall, before engaging in the sale of any of the articles as aforesaid, cause his name, the number of his license, his place of business, to be legibly placed on each outer side of all carriages or vehicles used by him in the conveyance and sale of the articles as aforesaid, in Gothic letters, not less than one inch in length, and he shall report to the inspector or inspectors any change of driver or other person employed by him which may occur during the term of his license. Whoever, without being first licensed under the provisions of this section, sells any of the articles as aforesaid, or exposes or offers them for sale from carriages or other vehicles, or has them in his custody or possession with intent so to sell, and whoever violates any of the provisions of this section, shall, for the first offence, be punished by fine of not less than thirty nor more than one hundred dollars; for a second offence, by a fine of not less than fifty nor more than three hundred dollars.

SECT. 5. Every person, before selling or offering for sale any of the articles as aforesaid in a store, booth, stand, or market-place in a city or in a town in which an inspector or inspectors of milk are appointed, shall within thirty days of the passage of this act, and annually on the first day of May or within thirty days thereafter, register in the books of such inspector or inspectors, or if there be no inspector then in the books of the town-clerk, and shall pay to him or them fifty cents to the use of such city or town; and whoever neglects to so register shall be punished for each offence by a fine not exceeding twenty dollars.

LAWS OF MASSACHUSETTS

RELATING TO THE

INSPECTION AND SALE OF VINEGAR.

PUBLIC STATUTES. [CHAPTER 60, SECTION 69, AS AMENDED BY CHAPTER 257, ACTS OF 1883.]

SECTION 69. Every person who manufactures for sale, or offers or exposes for sale as cider vinegar, any vinegar not the legitimate product of pure apple-juice, known as apple-cider, or vinegar not made exclusively of said apple-cider, or vinegar into which foreign substances, drugs, or acids have been introduced, as may appear by proper tests, shall for each offence be punishable by fine of not less than fifty nor more than one hundred dollars.

SECT. 70. Every person who manufactures for sale, or offers for sale, any vinegar found upon proper tests to contain any preparation of lead, copper, sulphuric acid, or other ingredient injurious to health, shall for each such offence be punished by fine of not less than one hundred dollars.

SECT. 71. The mayor and aldermen of cities shall, and the selectmen of towns may, annually appoint one or more persons to be inspectors of vinegar, who shall be sworn before entering upon their duties.

[CHAPTER 307, ACTS OF 1884, AS AMENDED BY CHAPTER 150, ACTS OF 1885.]

SECTION 1. No person shall by himself, his servant or agent, or as the servant or agent of any other person, sell, exchange, deliver, or have in his custody or possession with intent to sell or exchange, or expose or offer for sale or exchange, any adulterated vinegar, or label, brand, or sell as cider vinegar, or as apple vinegar, any vinegar not the legitimate product of pure apple-juice, or not made exclusively from apple-cider.

SECT. 2. All vinegars shall be without artificial coloring matter, and shall have an acidity equivalent to the presence of not less than four and one-half per cent. by weight of absolute acetic acid, and in the case of cider vinegar shall contain in addition not less than two per cent. by weight of cider vinegar solids upon full evaporation over boiling water; and if any vinegar contains any artificial coloring matter or less than the above amount of acidity,

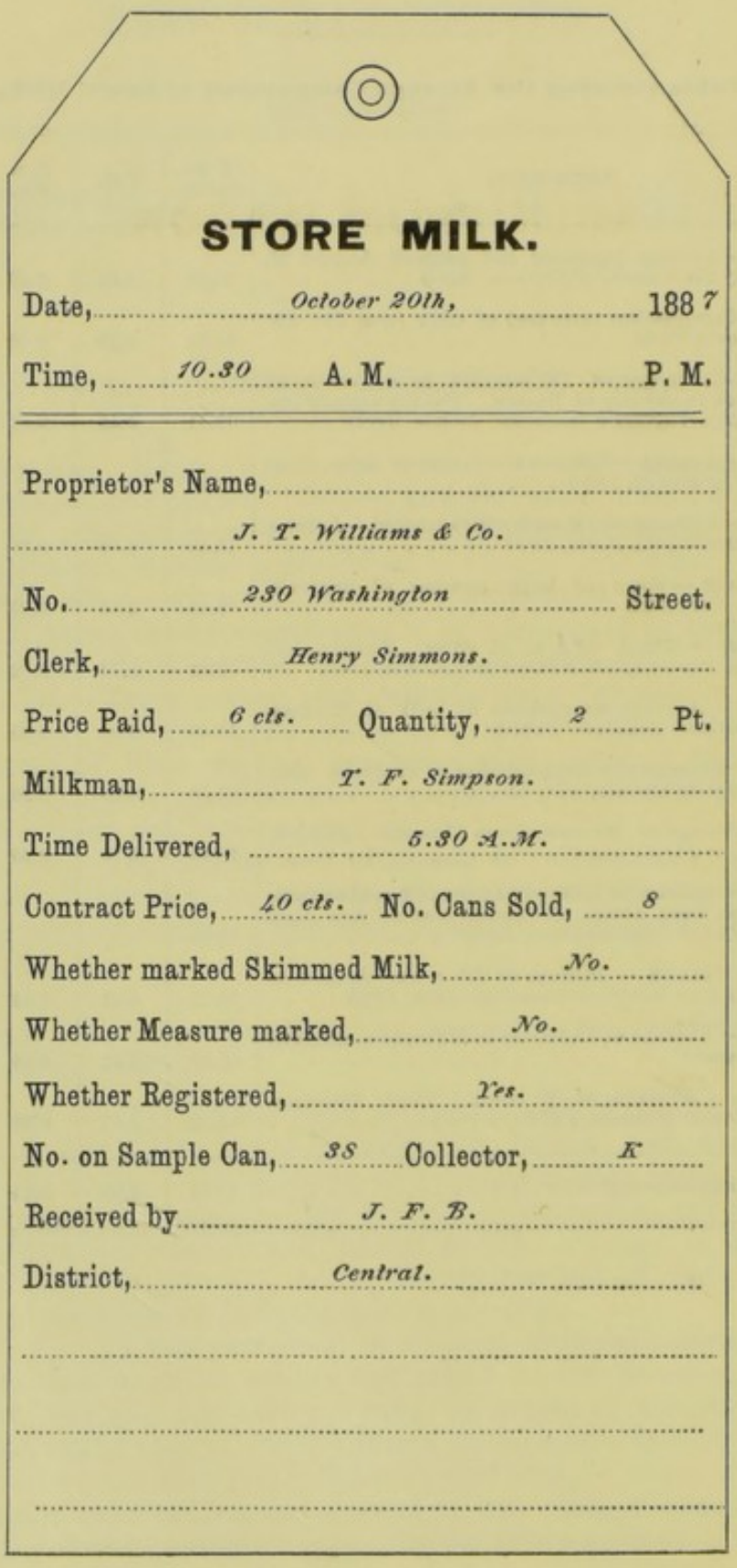
or, in the case of cider vinegar, if it contains less than the above amount of acidity or of cider vinegar solids, it shall be deemed to be adulterated within the meaning of this act.

SECT. 4. Whoever violates any of the provisions of this act shall be punished by fine not exceeding one hundred dollars.

Table showing the Average Composition of Cows' Milk.

AUTHORITY.	Total Solids.	Fat.	Not Fat.	Ash.
BOUDET. — Average proposed and adopted August 27, 1857, by the *Conseil d'Hygiene, Paris*	13.00	4.00	9.00	0.70
ADAM. — Composition (average) of milk from five districts near Paris	13.10	4.10	9.00	0.70
BABCOCK. — Average of 130 samples as delivered by milkmen in the city of Boston. *Twenty-seventh Annual Report of Milk Inspector, Boston, 1885*	13.11	3.45	9.66	0.70
ABBOTT. — Average of 601 cows. *Report of Mass. State Board of Health, 1886*	13.26	....	....	....
GIRARD. — Average of all authorities quoted. *Laboratoire Municipal, Paris, 1885*	13.30	4.00	9.30	0.70
BOUCHARDAT. — Mean of large number of analyses. *Traite d'Hygiene*	13.30	4.10	9.20	0.70
DAVENPORT. — Mixed milk of 31 cows. *Twenty-sixth Annual Report of Milk Inspector, Boston, 1884*	13.32	3.70	9.62	....
CAMERON. — Average composition of milk of 42 cows. *Agricultural Institute, Dublin*	13.40	4.00	9.40	0.70
WURTZ. — Average of a large number of analyses. *Dictionnaire de Chimie, Vol. II.*	13.50	4.00	9.50	0.60
BELL. — Average of 181 cows from 17 farms. *Analyst, 1877*	13.60	3.70	9.90	0.76
MARTIN. — Average of 2,282 cows from different sections of New York State. *Second Report of New York State Dairy Commissioner, 1886*	13.60	....	....	....
MARTIN & MOLLER. — Average of 296 cows. *Report on Milk and its Adulterations, New York, 1885*	13.73	4.21	9.52	0.71
NEWTON. — Average of 85 dairies in different sections of New Jersey	13.80	4.22	9.58	0.65
SHARPLES. — Average of 19 cows. *Proc. American Academy of Sciences, 1875*	14.49	4.83	9.66	0.66
Average composition of milk	13.48	4.03	9.45	0.69

SPECIMEN OF CARD USED FOR MARKING SAMPLES OF MILK FROM STORES.



STORE MILK.

Date, *October 20th,* 188 7

Time, *10.30* A. M. P. M.

Proprietor's Name, *J. T. Williams & Co.*

No. *230 Washington* Street.

Clerk, *Henry Simmons.*

Price Paid, *6 cts.* Quantity, *2* Pt.

Milkman, *T. F. Simpson.*

Time Delivered, *5.30 A.M.*

Contract Price, *40 cts.* No. Cans Sold, *8*

Whether marked Skimmed Milk, *No.*

Whether Measure marked, *No.*

Whether Registered, *Yes.*

No. on Sample Can, *88* Collector, *K*

Received by *J. F. B.*

District, *Central.*

SPECIMEN OF CARD USED FOR MARKING SAMPLES OF MILK FROM WAGONS.

MILK FROM WAGON.

Date, *July 10th,* 188 *7*

Time, *4.50* A. M. P. M.

Name on Wagon, *John Jones.*

Driver in Charge, *William Smith.*

Locality, *Court St., cor. Howard.*

Whether marked Skimmed Milk, *No.*

No. of Cans on Wagon, *25 and Small.*

Sample taken from *8 1-2* qt. can.

No. on Sample Can, *142* License No. *368*

Sample sealed and delivered, *Yes.*

To *Driver, — Wm. Smith.*

Receipt taken, *Yes.*

Collector, *M.* Rec. by *J.*

Remarks,

This is a new driver, who is not registered.

DAIRY MARK. *M*

I. Table showing the Percentage of Absolute Acetic Acid corresponding to any given number of Grains of Bicarbonate of Soda required to neutralize One Troy Ounce of Vinegar.

Grains of Bicarbonate of soda.	Percentage of Absolute Acetic Acid.	Grains of Bicarbonate of soda.	Percentage of Absolute Acetic Acid.	Grains of Bicarbonate of Soda.	Per cent. of Absolute Acetic Acid.
1	0.15	21	3.13	41	6.11
2	0.30	22	3.28	42	6.26
3	0.45	23	3.43	43	6.41
4	0.60	24	3.58	44	6.56
5	0.75	25	3.73	45	6.71
6	0.89	26	3.87	46	6.85
7	1.04	27	4.02	47	7.00
8	1.19	28	4.17	48	7.15
9	1.34	29	4.32	49	7.30
10	1.49	30	4.47	50	7.45
11	1.64	31	4.62	51	7.60
12	1.79	32	4.77	52	7.75
13	1.94	33	4.92	53	7.90
14	2.09	34	5.07	54	8.00
15	2.24	35	5.22	55	8.20
16	2.38	36	5.36	56	8.34
17	2.53	37	5.51	57	8.49
18	2.68	38	5.66	58	8.64
19	2.83	39	5.81	59	8.79
20	2.98	40	5.96	60	8.94

II. Table showing the Percentage of Absolute Acetic Acid corresponding to any given number of Grains of Bicarbonate of Potassium.

Grains of Bicarbonate of Potassium	Percentage of Absolute Acetic Acid.	Grains of Bicarbonate of Potassium.	Percentage of Absolute Acetic Acid.	Grains of Bicarbonate of Potassium.	Percentage of Absolute Acetic Acid.
1	0.12	25	3.12	49	6.12
2	0.25	26	3.25	50	6.25
3	0.37	27	3.37	51	6.37
4	0.50	28	3.50	52	6.50
5	0.62	29	3.62	53	6.62
6	0.75	30	3.75	54	6.75
7	0.87	31	3.87	55	6.87
8	1.00	32	4.00	56	7.00
9	1.12	33	4.12	57	7.12
10	1.25	34	4.25	58	7.25
11	1.37	35	4.37	59	7.37
12	1.50	36	4.50	60	7.50
13	1.62	37	4.62	61	7.62
14	1.75	38	4.75	62	7.75
15	1.87	39	4.87	63	7.87
16	2.00	40	5.00	64	8.00
17	2.12	41	5.12	65	8.12
18	2.25	42	5.25	66	8.25
19 . . .	2.37	43	5.37	67	8.37
20	2.50	44	5.50	68	8 50
21	2.62	45	5.62	69	8.62
22	2.75	46	5.75	70	8.75
23	2.87	47	5.87	71	8.87
24	3.00	48	6.00	72	9.00

III. Table showing the Number of Grains of Bicarbonate of Soda and of Bicarbonate of Potassium required to Neutralize One Troy Ounce of Vinegar having any given Percentage of Absolute Acetic Acid.

Percentage of Absolute Acetic Acid.	Grains of Bicarbonate of Soda.	Grains of Bicarbonate of Potassium.	Percentage of Absolute Acetic Acid.	Grains of Bicarbonate of Soda.	Grains of Bicarbonate of Potassium.
0.25	1.68	2.00	4.75	31.92	38.00
0.50	3.36	4.00	5.00	33.60	40.00
0.75	5.04	6.00	5.25	35.28	42.00
1.00	6.72	8.00	5.50	36.96	44.00
1.25	8.40	10.00	5.75	38.64	46.00
1.50	10.08	12.00	6.00	40.32	48.00
1.75	11.76	14.00	6.25	42.00	50.00
2.00	13.44	16.00	6.50	43.68	52.00
2.25	15.12	18.00	6.75	45.36	54.00
2.50	16.80	20.00	7.00	47.04	56.00
2.75	18.48	22.00	7.25	48.72	58.00
3.00	20.16	24.00	7.50	50.40	60.00
3.25	21.84	26.00	7.75	52.08	62.00
3.50	23.52	28.00	8.00	53.76	64.00
3.75	25.20	30.00	8.25	55.44	66.00
4.00	26.88	32.00	8.50	57.12	68.00
4.25	28.56	34.00	8.75	58.80	70.00
4.50	30.24	36.00	9.00	60.48	72.00

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