

when the cattle predominating in any given milk supply are of breeds or strains having a comparatively low percentage of fat, probably have the effect of markedly raising the "solids-not-fat" but that this effect will not be so marked with percentages of fat above about 4.50. Inasmuch as possibly most city milk supplies in the United States are now furnished by cattle having milk of low fat percentages, this method of payment is to be commended if a milk of given moderate nutritive value is desired; but, as has been pointed out by others, this method of payment is unfair to the man furnishing a low or medium grade milk, in that his cattle produce relatively higher total solids than cattle with a high fat content.

It will further appear, from an examination of the tables and figures, that in legislating, unless due regard is had to the inter-relations of the constituents of the milk, legislators will make trouble for administrators by suggesting such a composition for milk as is not normally produced by the cows themselves. Thus, for a standard of 3 per cent fat an average of 8 per cent solids-not-fat would be proper and for 8.5 per cent solids-not-fat, the fat should be placed at 3.5 per cent.

It is thus seen that the standard proposed by the Federal Government and in use by them of 3.25 per cent fat and 8.5 per cent solids-not-fat is open to criticism, the corresponding figure as shown by this curve being 8.3 per cent solids-not-fat as an average and the same thing is apparently true of the standards of most of the states.

It is worth while here to note Fig. II of our accompanying paper on the "Chemical Quality of New York City Market Milk." This figure shows the percentage of the samples in certain groups of known purity milk, arranged according to the same scheme of percentages as indicated by the tables in this paper. It will be noted by reference to that paper that the groups of the higher fat content and of the corresponding solids-not-fat show a marked parallelism, tending to show the accuracy of the relationship indicated by the zone chart presented herein. This is further indicated by Fig. III of that paper.

#### SUMMARY

I—The zone chart devised appears to show the approximate chemical composition of normal milk.

II—This chart appears to be capable of use as a guide in fixing legal standards.

III—It appears also to be capable of use as a guide in detecting adulterated milk.

IV—A milk standard having regard only for the total solids is illogical.

V—Most of the legal milk standards in force in the several states of the Union as well as that of the Federal Government are unbalanced and, therefore, incapable of enforcement.

We desire to acknowledge our indebtedness to the sources of reference given herewith and to Dr. L. L. Van Slyke, J. B. Newman, Assistant Food Commissioner of Illinois, and others for valuable information furnished in private communications.

BUREAU OF FOOD AND DRUGS  
DEPARTMENT OF HEALTH, NEW YORK CITY

## CHEMICAL QUALITY OF NEW YORK CITY MARKET MILK

By LUCIUS P. BROWN AND CLARENCE V. EKROTH

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The size of the problem presented in an endeavor to control the quality of milk supplied to New York City is one which is, of course, equalled nowhere else in the United States and probably in only one other city of the world. The population of the city is 5,500,000. It consumes daily about 2,000,000 quarts of fluid milk and as much or a little more milk in other forms. The fluid milk is collected at about 1200 country creameries and pasteurizing plants and supplied by some 45,000 dairy farms located in 7 different states and in Canada. When it arrives in the city, it is distributed by about 600 dealers using more than 7,000 delivery wagons and by 12,000 retail stores.

It is axiomatic that the cow producing the largest flow of milk will be the one favored by the dairyman dealing with a city milk supply, other things being equal. Unfortunately, this tendency can be pushed to extremes and it is conceivable that cattle may be so bred, with an eye single to the flow of milk, as to reduce greatly and injuriously the food-value of this milk. For the past ten years the chief efforts of the New York City Health Department have been devoted to securing a safe milk supply rather than one furnishing a maximum of nutrients. It is obvious that the tendency to reduce the quality of the milk supply must have limits set to it lest the community suffer from too great a reduction in the actual amount of food furnished by it.

In an attempt to get together, in an easily demonstrable form, information gathered during the past 40 years, we have made an exhaustive analysis of certain available data, hoping it may be of use to other food officials. Space, obviously, will not permit of detailed presentation of many of the facts which could be brought out.

In the years 1904 and 1905 this Department conducted a survey of the country creameries supplying the city, which resulted in the establishment in 1906 of a regular country inspection service. These investigations indicated that a considerable amount of skimming had been practiced in the country. A comparison of inspections in 1909 with those of 1905 showed that there had resulted, as the effect of closer supervision, a marked increase in the content of both fat and solids-not-fat, as shown by Charts *a*, *b*, *c* and *d* of Fig. I and as further indicated by Fig. III. Up to that time the standard for total solids of New York State milk had been 12 per cent. The Legislature of 1901 reduced this to 11.5 per cent, the fat being left unchanged at 3 per cent. Inasmuch as a certain proportion of the milk supply had been running below the standard for a number of years prior to this time, no marked change is indicated by Charts *e* and *f*, Fig. I, for 1912, except a slight drop of fat content; this is significant, however, only because the figures for 1915, when the lower solids requirement had been in effect for 5 years, indicated a still further lowering of the content of this constituent, very notable as

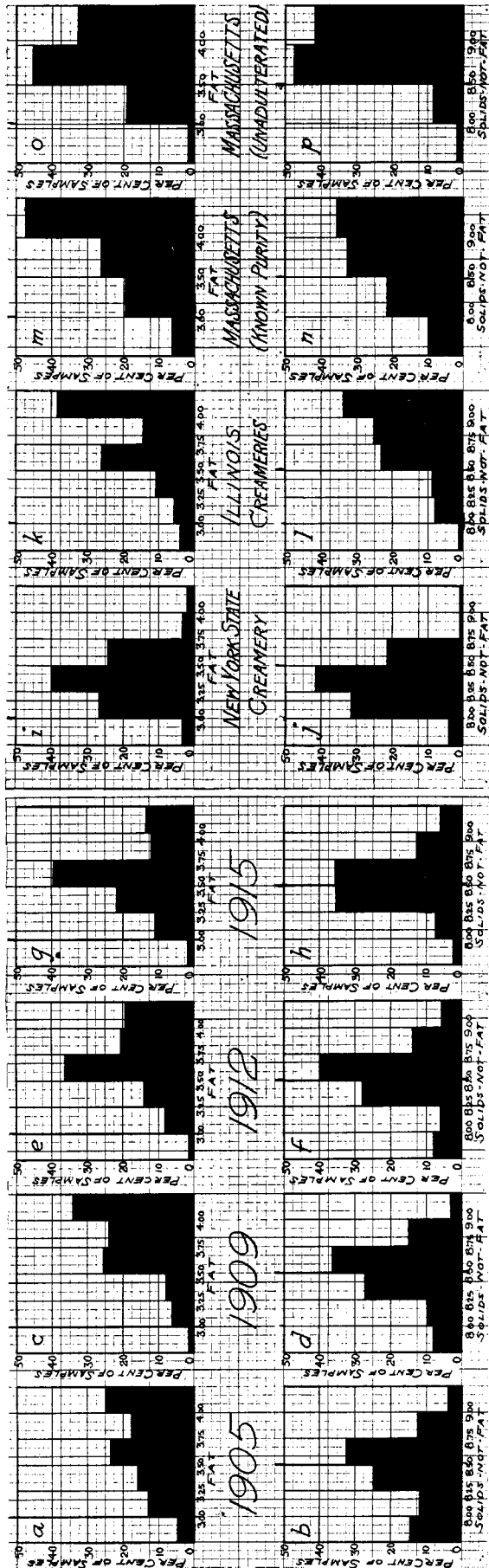
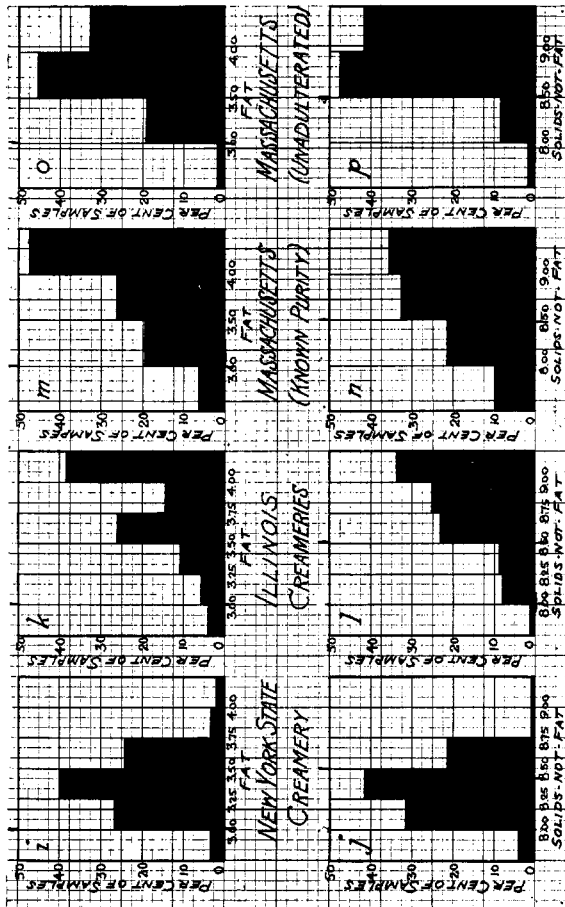


FIG. I—CHARTS SHOWING THE CHEMICAL QUALITY OF NEW YORK CITY MILK FOR FOUR YEARS

FIG. II—CHARTS SHOWING THE CHEMICAL QUALITY OF MILK FROM VARIOUS SOURCES



compared with the fat curve for 1909, the year when the maximum effect of the former high standards was observed.

An interesting feature of Fig. I is that the milk, as a rule, for the 4 years plotted, ran very much above the standard in fat. The solids-not-fat curves of this figure further indicate that during the greater part of these years, the milk was below the standard in solids-not-fat, an indication of the unbalanced character of this standard and the fact that the dealers in endeavoring to live up to such a standard were forced to give more fat than the standard called for. It also appears to indicate that the 3 per cent standard for fat is unneces-

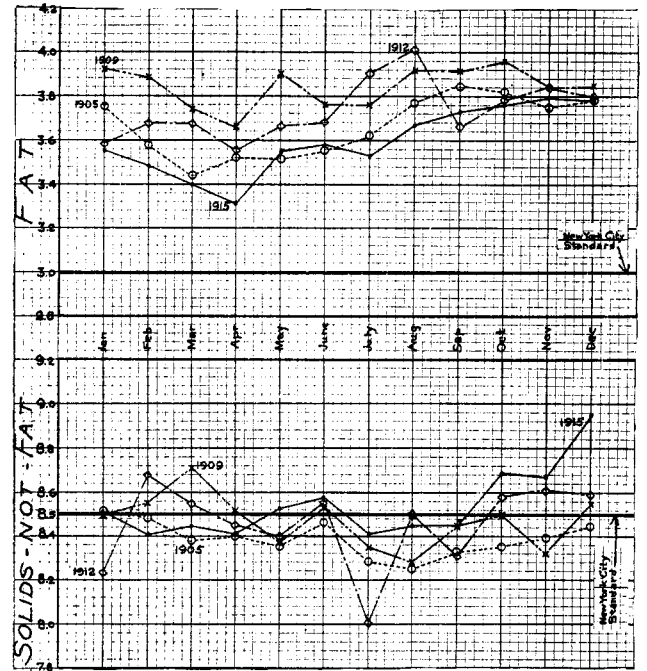


FIG. III—CHARTS SHOWING THE AVERAGE MONTHLY PERCENTAGES OF FAT AND SOLIDS-NOT-FAT IN NEW YORK CITY MILK FOR THE YEARS 1905, 1909, 1912 AND 1915

sarily low but, despite this fact, it is only natural to suppose that there was no great straining of the possibilities in this attempt, the effort being simply to get just within the standard. This is further indicated by Charts *k* to *n* of Fig. II, which are all of "known purity" samples and which all indicate a great preponderance of the higher percentages. Charts *o* and *p* are from routine milk supply samples but are supposed to be pure samples, and show the same thing.

In Fig. III the curve for solids-not-fat for 1915 is interesting, showing, as it does, a decided rise in the latter part of the year, coincident with the announcement by the Department of Health that a greater effort on the part of the dealers must be made to live up to the solids-not-fat standard. When compared with the corresponding curve for the fat the fact that the latter curve shows no perceptible change would lead to the supposition that an appreciable number of cows furnishing milks of higher fat content had been added to the milk shed, but that their milk had been partly skimmed and then added to lower grade milk in such a way as to increase the solids-not-fat alone.

Charts *i* and *j* of Fig. II are of interest as representing about 150 samples taken from the herds furnishing one of the lowest grade milk supplies of the state and of known purity. They indicate what the result of lack of attention to the quality of the milk supply may result in.

#### SUMMARY

I—The diagrams shown indicate a considerable betterment of the milk supply as a result of more rigid enforcement of the standards.

II—The fat standard of 3 per cent is a very easy one to live up to but will not result in a betterment of the nutritive value of the milk.

III—The suggestion in our other paper of this date as to the unbalanced character of the ordinary milk standard in effect in the United States is further indicated by these diagrams.

IV—As a corollary to the conclusions of both papers in question, it would appear that it is time that the chemical standards for milk in the United States were placed on a more rational basis.

BUREAU OF FOOD AND DRUGS  
DEPARTMENT OF HEALTH, NEW YORK CITY

#### RED PEPPERS

By FRANK M. BOYLES

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In the trade the hot red peppers are divided into or classed as "capsicums" and "chillies." The larger pods are usually called "capsicums" and the smaller pods, varying in size from about  $1\frac{1}{2}$  to  $1\frac{1}{2}$  inches in length, "chillies."

The term Cayenne or Cayenne Pepper is applied only to the ground product which is made from either or both the capsicums and chillies. The capsicums and chillies vary greatly in flavor and pungency. Contrary to general belief some of the capsicums are more pungent than some of the chillies.

During the past few years the writer has examined a large number of shipments of commercial grades of red pepper of various varieties, both domestic and imported, and has been impressed by the number that do not comply with the requirements for this class of products as laid down in *Circular 19*, Office of the Secretary, U. S. Department of Agriculture, which circular serves as a standard for the Department in the enforcement of the Food & Drugs Act of 1906.

This condition obtains not only with the imported peppers but also in a striking degree in the case of peppers of domestic origin, which are now being produced in such quantities as to be of considerable commercial importance.

Louisiana and Texas produce a considerable amount of capsicums and chillies and in South Carolina the industry has forged ahead considerably; in 1915 the production in this state was approximately 150,000 lbs.

The South Carolina capsicums average about  $2\frac{1}{2}$  in. in length and are of a bright red color. They are free of stems, very bright in appearance, carry no extraneous dirt, and altogether present an appearance not excelled by any variety of capsicums. Upon grinding, they produce a bright powder of excellent appearance, equal in flavor and pungency to most and much better than many of the imported capsicums.

The writer has had the opportunity of examining samples from a number of shipments of these capsicums, the data being compiled in Table I. These capsicums were ground under the supervision of the writer and the samples were composites, representing the regular

TABLE I—PERCENTAGE ANALYSES OF SOUTH CAROLINA CAPSICUMS

No.	Moisture	ASH		Crude Fiber	ETHER EXTRACT		
		Total	Insoluble		Total	Volatile	Non-Vol.
1	6.02	5.37	0.67	28.36	12.90	1.15	10.75
2	7.38	4.82	0.25	27.62	11.90	0.72	11.18
3	6.65	5.83	0.48	24.45	13.22	0.85	12.37
4	5.67	7.75	0.65	29.29	14.22	1.85	13.79
5	4.40	7.04	1.20	27.27	14.22	1.85	12.37
6	5.37	7.14	0.96	30.48	...	...	14.87
7	5.90	6.27	0.71	24.34	...	...	14.15
8	6.17	7.19	1.07	25.12	15.24	0.23	15.01
9	5.31	7.28	1.10	25.27	14.85	0.20	14.65
10	5.55	4.95	0.55	25.37	14.85	0.15	14.70
11	5.65	5.51	0.77	28.95	13.44	0.42	13.02
12	5.60	5.82	0.86	28.37	15.10	0.32	14.78
13	...	5.72	1.20	21.27	16.32	0.62	15.70
14	...	5.22	0.73	22.65	16.20	0.55	15.65
15	...	5.35	0.62	23.27	15.98	0.49	15.49
16	5.96	5.47	0.77	21.01	15.00	0.40	14.60
17	7.08	5.03	0.77	20.07	...	...	13.70
Max.	7.38	7.75	1.20	30.48	16.32	1.85	15.70
Min.	4.40	4.82	0.25	20.07	11.90	0.15	10.75
Av.	5.90	5.98	0.78	25.48	14.55	0.60	13.92

factory run and were taken at frequent intervals during the grinding. Each sample represents the composition of lots of about 2200 lbs. They were not previously sieved because of their apparent freedom from extraneous dirt and because a number of preliminary trials showed that only a negligible quantity of dust (from 0.03 per cent to 0.08 per cent) could be removed; the total ash and acid-insoluble ash in this small amount of dust were 14.5 per cent and 4.8 per cent, respectively. All lots were free from stems.

These peppers were grown under the indirect supervision of the Bureau of Plant Industry of the U. S. Agricultural Department, from Hungarian Paprika Seed. In this climate peppers grown from these seed become very much hotter than the imported Paprika, so hot indeed that in the trade they are classed as Capsicums, and when ground constitute Cayenne pepper. This industry was begun in South Carolina about 10 years ago.

A study of the results obtained on these peppers shows that 29.4 per cent exceed the standard of not more than 6.5 per cent for Total Ash as given in *Circular 19*, the maximum being 7.75 per cent; that 88.2 per cent exceed the standard of not more than 0.5 per cent for HCl-Insoluble Ash; that 23.5 per cent contain more than double the standard amount of Insoluble Ash; that 29.4 per cent exceed slightly the standard of not more than 28 per cent for Crude Fiber, the maximum being 30.48 per cent; and that 76.4 per cent fall below the standard for Non-Volatile Ether Extract of not less than 15 per cent, the lowest being 10.75 per cent. These data show that the South Carolina peppers, though of a very desirable quality, are, to a large extent, not in accord with any of the requirements of *Circular 19*.

In Table II are given the results on 35 lots of Bombay Capsicums. Each of these samples represents a grind of approximately two tons; the samples are composites taken at frequent intervals.

As in the case of the domestic peppers, these capsicums were not sifted, a preliminary trial having shown that less than 1 per cent, consisting of organic and inorganic matter, could be removed. In all of the varie-