

Science and the Milk Supply

Pure Milk in Portland Is a Fact Made Possible By City Ordinances and Laboratories

Sulphur, to purify the blood.....	2 grains
Iron, to make red blood.....	1½ grains
Soda, to neutralize blood acids.....	7.5 grains
Potash, to prevent fluids from turning to acid.....	7.5 grains
Lime, for bones and teeth.....	70 grains
Fat soluble, a growth substance, very necessary.....	5 ounces
Milk sugar, makes galactase or brain food.....	6.8 ounces
Milk protein, best protein for blood and muscle.....	4.9 ounces
Phosphorus, for repair of bones and teeth.....	36 grains
Chlorine, to make stomach acid and provide salt.....	56 grains
Magnesia, for the body fluids.....	29 grains
Fat, for body and energy.....	5.2 ounces
Water soluble, growth substance, about.....	3 quarts

By Earl C. Brownlee

PORTLAND people consume an average of 26,000 gallons of fresh milk every day in the year, totally aside from the vast additional quantities used in the manufacture of butter, cheese and other milk products.

Barring the extraordinary requirement for summer visitors the average daily demand will mean that, in 1920, Portland people will need 37,960,000 gallons of fresh milk.

If that amount of milk does not contain more than 7,592,000,000,000,000 invisible "animals" it will be considered absolutely pure and fit food for the most delicate.

Even in these days of widespread scientific knowledge it is difficult to convince the average milk drinker that the quart of fluid left at his doorstep in the dewy morning hours is "alive." Yet, Portland drinks more milk and less "animals" per capita than ever before in the city's history. None of the milk sold in the city contains injurious bacteria.

The skeptic may be edified at the city milk laboratory in the city hall, where Dr. David W. Mack, chief dairy and milk inspector for the city, will expose to the visitor the presence, in one tiny cubic centimeter of space, milk containing 200,000 bacteria. And science will rush in to exclaim, upon indisputable authority, that the milk in view is perfectly pure and wholesome.

After being scientifically processed to reveal the bacteria, a drop of milk under a powerful glass, looks like the result of a

husky dust storm. The glass upon which the bacteria is collected by the processing shows a mass of tiny specks, each a colony of bacteria.

These bacteria, invisible without a microscope, are largely essential to the quality of milk—just so there are not too many of them. It is to see that there are not too many that the city milk inspector was installed in office 11 years ago and, in the following year, a fine chemical and testing laboratory was established for his use.

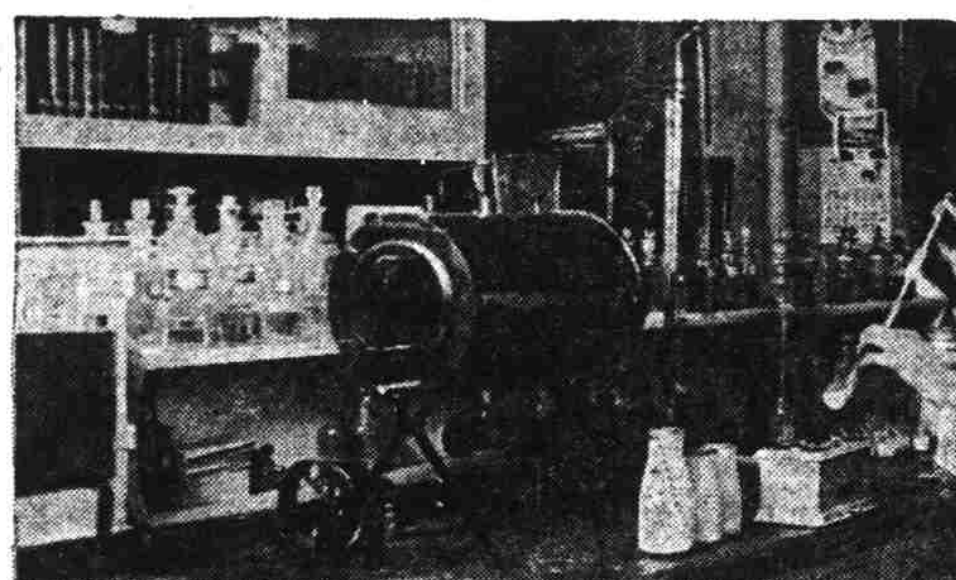
Portland demanded pure milk and got it. The Journal led this fight for pure milk to a victorious conclusion. The getting was a long and sometimes bitter fight, but the result has been achieved and, in 1917, 61.38 per cent of the city's supply contained less than 10,000 bacteria to the cubic centimeter.

With less bacteria milk would lose much of its flavor and some of its food value, science says.

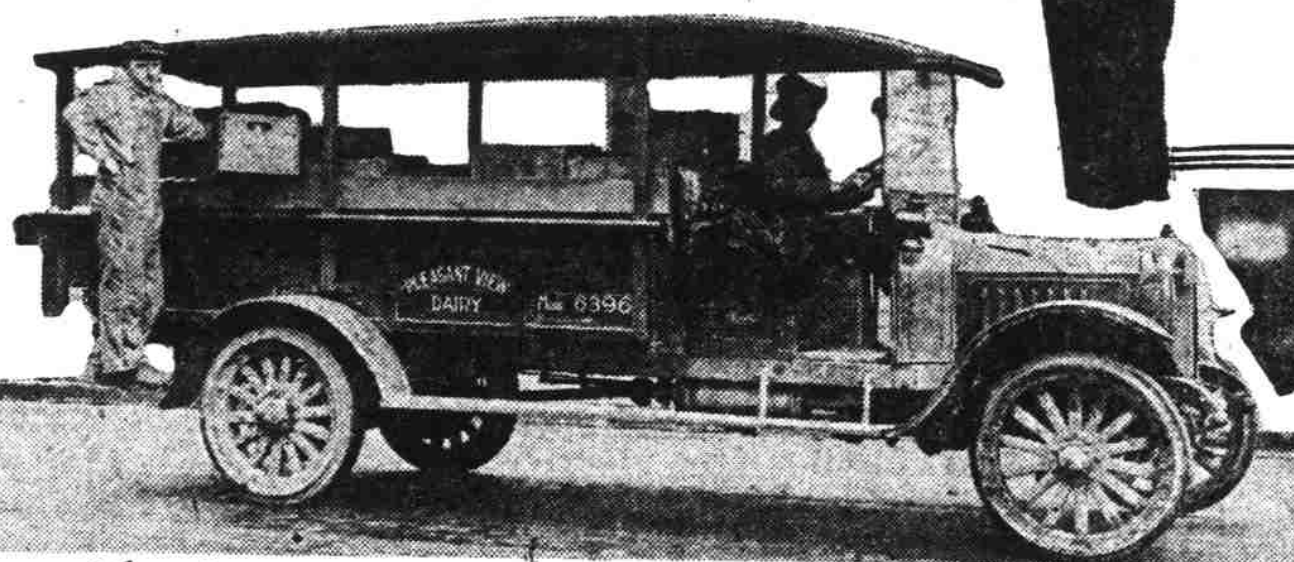
Twenty samples taken in New York tenements in mid-winter showed 1,977,692 bacteria to the cubic centimeter. At the same time samples from well-to-do districts showed, 327,500 bacteria. Samples from the tenements in September showed an average of 15,163,600 bacteria in a cubic centimeter of milk and in well-to-do districts at the same time the average sample contained 1,061,400. Meanwhile Portland's supply averaged less than 10,000.

The mere fact that milk sours is proof that it contains bacteria and that they are increasing in number as the milk ages.

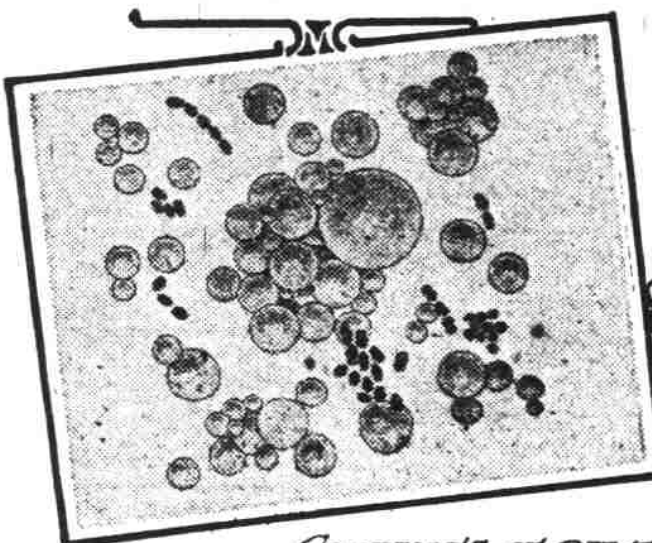
The ordinary bottle of milk contains a majority of the food ele-



A STEP IN THE ANALYSIS OF PORTLAND'S MILK SUPPLY.



MODERN SANITARY MILK DELIVERY



GLOBULES OF BUTTERFAT AND LACTIC ACID BACTERIA COLONIES BOTH ESSENTIAL TO THE QUALITY OF MILK

ments necessary to physical and mental welfare of human beings and milk constitutes, the scientist says, "one of the most important food products."

Science finds in milk properties that will purify the blood, make red blood, neutralize acids in the blood and stomach, build bone and teeth, provide the growing substance for bodily upbuilding and repair, make galactase or brain food, provide protein for blood and muscle and create bodily fluids and energy.

Roughly figured, Portland's milk is the product of more than 10,000 cows. In other words, to provide enough milk for only drinking and cooking, 10,000 cows are milked twice a day and yield 26,000 gallons. Milk for by-products and for condensaries is not included.

Fifty per cent of this milk supply is pasteurized and the other half is consumed in a "raw" state, just as it comes from the cow, via the milk "maid's" pail and the dairyman's can. The "raw" supply is brought in from nearby farms and smaller dairies adjacent to the city by producers who personally distribute the production of their cows.

With many large milk distributing plants about the city the fact that 50 per cent of the milk used in the city is "raw" proved interesting.

"Portland prefers raw milk because there is a difference in the flavor; it is richer in fat and is equally as wholesome," Dr. Mack explained. "The difference in flavor is largely due to pasteurization in distributing plants. This process requires that milk be heated to 142 degrees and kept at that temperature for 30 minutes. Of course, any possibility of impurity is destroyed."

Another fact is that raw milk is supplied by the small-scale dairyman, who is more concerned with the quality of his product than its quantity and keeps quality rather than quantity cows.

"The average raw milk contains about 4 per cent fat, as compared with an average content of 3.6 or 3.8 per cent for milk from the plants. All central distributing plants, with one small exception, pasteurize their milk. This milk does not sour as quickly as raw milk, because the bacteria that causes the souring process is largely killed by the heating. The food value of pasteurized milk is not lessened in any way."

In spite of the apparent prefer-

ence for raw milk, it is utterly impossible to supply it to the entire city, Dr. Mack and other authorities agree. Much of the supply is shipped to the city from distant points and if sold raw would sour before it could be used. Pasteurization, which purifies, abolishes any danger from contamination in transit.

There is no impure milk in Portland. It is not permitted, thanks to a city ordinance that covers the situation very thoroughly.

The milk inspector's office, employing a staff of eight people, is constantly vigilant—ready to bring to task any person who dares affront a defenseless purchaser with impure or unclean milk.

The department keeps several men in the field gathering samples for the laboratory to test for purity and food value.

At any time of day a city "sampler" may stop a dairyman's delivery wagon and from the most concealed case of bottles take one for a sample. Other men get test samples at the source, others from distributing plants, occasionally from the doorstep and from restaurants. All samples are brought to the laboratory for test.

In the average year more than 6000 samples of milk from Portland's supply are analyzed. Analysis is made for any citizen at his reasonable request.

Aside from this work about 15 samples of mother's milk are tested every month. Mothers are told whether the food is pure and nourishing and whether there is any possibility of passing a diseased condition to the child.

Whereas most large cities permit the sale of milk containing from 250,000 to 500,000 bacteria to the cubic centimeter, Portland has established 200,000 as the maximum. However, the content varies greatly in the local supply, running from as low as 250 to the limit.

In 1918, 77.9 per cent of all raw milk sampled at the city laboratory was "certified," meaning that it contained less than 10,000 bacteria to the cubic centimeter. In the same year 98.6 per cent of the



MILK & DAIRY INSPECTORS' LABORATORY AND FIELD STAFF



PHOTO BY ERN NEER, JOURNAL STAFF PHOTOGRAPHER

DR. DAVID W. MACK, CHIEF MILK INSPECTOR



PROOF OF THE PURITY OF MILK IS ESTABLISHED BY CHEMICAL TESTS IN CITY LABORATORY

total local supply contained less than 100,000 bacteria. Raw milk delivered by producers in the same year showed 45.6 per cent to contain less than 10,000 bacteria and 48 per cent of the pasteurized supply contained less than 10,000.

The low average content of raw milk is due to the fact that the supply delivered in Portland comes from tuberculin-tested cows on splendidly kept farms where sanitary conditions are excellent. The raw milk, therefore, is almost equally as pure and clean as is pasteurized milk. The same statement could not hold true in most cities of Portland's size.

One dairyman has a small herd of cows which he personally cares for and milks. The bacteria content of his milk averages below 400 per cubic centimeter.

The year 1917 was a banner year for pure milk. In that year 6295 samples, representative of Portland's entire supply, raw and pasteurized, showed 61.38 per cent to contain less than 10,000 bacteria

to the cubic centimeter and was, therefore, "certified." These figures made a record for the nation, if not for the world, that has not yet been duplicated, authorities say.

The record for 1918 was not so good, because of the handicap brought about by the war, especially with regard to labor. The figures for 1919, when tabulated, and those for the present year, will approach the 1917 record, in the opinion of Dr. Mack.

Most large cities demand that their milk contain not less than 3 per cent fat. Portland's fat standard is 3.2 per cent, but the average over a period of years is 4 per cent in spite of the higher fat standard set here.

Federal, state and city governments are about to start a campaign in which every cow in Portland's "milk shed" will be tuberculin tested, further safeguarding the local supply. With cows thus tested pasteurization will be even less necessary than it now is.

Dr. Mack was appointed to the office of city milk inspector May 1, 1909, when it was created. By his personal efforts the purity of milk sold here was increased during the first year. In the second year a laboratory was installed and a milk chemist and additional veterinarian were employed. These three served a year and a sampler was added to the staff. In 1913 the force was increased to nine people and today the office provides work for eight persons.

"The city government is very considerate, if I may put it that way, to provide this protection for the city's milk supply," Dr. Mack said. "The fact that eight people are no more than enough to handle the big work of the office and laboratory is indicative of the necessity for the service."

"We get hearty cooperation from the council and the public as well as from the dairymen, distributors, the state dairy and food commissioner and the federal government."

