Surveying Sediment Controls*

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It perhaps is most fitting at this time when our nation and the world are so concerned about our food supply, that we, as sanitarians, turn our attention to ways in which we may be of the greatest help. Milk and milk products are outstanding among the basic foods for supplying the world's nutritional needs. Much valuable work by our many college and experiment station research personnel has been done to bring information to our vast diversified farm population, to inform and show them how to produce more milk each day. They have been given practical and scientific data on breeding, feeding, better pasture and hay development, better milk methods, and personal care of cows. These factors have specifically contributed to volume milk production without adding more animals. This has been a direct contribution to our and the world's food needs.

We are all well acquainted with the fact that our present convenient yardstick for measuring cleanliness from a quality standpoint of commercial milk, is the sediment test—taken from a pint of milk, drawn off the bottom of a milk can at the milk plant's receiving dock. This is the standard method of the United States Food and Drug Administration, and by many state, county, city health, agriculture, and sanitary officials. So commonplace now is this method that most organizations have united on a standard set for judging. They have the same card for identifying sediment grades.

With our present advancement in this valuable milk industry, we, as sanitarians, are today faced with an opportunity to help our and the world's food needs by seeing that the production of milk is conserved and reaches market clean and that our finished milk products are wholesome and clean for human consumption.

Wendell Vincent, Chief of the Denver Station, United States Food and Drug Administration, in his address at the Utah Agricultural College, Logan, Utah, on March 12, 1947, said, "I believe that ultimately there will be just two kinds of milk offered to dairy plants. One is going to be good, fit for any use, and the other will be good for nothing other than animal feed. It will be rejected." Our service to this cause is equally as valuable as that of those first referred to, who have so excellently assisted in pointing the way to greater and better production. Therefore, it is timely that we "survey sediment controls" and through such a survey find methods for conserving all our milk supply so that it may be used for human consumption.

**Losses from Dirty Milk**

In America, vast amounts of milk, daily produced and already hauled to market, are lost by sediment rejection. It does not measure up to cleanliness standards, as judged by the sediment test. Indicating this extensive loss, a recent public announcement in Indiana, under the heading "Quality Program", reads, "Indiana Milk Quality Improvement Program has shown fine progress in securing industry cooperation in producing high quality dairy

products,” according to a survey made by Purdue University, which supervises the program. For eleven months the program has been operating in Northwestern and East Central Indiana and five months in 1946, covering southern and northwestern parts of the state. An estimated 2,508,011 pounds of milk were rejected by companies participating in the program—a loss of about $100,000, at reasonable price per hundred pounds. It is estimated that more than 4,500,000 pounds of milk will be rejected in 1947 because of inferior quality."

Again on this subject, from a paper given September 5, 1947, by Dr. J. C. Marquardt, New York State Department of Agriculture and Markets at the Dairy Industry Conference, Cornell University, Ithaca, N. Y., “During 1946 more than 8 percent of the milk was rejected as unclean on days that tests were made by the Department. At several plants rejections ranged as high as 15 to 30 percent. At the better plants, the rejections were as low as 3 percent.”

I continue to quote from this paper, “We made several tests at this plant during May, and 33 percent of the milk was satisfactory. On federal standards, a small percentage of this milk would have been rated satisfactory.” Another paragraph reads, “During May, a fluid plant was checked with the L and W. This milk was filthy. Less than 10 percent was satisfactory on our standards. Fifty percent of the milk was exceedingly dirty. On federal standards, practically none of this milk would have been rated satisfactory.”

I personally stood at a receiving dock of one of our well-known national milk company’s branch milk plants when sediment tests were being taken in the presence of a national regulatory authority. Of the milk received that day, I saw 42 percent of it returned to the farmers because of undesirable sediment found in some of the cans of milk. It was significant to me to note that rarely did any one farmer receive back all of his cans of milk. Some farmers had 3 to 10 cans of milk in the daily shipment and received back only one or two because of bad sediment. The other cans of milk on that delivery were quite acceptable from a cleanliness standpoint. This immediately indicated to me, as an observer, that, by and large, our farmers who produced milk did want to keep it clean, or they would not have had any acceptable cans of milk in their daily shipments. Following through on the sediment study by visiting these farms at milking time and observing the milking practices, valuable observations were made.

In the past four years I have attended over 350 farms at milking time in all sections of the United States. All of these farms had milk returned because of undesirable sediment. To my way of thinking, and from this practical experience in field work, all farmers should be encouraged to save and mount the used filter disk and make a “Farm Sediment Check-Up.”

This reveals many important factors on quality control to them. It first teaches them that a filter disk should never be used to remove dirt, carelessly permitted to get into the milk bucket, in order to make the can of milk acceptable for market. The only use of a filter disk should be to obstruct the stream of milk when it leaves a milk bucket, immediately after it has been drawn from a clean healthy cow, as it is poured into a clean milk can to show there was no dirt to be removed when mounted after use. When the used filter disk is clean, the producer may point to it with pride as his “Badge of Merit.” Should unavoidable accidents occur, the filter disk is there to be the safeguard.
How to Keep Extraneous Material Out

Prof. G. Malcolm Trout, Michigan State College, in his recent articles appearing in the August and September, 1947, issues of dairy publications, has so well named the basic factors for quality milk production. I quote, "Many steps advocated today in sanitary milk production are antiquated. They belong to the 'horse and buggy' days. The quality of milk seldom improves after it leaves the udder of a healthy cow. All the milk producer can hope to do is to protect the milk from contamination and maintain, through cooling, the quality which already exists. This, in the light of present scientific developments, is not so difficult as it seems."

I should like to add here: The "Farm Sediment Check-Up" could well be the measuring yardstick of this accomplishment if we take time to teach and encourage its use.

Professor Trout further states, "Definition of milk quality is not simple. . . . The term 'quality' as applied to market milk often connotes entirely different concepts to various groups of people as previously suggested. In general, the specific concepts of individual groups are as follows." Dr. Trout goes on to classify these groups as 5, the fifth being, "The milk sanitarian or health officer; his concepts are: safety, low bacteria count, cleanliness."

Another outstanding authority on milk and milk products, Dr. J. C. Marquardt, states, "The consumer judges milk mainly by its flavor, appearance, and price. Unclean flavors are very objectionable. During 1944 the author demonstrated that when more than 25 percent of the milk received contained excessive amounts of sediment, an unclean flavor was developed in a mixed tank of milk. This according to numerous observations took place in less than 6 hours even when the milk was cooled and held at 40° F. or below. . . . The flavor of milk is improved as the percentage of clean milk is increased." In this same article, Dr. Marquardt advocates, "The use of mounted and dried single service cotton discs by the producer proved to be most efficient as a sediment check-up. It affords a farm check-up on the progress in keeping milk physically clean."

This subject has so concerned national and state authorities who are taking steps for action that I herewith quote from a few. First, from Wendell Vincent, U. S. Food and Drug Administration: "Poor utensils and inadequate facilities for cleaning contribute to unfit milk, both from the bacterial and physical standpoint. . . . unclean animals make contributions of similar contaminants. . . . the placing of milk in a dirty can or one that is inadequately dried contributes to pollution of his product."

Second, Milton H. Button, Director, Wisconsin Department of Agriculture, Madison, in April of this year says: "The problem of sediment control, it seems to me, can be divided into two phases: First, how does the extraneous matter which causes poor sediment tests get into the milk? Second, how can we keep it out? These, it seems to me, summarize the problems which are facing the dairy industry. I like to emphasize the second point: How can we keep extraneous matter from getting into milk? As a dairy industry we are interested in CLEAN MILK. Our problem, is to KEEP the dirt OUT."

Harvey J. Weavers, Chief of the dairy division of the Wisconsin Department of Agriculture under Mr. Button, has this to add in instructions for quality farm milk production: "Keep Milk Covered While Cooling." "Milk cools through the sides and bottom of the can. For that reason it is not necessary to have the covers loose. The principle involved is
The New England Dairyman, August, 1947 issue, "With supplies of milk more readily available, our buyers are becoming quality conscious, and if at any time this office can be of service to you in attempting to straighten out your quality problems, feel free to call upon us."

A large independent dairy in their May-June, 1947, house organ to their producers, wrote: "Federal Food Inspectors Plan Careful Check for Sediment. There's trouble ahead for some milk producers."

Many states have given special attention to their dairy laws, in several cases revising and revamping them. Notably, Minnesota, Michigan, Ohio, Wisconsin, and Texas. Oklahoma, Iowa, and others, have established joint quality field service plans. A trade journal's news notes recently stated: "100 dairy plants in Iowa and an estimate of 75 in Wisconsin have adapted 'co-operative field service'."

A September, 1947, bulletin from C. O. Jacobson, Oklahoma Butter Institute, says in announcing 5 meetings during the week of September 27, 1947: "The State Department of Agriculture, Dairy Division, will furnish an inspector to supervise Sediment Testing and the Grading of All Producers' Cream at all of the above locations on Saturday, September 27, 1947."

Here is another from the August 27, 1947, Texas Dairy Products Association, Inc., trade letter by J. C. Davidson, Jr., who says, "Sediment Testing and Grading Days. The Oklahoma plan of sediment testing and grading all cream received at certain towns and certain days was adapted."

Following the work of national organizations on sediment control, we find such leaders as Dr. E. H. Parfitt of Quality Standards, Evaporated Milk Association, and his able force of associates have set and maintained leadership of high quality for farm production. The American Butter Institute, under the energetic leader-

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**CLEAN MILK DEMANDED**

Quality milk is such a ringing note over the nation that during the past six months, all leading dairy trade journals had editorials with such headings as "F and D Isn't Bluffing", "Where Fighting is Foolish", "Either Clean or Dirty", "Institute Organized to Improve Quality of Milk and Cream". Headlines appear on the front pages of leading city daily papers, such as, "U. S. Raids Cream Shipped into City: Few Cans Filthy" and another, "Dairy Man Gets $2,000 Fine in Cheese Case."

Dairy cooperative house organs and independent dairy operations recently sent this information to their producers, "IMPORTANT" "The New York City Department of Health recently advised the milk industry it was necessary to take immediate steps to improve the quality of the milk going into our country plants and then shipped to the city pasteurizing plants."

*Again I quote: "Don't Let Your Neighbor Down", "Produce Clean Milk." "We feel that our members believe in producing a quality milk and maintenance of Department of Health Regulations, particularly when they know the reasons for it, and have the cooperation of management and employees in obtaining the results."

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Following the work of national organizations on sediment control, we find such leaders as Dr. E. H. Parfitt of Quality Standards, Evaporated Milk Association, and his able force of associates have set and maintained leadership of high quality for farm production. The American Butter Institute, under the energetic leader-
ship of Russell Fifer, and his active associate, Ray Alberts, are way out in front on quality leadership. Up with this group is The National Cheese Association with quality work excellently directed by E. W. Gaumnitz and E. H. Richert. All of these are vigorously working toward one end: quality milk production from "Cow to Milk Plant" and on to the finished products. We can all join them by encouraging all who contact producers to encourage the use of "The Farm Sediment Check-Up."

Use of Filter Disk

I have visited the famous milk parlor with the "Rotolactor". Here the cows are given splendid preparation before milking. To my knowledge, no place in the world surpasses their sanitary milking methods. Here they take the added sensible precaution to obstruct the stream of milk from the cows going to the container vats by using a cotton filter.

My associates and I have visited over 3500 farms in these United States, who have had milk returned because of sediment. Two thousand visits were at milking time. These farmers mounted the used filter disk after the milking. By our observation, 50 percent were ashamed of their workmanship because of the amount of dirt which was removed from the milk. They immediately took steps to keep dirt from getting into the milk at future milkings. Twenty-five percent did not like the results as indicated on the mounted disk, but were principally encouraged to be more careful in their methods as they felt they were being policed. The remaining 25 percent were quite indifferent to the fact that the disk contained dirt.

Many of these were large producers -5 to 15 cans per daily delivery. Over one-half of these producers could be and were changed by this method of having them frequently mount and dry the used filter and send it to the milk plant by the milk hauler, to become more careful and cleaner handlers of their milk. Continually mounting a used filter disk having excessive sediment, shamed them into taking reasonable precautions. One-half of these, however, could never be cured. Their personal conception of sanitation, that is rightfully needed for producing milk, is lacking. It is difficult to teach sanitation from the barn to the house. These producers in their homes are not as sanitary in their daily living habits as we find to be necessary for keeping milk clean. The sooner this small proportion are eliminated from producing milk and return to other farming activities, the better it will be for our industry.

This mounting of used filter disks is the "Farmer's Own Sediment Test." When the disk is clean as it should be, it is his "Badge of Merit." He can point with pride to his workmanship. He can show that from each healthy cow which gave clean milk, "He Kept It Clean." The industry has no better tool for quick, impressive results than this little piece of cotton, called a filter disk, to teach this valuable educational lesson. Just as sediment tests must be taken at the plant, this also must be done at the farm continually to assure protection from sediment. It is work. It takes effort on the part of the fieldman of milk companies. Those who have consistently followed it with their producers have received telling results.

When a producer is checking on one necessary feature of his production methods, he is apt to check on all requirements. Dirt is precious, but when it gets into milk it is filth. Encourage and instruct the farmer to SAVE his used filter disk. Let him periodically follow "The Farm Sediment Check Up." He then will come to these same conclusions regarding dirt. We must realize that in most things a farmer does in following his occupation, he works with dirt. Therefore, dirt to him, consciously or unconsciously, becomes glorified. He thinks...
little about dirt when associated with food products in their raw producing stages. "The Farm Sediment Check-Up" gives him a visual picture and a different impression of dirt when it contaminates milk. We as sanitarians have an important, valuable, and very useful mission to render our nation and fellow man. Here is a worthy opportunity.

We can save much of this already produced daily milk supply now being returned to farms because its quality is below clean standards. This service can be rendered simply through the means of encouraging proper milk plant authorities to use the "Farm Sediment Check Up" as a basic feature in their quality program.

Dust

We, ourselves, need to be versed with the facts so we can impressively pass them on. Up to date I have viewed some 15,000 used filter disks that farmers have mounted and saved after filtering milk. The type and kind of sediment on these disks is not as prevalent as a manure base as years ago. Much is sand and dust. Farmers are generally taking better care of barn yards, bedding, and surroundings, providing better personal comfort to their herds.

However, they are not giving the attention to and protection against dust and wind blown earth; this control is also needed in quality milk production. We sanitarians need to be well versed with these dust contaminating features. Care of the milk cans and all milking utensils is most important. Sometimes the type of sediment on the lintine sediment test disk at the milk plant is different from the type of sediment on the used filter disk which filtered that same milk into the can at the farm. The "Farm Sediment Check Up" is the source of the study. Wind blown dust has been the offending element. The milk cans had not received proper care and protection, either before milk them.

A milk can must at all times be as ply. Following through to determine reasons why undesirable sediments was put into them, or after milk was in well cared for and clean as the receptacle that careful farmers use to bring into the house their personal milk supplies were experienced at the milk plants from cans of milk which were of good sediment test after milking at the farm, we discovered this bothersome element—wind blown dust. Milk cans must be properly washed at the milk plant. Frequently, the shoulders of milk cans harbor accumulations of dirt, not removed by the can washer. This needs elbow grease and brush applied either by milk plant management or by the farmer. A soapless cleaning solution must be used. It has been found that such milk cans, when full of clean milk, on the haul from the farm, did not measurably affect the sediment test taken at the milk plant. However, such cans partially filled with clean milk, on the haul from the farm, did affect the sediment test taken at the milk plant dock. Evidently, the dashing of milk in a partially filled can washed away some of this accumulated residue from the shoulder of the milk can.

Another important influence upon sediment from wind blown dust, with milk cans, is dust deposited on the pouring lip of our present standard type milk can. When a milk can is not properly protected at all times, this pouring lip is a perfect receptacle for fine wind blown dust.

Professor A. W. Rudnick, of Ames, Iowa State College, has done some outstanding work in this field and has given the industry most valuable data.* On the basis of follow up by

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* Work by Dr. K. G. Weckel, University of Wisconsin on "Milk Cans Often Hide Sources of Bad Flavor" was reported in an article Nov. 1, 1946 in Dairy News. Dr. Weckel appropriately states: "Milk cans are strange devices. They are designed to convey milk. But what is a clean can, acceptable for conveying milk, as examined from the inside? What are the defects of cans as they are returned to farms? What can these defects do to quality of milk and products made from it? There are quite a number of things that should be worried about it."
"The Farm Sediment Check Up", we, in cooperation with others, have done some extensive follow through on this subject. In collaboration with Professor V. C. Manhart, Department of Dairy Husbandry, Purdue University, and again with R. H. Cronshey of California's Challenge Cream and Butter Association, special studies were conducted in field experiments studying the sediment problem of wind blown dust on milk cans.

This work was published in the *Southern Dairy Products Journal* and *The California Dairyman*, under the title, "A Study of Causes of Milk Rejection": "Influence of Wind Blown Dust on Sediment Content of Milk", and "Attention to Milk Can Design." Further work was done this past June in cooperating at a "Sediment School" with The Golden State Milk Company, Gridley, California. This was entitled "Following Through on Sediments" and was published in *The California Dairyman* and *The Pacific Dairy Review*.

**Other Factors**

It would seem reasonable that for future needs those in this industry could build a more serviceable milk can. This milk can should have built into it features to help correct these problems. Two national manufacturers are working on it and have placed out to the trade some of their early results. One is a stainless steel milk can; another, an aluminum milk can. Standard milk can manufacturers are alert to the needs and are intelligently working on the matter.

At some places the problem has been of sufficient trouble to cause the use of a cellophane cap to go over the milk can top. In Idaho one company is using a heavy duck canvas milk can top cap and are paying handlers extra to place them on all cans as they take them from the can washer at the plant and return them to the farms. Farmers replace the cap as soon as the milk is placed in the can.

One of the contributing factors to sediment in milk when milk cans are not rinsed at the farm is the air intake for drying milk cans on the can washer at the milk plant. Here dust and dirt collects on the wire frame grill and breaks off in clusters and sometimes contaminates a washed can. A special filter cotton is obtainable to place over this air intake to catch this dust.

Some can washer manufacturers are giving special attention to this protective feature in present design and construction of their can washers.

We, as sanitarians, can carry the message and encouragement to both the milk industry and the producer to use this simple "Farm Sediment Check Up" as a basic tool for saving this valuable milk supply already produced and ready for market. It is as important as pointing the way to efficiently produce more milk.

**Literature References**