

the Ayrshire milk. The centrifugal separator left between 1 and 2 per cent. of the fat of these milks behind in the skim-milk. These results speak for themselves, and call for no further comment."

At the Cornell Experiment Station Prof. Wing obtained the following results with "Wheeler's Gravity Cream Separator" and "Hunt's Improved Ventilated Cream Separator," in comparison with the Cooley can.

TABLE NO I. MIXED HERD MILK. MANY OF THE COWS NEARLY DRY.

| Date. | Number of hours set. | Per cent. fat in whole milk. | WHEELER'S. | | | | | | HUNT'S. | | | | | | COOLEY. | | | |
|--------------|----------------------|------------------------------|-----------------|--------------|---------------|--------------|---------------------------|-----------------------------|--------------|--------------|---------------|--------------|---------------------------|-----------------------------|--------------|--------------|---------------------------|--------------------------------|
| | | | Pounds of milk. | Temperature. | Pounds water. | Temperature. | Temperature when skimmed. | Per cent. fat in skim-milk. | Pounds milk. | Temperature. | Pounds water. | Temperature. | Temperature when skimmed. | Per cent. fat in skim-milk. | Pounds milk. | Temperature. | Temperature when skimmed. | Per cent. of fat in skim milk. |
| July 6..... | 14 | 3.95 | 30 | 92 | 30 | 53 | 70 | .76 | 25 | 92 | 25 | 52 | 69 | .66 | 33½ | 92 | 42 | .90 |
| " 7..... | 14½ | 4.1 | 25 | 86 | 25 | 56 | 72 | .86 | 53 | 86 | 40 | 56 | 72 | .86 | 35 | 94 | 38 | .80 |
| " 8..... | 15 | 3.6 | 25 | 94 | 25 | 50 | 72 | 1.00 | 25 | 88 | 25 | 48 | 68 | 1.00 | 28 | 88 | 42 | 1.20 |
| " 9..... | 12 | 3.9 | 20 | 92 | 20 | 56 | 64 | 1.20 | 28 | 92 | 28 | 56 | 64 | 1.00 | 20 | 92 | 44 | 1.01 |
| " 11..... | 17 | 3.6 | 20 | 87 | 20 | 47 | 68 | .80 | 28 | 87 | 28 | 47 | 65 | 1.04 | 34 | 87 | 38 | .90 |
| " 12..... | 16 | 3.6 | 20 | 87 | 20 | 47 | 68 | .80 | 28 | 87 | 28 | 47 | 65 | 1.04 | 34 | 87 | 38 | .90 |
| Average..... | | | 94 | | | | | | 1.01 | | | | | | 1.01 | | | |

TABLE II. MILK FROM COWS COMPARATIVELY FRESH.

| | | | | | | | | | | | | | | | | | | |
|--------------------------|-----|------|----|----|----|----|----|------|-----|----|----|----|----|------|-----|----|----|-----|
| July 13..... | 16½ | 3.75 | 20 | 94 | 20 | 56 | 70 | .92 | 28 | 94 | 28 | 56 | 70 | 1.40 | 33 | 94 | 40 | .50 |
| " 14..... | 16 | 3.7 | 20 | 94 | 20 | 55 | 72 | .80 | 28 | 94 | 28 | 55 | 72 | .80 | 33 | 94 | 40 | .50 |
| " 15..... | 16 | 3.75 | 20 | 94 | 20 | 54 | 72 | .40 | 28 | 94 | 28 | 54 | 72 | .40 | 33 | 94 | 40 | .60 |
| " 16..... | 16½ | 3.8 | 20 | 94 | 20 | 60 | 70 | .60 | 28 | 94 | 28 | 60 | 71 | .40 | 34 | 94 | 37 | .50 |
| " 17..... | 16 | 4.0 | 20 | 95 | 20 | 50 | 73 | 1.00 | 28 | 95 | 28 | 50 | 73 | .90 | 37 | 95 | 38 | .65 |
| " 18..... | 16 | 3.9 | 20 | 96 | 20 | 48 | 75 | .90 | 28 | 95 | 28 | 48 | 75 | 1.90 | 34 | 96 | 42 | .50 |
| " 19..... | 16 | 3.65 | 20 | 96 | 20 | 48 | 75 | .90 | 28 | 96 | 28 | 48 | 75 | 1.00 | 38 | 96 | 40 | .50 |
| " 20..... | 16 | 3.45 | 20 | 96 | 20 | 48 | 75 | .90 | 28 | 96 | 28 | 48 | 75 | 1.00 | 38 | 96 | 40 | .50 |
| " 21..... | 15½ | 4.1 | 20 | 94 | 20 | 58 | 75 | .90 | 30 | 95 | 30 | 54 | 74 | .60 | 34 | 95 | 41 | .40 |
| Average..... | | | 79 | | | | | | .93 | | | | | | .53 | | | |
| Average both tables..... | | | 86 | | | | | | .97 | | | | | | .77 | | | |

In the summer of 1892 Prof. Wing visited seventy farms, and the fat content of the skim-milk was determined at each place. On forty of these farms shallow pans were used and on thirty a deep-setting system, in most cases the Cooley was in operation. The average results were as follows:

| | Per cent. of fat in skimmed milk. | | |
|--------------------------------------|-----------------------------------|----------|----------|
| | Lowest. | Highest. | Average. |
| Forty farms using shallow pans..... | .15 | 1.63 | .39 |
| Thirty farms using deep setting..... | .14 | .60 | .30 |

The centrifugal separator has been so perfected that the loss of fat in the skimmed milk is reduced to a minimum, and it is now recognized by both manufacturers and users of separators that the percentage of fat in the skimmed milk need not be more than .05 of 1 per cent. In actual practice at the Iowa Dairy Creamery here, our separators on an average for the past week have skimmed as close as .047 of 1 per cent., and on several occasions we have found the algebra to be skimming as close as .02 of 1 per cent.

We are now able to judge the efficiency of these gravity cans. It will be seen that in no case do they approach anywhere near the efficiency of the centrifugal separator and, in most cases, the percentage of fat in the skimmed milk is decidedly more than would be called good creamery by either the shallow-pan or deep-setting process.

After conducting a thorough test of the various makes of the gravity or dilution separators, Prof. Wing sums up his results as follows:

"Gravity of dilution separators are merely cans or tanks in which the separation of cream by gravity process is aided by dilution with water."

"Under ordinary conditions the dilution is of no benefit.

In may be of some use when the milk is all from 'stripper' cows, or where the temperature of melting ice cannot be secured."

"These cans are not 'separators' in the universally accepted sense of that term, and cannot work in efficiency with them."

"They are even less efficient than the best forms of deep, setting systems, such as the Cooley creamer."

"They are no more efficient than the old fashioned shallow pan; but perhaps require less labor."

"In all probability they will give better results if used without dilution and immersed in as cold water as possible, preferably ice water."

The advantages claimed for these "separators" are reduced cost, lessened labor, durability and the obviation of the necessity of ice storage and use. The disadvantages which certainly attach to any such a device are the need of a relatively large tank room and the dilution and deterioration of the skim-milk. There seems also to be good reason for believing that a more serious disadvantage, poor creaming, may be added to those already cited.

It does not appear to me, however, that the convenience, simplicity and cheapness of the apparatus compensate for its lack of efficiency; or that it ought to compete successfully with the centrifugal separator. Its use in a herd of twenty cows for a year would entail a loss of butter fat, not to say anything of the deteriorated value of the skim-milk, which would go far in paying for the more expensive, yet in the long run the cheaper, centrifugal separator.

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