

(2) *Temperature of the Milk.*—Milk at 70 degrees temperature is thicker or more viscous than the same milk would be if heated to 95 degrees; it will therefore not run through the separator as fast, the cream line will be narrower and the cream will test higher from milk at 70 degrees than from the same lot of milk separated at 95 degrees.

(3) *Flow of Milk into Separator.*—The milk inlet on all separators is made to feed the separator to its full capacity. If the flow of milk is partly shut off, the cream line will be narrower and a richer or higher testing cream will be the result.

(4) *Speed of the Separator.*—All hand separators are manufactured to run at a certain speed and they will do the best work at this speed, which is usually indicated on the handle of the separator. If the speed is increased, the centrifugal pressure is increased, which has the effect of condensing the cream, so that a smaller quantity of richer cream is the result.

To ascertain to what extent the above conditions would affect the percentage of fat in the cream, and to secure some accurate data on the subject, the following experiments were carried out, using a 400-pound hand separator.

In table I is given the results of separating the milk at different temperatures, all other conditions being the same. One run was made from the same milk at each temperature stated on three different days. The figures given are the average of the three days. Mixed night's and morning's milk from the same patrons was used each day.

TABLE I.—Separating at Different Temperatures.

Per Cent Fat in Milk.	Temp. of Milk at Separating.	Lbs. Cream per 100 lbs. Milk.		Per Cent Fat in Cream.	Per Cent Fat in Skim-milk.
		Lbs.	Oz.		
3.57	70 degrees	8	0	44.2	.040
3.57	75 "	8	14	40.0	.033
3.57	80 "	10	0	35.5	.021
3.57	85 "	10	11	33.1	.028
3.57	90 "	11	2	32.0	.017
3.57	95 "	12	2	29.3	.021

Here we find a variation of 14.9 per cent fat in the test of the cream with all the conditions the same, except the temperature of the milk. The pounds of cream per one hundred pounds of milk increases as the temperature of the milk is raised and it must also be noted that the percentage of fat in the skim-milk increases as the temperature of the milk is lowered.

Table II shows the effect of changing the speed of the separator. The figures given are the average of three runs at each speed on three different days.

TABLE II.—Variation in the Speed of the Separator.

Per Cent Fat in Milk.	Temperature Of Milk.	Speed turned per minute.	Lbs. Cream per 100 lbs. Milk.		Per Cent Fat in Cream.	Per Cent Fat in Skim-milk.
			Lbs.	Oz.		
3.63	95 deg.	65	9	14	36.6	.018
3.63	95 "	60	12	0	30.1	.017
3.63	95 "	55	15	7	23.4	.023
3.63	95 "	50	18	14	19.2	.027

A metronome was used to count the turns of the handle, so that the speed of the separator was absolutely the same during the whole run. It was found extremely difficult to turn the separator at a uniform speed throughout an entire run, and unless the operator has a reliable indicator, there is likely to be a considerable variation in the speed of the separator. The writer is of the opinion that the speed of the separator has probably more to do with the variations in the cream tests than any other condition.

Five turns per minute under proper speed made 5.7 per cent difference in the test, and ten turns too slow made a difference of 10.9 per cent. The difference in the test between five turns too fast and ten turns too slow was 17.4 per cent, the percentage being only a little over half in one case what it was in the other.

Turning the separator too slow also causes a greater loss of fat in the skim-milk. Ten revolutions per minute too slow increased the loss of fat 0.1 per cent.

*Correct speed.