

8. The cost of the separator, including the intermediate motion.

9. The cost of fixing.

10. The revolutions.

11. The safety.

12. The convenience of delivery of the skim-milk and cream to a higher or lower level.

13. The adaptability for horse-power.

14. The intermediate motion, embracing simplicity of construction, readiness of throwing in and out of gear, and any arrangement for neutralizing the effect on the speed, by the stoppage of the horse.

15. The power required to work each machine.

As regards the last point, the judges were informed the Council did not desire the machines to be tested on this point.

They further wished to test the weight of skim-milk and cream, but were prevented by the absence of the steward.

MACHINES COMPETING.

There were four machines competing, three of them being Danish, exhibited by the Aykeshury Dairy Company—these were exactly similar in design, and, in fact, were three different sizes of the same machine—and De Laval's, exhibited by D. Hald & Co.

For convenience it will be better to distinguish the three Danish machines as A, B and C; A being the largest machine, B the medium-sized, and C the smallest.

FIRST POINT.

1. Taking the points deemed most essential by the judges in rotation, we have, first, construction. It is not deemed necessary to give any illustration of the two separators, as they are most probably familiar to all those interested. It certainly seemed that in the detail of point indicated, viz.: simplicity of design, facility of cleaning, emptying and oiling, the advantages were all on the side of the De Laval. On the judges requiring this machine to be emptied, the drum was simply lifted out of its bearings and turned upside down by one man, the contents being emptied into a bucket, this occupying a very few minutes. In the B Danish, the milk had first to be removed by a siphon, and then it seemed to require two or three men to undo the several screws and adjustments, and to lift the drum from its place. A hole was provided in the base of the drum, into which a conical plug was driven; this plug had to be knocked out with a hammer before the milk left in the drum, after the siphon had extracted all it could do, could be run out. There seemed to be great difficulty in getting at this plug, to knock it out, when the drum was in its place, and it seemed to be at best a clumsy contrivance. These remarks apply to all the four Danish machines, which were of similar construction.

SECOND POINT.

2, etc. Before considering the next point of analysis it will be convenient to state the course of proceeding; 400 pounds of whole milk was ordered to be weighed out to each machine, the milk being first mixed in a large tank provided for the purpose to ensure equality of sample. The judges wished to try them all simultaneously, but unfortunately, only the quantity was weighed out for two of the machines—the De Laval and the B Danish—on the first day. The A Danish and the C Danish not having their milk weighed out till the next day was unfortunate, as it somewhat altered the conditions of the contest; but in the absence of the steward it was impossible to rectify the error. The temperature of the whole milk in the large tank showed 56 deg. The following table will bring concisely together the different points in connection with each machine which were considered important. It is not thought necessary to give the different totals of the complete analysis, as only the item "butter fat" is important. The effect of the action of the separator on the "solids not fat," or cheese-making matters, in milk is a point that has not been tested, though it is, undoubtedly, an important one, as certain curious facts in connection with them have been observed:

Name and machine.	Butterfat in whole milk supplied.	Butterfat in skim-milk of the Separator.	Butterfat in cream of the Separator.	Temperature at which the milk was separated.	Time in separating 400 lbs.	Quantity of milk required to work Separator.	Cost.	Revolutions attained per minute.	Revolutions required per minute.
De Laval's	4.32	.67 47.38	62	40	12.25	37	£234	6000	
B Danish.	4.32	.18 15.05	88	42	30.75	41	2500	3000	
A Danish.	3.60	.32 26.42	62	32	128.75	73	1000	2000	
C Danish.	3.60	1.62 33.12	74	68	5.25	26	3400	3000	

It will be observed that the butter fats in the whole milk supplied showed an excellent quality of milk, and as the most important point of a separator is to separate the cream from the skim-milk, the analysis of the skim-milk and of the cream must be compared to see what quantity of fat is left in the skim-milk and what quantity of skim-milk is left in the cream, and it will be noticed that, though the De Laval left a somewhat large percentage of fat in the skim-milk, it left little or no skim milk in the cream, the cream from this machine being far above the standard of ordinary cream.

The B Danish, though showing only an average percentage of fat in the skim-milk, showed a remarkable result in the cream, being considerably below the standard of ordinary cream; and the

*By an error of the steward, 600 lbs. was weighed out to this machine.

explanation of this is that a large percentage of skim-milk passed into the cream, probably about 50 per cent. of the whole milk supplied to it. In plain language, this machine absolutely failed to carry out the very first element in a separator, viz.: to separate the skim-milk from the cream, and, for the purposes of butter-making, it would have been cheaper to have churned the whole milk, instead of having the expense of separating.

The A Danish, showing rather above the standard of fat left in the skim-milk—though not so high as the De Laval in the cream—there is still a large percentage of skim-milk, leaving the cream of poor quality.

The C Danish, being the smallest of the Danish machines, and looking like a toy beside the leviathan A machine, shows a very large percentage of fat in the skim-milk (about $2\frac{1}{2}$ times as much as the De Laval); and, though the cream is better in this than in either of the other Danish machines, it must still be declared poor, considering the quality of the whole milk separated, and, like A and B machines, shows skim milk mixed with the cream. From what has been said about the mixture of skim-milk with the cream in the Danish machines, it will be apparent that the quality of the cream, as it ran from these separators, was decidedly inferior. This point had the special attention of the judges, as it is an important one where the sale of cream is an object. The machines were tried as to their capability of producing thick or thin cream at pleasure; and, whilst the De Laval proved itself capable of doing this, the Danish proved themselves incapable of doing it; in fact, the operator tried to produce thick cream at the request of the judges, but failed.

TEMPERATURE.

5. The next point was the temperature at which the milk was separated. This is a very important one, as upon the lowness of the temperature at which the milk is separated depends the keeping quality of the skim-milk and of the cream; and, where the sale of the skim-milk and cream is an important item, the lowness of temperature in separating is a *sine qua non*, as, where the milk is separated at a high temperature (as was done in the B and C Danish), the skim-milk and cream will be liable to go sour very quickly.

The De Laval and the A Danish separated the milk at the low temperature of 62 deg., but the B and C Danish separated at the high temperature of 88 deg. and 74 deg. respectively. It is claimed that these Danish machines can separate at 40 deg. If so, then why was it necessary to separate at the high tem-