in this liquid long enough to acquire the desired aroma it is worked in the usual way.

In the old process the butter acquires its flavor during the ripening of the cream before the churning. In the new process this aroma is imparted to the butter by means of skim-milk ripened separately. In both a certain quantity of milk stays in the butter after it has been worked.

We quote from an article published in the *Journal d'Agriculture*, by Mr. H. Pihier, a detailed account of the different parts of the machine:

"The Salenius radiator is composed of:

"(1) A pasteurizer where the milk is carried to a temperature of 158 to 170° F.

"(2) A refrigerator where it is cooled down to a suitable temperature for separating, viz., 125°F.

"(3) A separator presenting certain peculiarities though not noticeably differing from anterior types. The skim-milk escapes from it at the skimming temperature.

"(4) By an ingenious contrivance the cream goes back into a second refrigerator set upon the axle of the turbine where a swift current of cold water cools it down to about 60°F. From there it is forced into a tube by the acquired speed, from which it is projected as a fine rain, radially—hence the name *Radiator*—against the inside wall of the refrigerator. This inside wall is perforated with numerous small holes, through which the cream passes. On the other side of this wall it meets the coloring matter dropping from a cup arranged to that effect. This mechanical work acts as a churning and caused the agglomeration of the fat globules.

"(5) The butter grains thus formed are collected with a small part of the buttermilk in a drum where a set of vertical paddles shoves the mass toward the exit."

Although the test to which this apparatus has been submitted cannot be considered as sufficient to preclude all doubts as to the satisfactory working of its parts, yet the observations taken so far have brought nothing to disprove the claims of the inventor.

From a mechanical point of view the separator is as safely built as our best types, but the task of taking it to pieces for cleaning is somewhat more complicated. The skimming could not be improved as the loss of fat is reduced to a minimum.

The quality of the butter seems to be satisfactory. Nothing definite can yet be said as to its keeping qualities, but samples are now under test to determine this latter point.

As to the advantages resulting from the use of this machine, the most important would certainly be an increased regularity in the quality of the butter as well as an increase of this quality: the ripening of the small quantity of milk required to impart an aroma to the butter offering less difficulties than that of a large quantity of cream. To this may be added the reduction in the number of butter-making utensils—a saving of hand work, of time, and space. But it is yet doubtful whether these secondary advantages would not be more than counterbalanced by the high price of the Radiator, the cost of which is far above that of any of our present separators.

Alfalfa or Lucerne.

Experiments in Cutting and Feeding.

A series of experiments lasting over five years has been carried on at the Utah Experiment Station to determine at just what time in its growth alfalfa should be cut for best results, composition, annual yield per acre, and feeding value all being taken into account. In this connection the feeding value of such well-known rough feeds as timothy hay, corn-fodder and red clover has been compared with that of alfalfa. For this experiment a field of alfalfa was divided into three equal parts, one being regularly cut when the first blooms appeared, the second when in full bloom, and the third when half the blossoms had fallen, these being denominated early, medium and late cuttings, respectively. Incidentally, there was made a comparison of the first, second and third crops.

The details of this investigation are reported in Bulletin No. 61 of the above station, and the following are the more important facts, together with the conclusions that may be legitimately drawn from the results:

1. The largest annual yield of hay per acre is obtained by the method of early cutting and the lowest by the late, the average result standing as follows: Early cutting, 100; medium, 92; and late, 85.

2. The early cut alfalfa contains the highest per cent. of protein and fat, the most valuable food constituents, and the lowest per cent. of crude fiber, the most indigestible portion. The former decrease constantly, while the latter increases rapidly from early bloom to the full maturity of the plant.

3. The proportionate amount of leaves to stems is greater at early bloom than at any subsequent time, and both leaves and stems contain a greater per cent. of protein and a less per cent. of crude fiber at this time than at any later period in the growth of the plant. The relative proportion of leaves to stems in the different cuttings is as follows: Early, 42 to 58; medium, 40 to 60; late, 33 to 67.

4. Alfalfa leaves as compared with stems are very much richer in protein, fat and nitrogen-free extract, and they contain a much smaller proportion of crude fiber. The per cent. of the protein and fat grows constantly less and that of the crude fiber greater from the time of early bloom to maturity. The average composition of all cuttings and crops shows the leaves to contain 150 per cent. more protein than the stems, 300 per cent. more fat, 35 per cent. more nitrogen-free extract, and 256 per cent. less crude fiber.

5. The more important nutrients, protein and fat, have the highest per cent. of digestibility in the early cuttings, and it grows less and less with the age of the plant.

6. In the feeding tests, the highest gains were made from the early cuttings and the lowest from the late, the results standing proportionately as follows: Early cutting, 100; medium, 85, and late, 75.

7. The variation in the amount of the different cuttings eaten per day was very slight, being the highest for the early cutting and the lowest for the late, but the quantity of dry matter and also of digestible matter required for a pound of gain was decidedly lowest for the early cutting and highest for the late, the relative amounts of dry matter standing as follows: Early cutting, 100; medium, 131, and late, 166.

8. The annual beef product per acre was largest from the early cuttings, not only in the general average but in each separate season's test, and that from the late cuttings was smallest, the proportional products standing as follows: Early cutting, 100; medium, 79½, and late, 69½.

9. Taking all points of comparison into consideration, both separately and collectively, including everything that pertains to the largest yield and highest feeding value, the tests favor cutting alfalfa for cattle-feeding when the first blooms appear.

CROP COMPARISON.

10. The first crop gave the largest yield in each of the five tests and in fourteen of the fifteen cuttings, while the third crop gave the lowest for every test and in every cutting but one. The average acre yields for the five years, including all cuttings, stand in the following relation: First crop, 100; second, 78; and third, 39. For the early cuttings alone: First crop, 100; second, 83; third, 66.

11. In the average composition of all cuttings for three years, the nutrients of the three crops vary but little. The second has slightly the highest per cent. of protein and fiber; and the third the most fat and nitrogen-free extract.

12. The third crop has largest proportion of leaves to stems; but the per cent. of protein in the leaves is highest in the second crop, and next highest in the first. The leaves of the first crop contain the most fat, and of the second the least.

13. The third crop produced a higher average rate of gain in the feeding tests than the first or second and also higher than any of the separate cuttings. The amoun