

almost sure to occur. Hence the killing effect below this temperature is very slight.

Observations by the same station were made at 176 degrees F., and the results of pasteurization at this temperature 'showed a surprising reduction in the germ life, and this reduction was accomplished with very slight variation on each of the 25 days on which the tests were made. These tests gave an average of only 117, with a maximum of 297 and a minimum of 20, living germs per c.c. in the pasteurized milk.'

Seven tests at the temperature used in Denmark, 185 degrees F., gave an average of 113 living germs per c.c.; and, as the writers remark, 'were it not for the fact that in the present state of our knowledge, it is believed that a heating of milk to 185 degrees F. in a continuous pasteurizer, is necessary to remove all danger of tuberculosis, the use of 80 degrees C. (176 degrees F.) in pasteurization for butter-making would leave little to be desired.'

*The Pasteurizers.*—The pasteurizers used in the experiments here were the "Reid" in March and the first seven days in April, and the "Lister" for the remainder of the season.

The Reid machine is driven with a belt and, in addition to heating the milk, elevates it several feet. The milk is heated by passing over a steam heated surface, and it is kept in a circular motion by means of paddles which revolve in the milk. The weaknesses of the Reid pasteurizer are. The difficulty of maintaining a uniform temperature, and the fact that it requires a firm foundation for the large machine. Its strong point is that it not only pasteurizes the milk, but acts as a milk pump for lifting the milk from the receiving vat to the separator.

The Lister machine is driven with steam directly from the boiler, and is what is commonly called a turbine pasteurizer. It does not elevate the milk above the outlet near the top of the machine, and must be placed above the separator in order to have the milk flow into the separator. The milk for this machine was pumped from the receiving vat directly into the feeding funnel of the pasteurizer; and the temperature of the milk, which was received at a temperature of about 60 degrees, was raised from 125 to 130 degrees while passing through the machine, when fed at the rate of about 2,600 pounds of milk per hour. Milk which was heated above 185 degrees, required a preliminary heating before entering the pasteurizer. The three weak points of the Lister machine are: That it does not elevate the milk, that the centre bearing of the paddles fills with milk if the machine is allowed to get too full, and that the turbine has not at all times sufficient force to keep the milk in constant motion. The strong points of the Lister are that it occupies a small space, no belt is required to run it, and no special foundation is needed.

The Danish Pasteurizer, invented by Fjord, has of late been considerably altered, because the Danes are now compelled to heat the