

**EXPERIMENTAL
DAIRY
BACTERIOLOGY**

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Experimental Dairy Bacteriology by H. L. Russell & E. G. Hastings

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INTRODUCTION

The purpose of the course here outlined is to train the student in those bacteriological processes that are necessary for him to comprehend thoroughly, before he is in a position to appreciate the relation of microorganisms to dairy processes. This work is of fundamental importance to the student who wishes to learn the nature of the biological changes going on in milk and its products, whether he is concerned purely with the practical side of dairying or is interested in the cognate work of dairy chemistry or dairy bacteriology.

The attempt has been made to keep the scope of this work within the realm of dairy bacteriology, and not encroach upon the field of dairy manufactures. For example, in the study of starters it is desirable that the bacteriological student should know how to determine the purity and vigor of a culture, but the practical propagation of the starter should be presented from the creamery point of view. The effect of the ripening of cream on the churning process and the action of acid on the physical condition of cheese are instances of biologic activity that can better be studied in the factory than in the laboratory. In many cases it would be advantageous if the practical and theoretical work could be carried on simultaneously. Thus, in studying a starter bacteriologically it would be very desirable to test in the laboratory by frequent examinations the purity of the starter as it is handled in the dairy from day to day. The possibility of deterioration could then be ascertained from both the practical and scientific points of

view, and each would supplement the other. Such studies, however, are better adapted to the advanced student than to the beginner, and it is felt that it is preferable to present to the elementary student the biologic aspect of the subject more or less completely divorced from the practical factory work. The technique of bacteriological methods should be mastered by each student individually. He should learn how to make his media, and how to care for the same. After this necessary technical foundation has been laid, it is possible to make certain experiments in groups, and thus economize in time and material with no loss in pedagogic value.

The methods presented are believed to be the best in use at the present time. A committee of the American Public Health Association now has under consideration the formulation of standard methods for milk analysis, but these have not as yet been published. The methods of 'media making are those recommended by the Laboratory Section of the American Public Health Association, and, while more complicated than those usually described in text-books, are surely more desirable in establishing uniform methods.

In bacteriology, as in other biological sciences, unknown factors must be dealt with. Again, numerous conditions that cannot be controlled influence the results. A long series of observations may be certain to point in a definite direction, while one or two observations, such as can be made in a course of study, may give results wholly at variance with what is expected. This fact does not, however, lessen the value of the exercise in training the student in technique and in developing his power of observation.

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