duges on the surface of the cell, by the movement of which the organism is able to move.

Protoplasm,—the life-stuff of which the animal or vegetable is composed.

Spore,—a latent structure, formed within the cell, capable of resisting many unfavorable conditions and of producing, by germination, another similar cell. Spores are analogous in function to the seeds of the higher plants.

Aerobic,—organisms that require the free oxygen of the air for their development.

Anaerobic,—organisms that can grow without air. The bacteria and the yeasts are the main groups that possess this property.

Mammalian life,—animals that belong to the group mammalia—those that suckle their young.

Cholera Infantum,—an intestinal disease affecting infants.

Saprophyte,—an organism that lives on dead organic matter.

Sterile,—free from all living germs.

BACTERIA AND DAIRYING.

There is no phase of agricultural activity that stands in closer relation to bacterial life than the processes embraced under the general subject, dairying. The methods that have been adopted in actual practice are, for the most part, the result of long years of experience, and while experience is often a safe and valuable teacher, it cannot but be conceded, that the introduction of modern scientific methods is revolutionizing the dairy business of to-day.

Up to the last decade, dairying was an art; today it is fast becoming a science. The fundamental laws of nature, that are operative, in dairy processes, are being rapidly discovered, and as the why and the wherefore of the various changes come to be better understood, more rational methods are sure to be inaugurated. Greater uniformity will then prevail, and values will, thereby, be increased at losses due to inferior quality of product are lessened.

Bactaria in Milk.—It may seem a little strange but it is nevertheless true, that the fluid intended by nature to serve as food for all kinds of mamlian life, including man, the lord of creation, is likewise admirably adapted for the development of the lowest vegetable forms that are known to exist. Most bacteria thrive in milk. Not only does it contain all the ingredients to make a balanced bacterial ration, but they are in such degrees of concentration and such form, that they are readily assimilable by germ life. If bacteria gain access to milk, various changes induced by them are sure to occur, and, to a considerable degree, these are such as to diminish its value as a human food.

Number of Bacteria in Milk.—If we were to measure the extent of pollution of different substances according to the number of bacteria they contain milk would be almost the worst food we could use, for, as a rule, a drop of milk, as we drink it at our meals, contains more bacteria than an equal volume of sewage. A water supply that would contain a fraction of what is ordinarily found in milk, would in most cases, be considered unwholesome, not on account of the mere numbers that it contains, but in a light of what such a condition means. A water supply containing hundreds of thousands of organisms per drop is unsatisfactory, because it indicates, indirectly the presence of organic matter in abnormally large amounts, and such material is undesirable in water. In milk, this number would not be interpreted in the same way, because, normally, milk contains organic matter that would support such a growth.

Even under the most favorable conditions, milk contains many more bacteria than water ordinarily does. As it comes from the animal, it generally has from one hundred to a thousand germs per drop. These immediately begin to multiply, on account of the favorable conditions of growth, so that with increasing age, the germ content is greatly increased, until, in commercial market milk, there are, frequently, millions in every drop.

The character of the bacteria in any milk is of vastly more importance than the presence of mere numbers. Ordinarily the great majority of the contained organism are harmless so far as their effect on the human system is concerned. They are the kinds that cause the various fermentations to which milk is peculiarly subject.

Not infrequently, certain bacteria gain access to the milk, that are able to form deleterous substances. Cholera infantum and other disorders of the intestines are frequently attributable to their effect. The presence of even a few organisms, of this class, is very much more dangerous than the millions of saprophyte that are concerned in the production of the various fermentative changes.

IV.

QUALITY OF MILK AS AFFECTED BY GERM LIFE.

The amount of butter fat in milk is usually taken as a measure of its value, but this value is often lessened by the character of the germ life in the fluid. If undesirable organisms are present, taints are produced that injure the quality of the product, thereby reducing its market value. In