FERMENTATION. The term "fermentation" is, as a rule, confined to the production of alcohol from liquors and substances containing sugar, but the word is now extended so as to denote many other changes caused by the action of micro-organisms; for instance, the germ causing the souring of milk is often spoken of as the lactic ferment, and the changes which it causes constitute the lactic fermentation; in the same way, the production of vinegar, or acetic acid, is caused by a microbe, and the wine or other substance from which it was made, is said to have undergone acetic fermentation.

In this bulletin, the fermentation of flour is frequently referred to; and by the term it is meant that the sugar contained in the flour is acted upon by a living organism—the yeast plant—and is changed into alcohol and carbonic acid gas, the same gas which is contained in beer and causes it to froth. This gas is formed in the beer by the action of the yeast upon the sugar contained in the malt. The alcohol remains in the beer, but disappears from the bread, being evaporated by the heat during baking.

PUTREFACTION. This term is usually applied to substances which are decomposing and producing a bad odor; when no bad odor is produced in the decomposition the words decaying or rotting are generally used to describe it. There are stricter limitations to the meaning of these words when used in a bacteriological sense, but they need not be given here. It is difficult, if not impossible, to draw any clear distinction between these processes, and that of fermentation. They are all caused by the action of minute vegetable organisms, and all lead to the same result, which is the decomposition of dead organic matter into its chemical constituents, so as to furnish food available for growing plants. This change is constant in the manure applied to land for a coming crop. Every farmer knows that manure must rot, either in the barnyard or in the earth, before the plant can derive any benefit from its application. The crop feeding upon this decaying manure grows up, and is then either eaten or decays where it grows. If it is eaten, a portion of it is excreted as manure and a portion goes to form the flesh of the animal consuming it; the manure undergoes the same process of decay, the flesh gradually wastes during life, and the waste products are thrown off into the air; and when the body dies it decays, forms a portion of the soil, and is again available for plant food.

In order that this process of putrefaction may go on, four things are necessary:

1. The substance to decay.
2. The bacteria to cause decay.
3. A suitable temperature.
4. Moisture.

These are all present in the dough or sponge state of bread-making, as it is desirable to provide the best conditions for the growth of the yeast; and, of course, if other organisms are present they will also grow rapidly and produce sour bread and other defects. Hence great care should be taken to prevent bacteria from gaining access to