

ever, occur normally in the healthy tissues of man nor animals. Under favorable conditions bacteria grow and multiply with enormous rapidity. A single bacterium in contact with a nutritious substance, like beef gelatin will produce over fifteen million of its kind in twenty-four hours. When thus surrounded by an ample food supply of the proper kind they increase or multiply by what is known as fission or simple dividing. Each individual upon reaching a certain stage in its growth will divide in the middle into two similar halves, each of which immediately starts to grow and repeat the process. Some species have been carefully watched under the microscope during their development and have been found to divide as often as every half hour and in some cases in still less time. Notwithstanding the hundreds of different species of bacteria there are only three general forms—spheres, rods and spirals. Some of the spheres are large and some small, while the rods may be long or short, thick or slender, with either rounded or flat ends and the spirals may be loosely or tightly coiled. To illustrate we might say the three forms resemble marbles, pieces of slate pencils and coiled wire springs. In size the spheres vary from twelve one-millionths to six one hundred thousandths of an inch in diameter, while the rods and spirals vary in diameter from fifteen millionths to one ten thousandth of an inch, and in length from one but little more than their diameter to threads as long as one hundredth of an inch. Bacteria are usually given a generic name, based upon their appearance under the microscope and their method of dividing during growth. Some of the more common names are micrococcus, streptococcus, staphylococcus and sarcina, all of which are given to the spherical forms. The rod forms are

all given the generic name of Bacillus and to this is usually added a specific name based upon some physiological character as bacillus typhus—those causing typhoid fever. And in much the same way the spiral forms have come to be designated as spirillum—spirillum dentinum being a form which occur in the so-called fur of the teeth. Many species of bacteria have another method of reproduction besides simple division of fission. It is by means of spores, which are usually round or oval particles of substance called bacteria protoplasm. These spores or protoplasmic particles are capable of resisting conditions of heat, cold or starvation that would destroy the ordinary bacteria.

There are among bacteria two different methods of spore formation—endogenous and arthrogenous. The endogenous spores are developed inside of the rod and spiral forms of bacteria itself. They usually break out of the rods and may remain inert for a long period of time or until they come in contact with proper food materials and conditions for development when they start to grow and multiply in the ordinary way. It is to this class of bacteria that the Bacillus milli of "Black Brood" belongs. Arthrogenous spores are formed by breaking up of a long rod into short segments or sections. This form will not resist adverse conditions as well as the endogenous and some authorities claim they are not true spores but are simply resting cells. Whatever the method of forming the spores, its purpose in the life of the bacterium is that of insuring a perpetuation of the species, through its increased powers of resistance. Some species of bacteria possess the power of motion to and fro in the media in which they are growing. This motion is produced by hair-like appendages, one or more in number, which protrude from the