

they would grow in the first tube, but they would go no further. It is not necessary to tell all the devices he tried to coax this fastidious bacillus to continue its growth in his jellies—how he modified these jellies, first in this way and then in that, in hopes of finding a suitable medium, always without success, until he hit upon the expedient of smearing the surface of his jelly with a little blood, when, presto! he found that his influenza bacillus would grow beautifully, and he discovered that it required as the most necessary condition of its growth, the hæmo globin or red coloring matter of the blood.

Even if our study of microbes had only given us the facts which we have outlined, we might consider much had been done, but these are only a fraction of the results. Perhaps the most fascinating part of the whole field is that which bears upon the relationship of these minute creations to man and animals. Here it is that we must look for progress in the future which may, possibly, in a few years, completely revolutionize the medical treatment of infectious diseases. And here, indeed, those timid persons who always tremble lest deadly germs of disease may be lurking about them, may receive comfort; for our studies have taught us that the bacteria which we dread are met, as soon as they enter the tissues of our body, by a host of enemies whose business it is to destroy them. The body, in fact, is equipped with a means of defence against all disease germs, and, if conditions were absolutely favorable, would always destroy them. If we examine the blood microscopically, we find it is composed of a colorless fluid in which float multitudes of little red disks, which are called the red blood-corpuscles, and whose duty it is to carry the vivifying oxygen from the lungs to the tissues, and return the carbonic acid gas, the waste material of life, to the lungs again; but here and there amongst these red disks we see a little

white body which is called a white blood corpuscle. The duties of these white blood cells were for a long time not well understood, and even now we do not know all their functions, but we do know that one of their chief functions is to act as scavengers in the blood, picking up waste material wherever found and carrying it away to where it may be got rid of as easily as possible. These white cells are the structures which assist us in our struggle with the microbes, for when they meet them they seize them, killing and digesting them, and if they always perform this duty we have little to fear. From this habit of theirs of

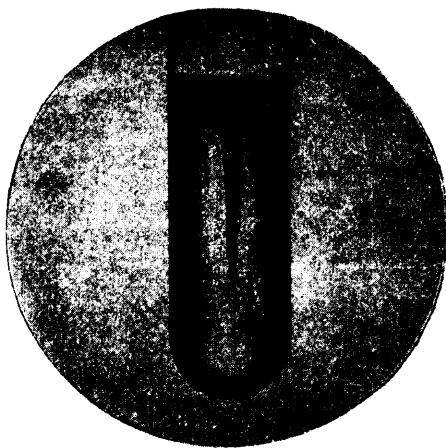


FIG. 5. STAB CULTURE OF CHOLERA, 3 DAYS OLD.

devouring bacteria we call them phagocytes, and we find that in this rôle they are extremely active, restlessly moving throughout the body and attracted to any spot at which invasion occurs. In Fig. 7 we have three of these phagocytes, which are filled with bacteria. The action of the white blood cells is very different in different diseases, according as the animals are susceptible to the disease or not. In fact, to say that an animal is susceptible is simply to say that these scavengers are not doing their duty. When they are doing it thoroughly, the disease has not a chance to take hold, and the animal is said to be immune. This immunity is frequently