

specific diseases are associated with specific forms of these vegetable organisms. At present there are but four affections in which these specific forms are known to exist; they are small-pox, sheep-pox, splenic fever, and relapsing fever. In small-pox, for instance, the fungus consists of minute spheroidal corpuscles, which rapidly develop by fission into groups, chains, &c. The other diseases I have just mentioned are each characterized by special forms of fungus.

Besides these diseases associated with specific forms of vegetable life, there are others depending upon the infiltration of the tissues with septic microphytes, or, as they are sometimes called, micrococci, one of the forms of bacteria just referred to. Two are at present known—diphtheria and erysipelas; the infiltration with these low forms of vegetable life being the starting point of the diseases.

Experiments such as inoculating the cornea by puncturing it with a needle charged with diphtheritic material has resulted in the infiltration of the lymphatic canicular system with myriads of these low organisms. Their discovery in erysipelas is of but very recent date—within the last few months. Large numbers of bacteria have been found in the fluids of the swollen parts.

It is the microscope chiefly that we are indebted to for these recent discoveries. No single instrument has done as much for Medicine as it. In connection with it, much new and important information has been afforded us by the use of the hot stage, by means of which objects can be examined under conditions more nearly approaching those occurring in the human body. It has helped very materially to enlighten us as to the amœhoid movement of the white corpuscles of the blood and the wandering cells of the connective tissue. The moist chamber, the use of immersion lenses, and the application of electricity have all been of immeasurable benefit. Before the more general use of the microscope, our knowledge of the diseases of the nervous system was very meagre indeed. Through it insanity is no longer a disease of the mind, but of the brain. It is only since Bright's discovery that the processes of degeneration have been studied. Now, through the microscope, the study of these processes is one of the most important in Scientific Medicine. The changes occurring in inflammation have been made out chiefly through this instrument.

Every day the knowledge of the laws of the various branches of physics is becoming of increasing importance in Medicine. Most of the recent advances in physiology and pathology have been the

result of using the wonderfully ingenious apparatus invented by Marey, Ludwig, DuBois, Reymond, Helmholtz and others—cylinders revolving with great rapidity and perfectly regular movement; levers adapted so as to measure the minutest movements; chronographs to record periods of time so short, that they are measured by the almost imperceptible vibration of the tuning fork; mechanical apparatus with the aid of which artificial respiration can be maintained for hours. All of which instruments you will all have the opportunity of seeing at work in the physiological laboratory in connection with this College.

In fact it may be said that every improvement in the delicacy and accuracy of our instruments has been, as also it will surely hereafter be, followed by a corresponding advance in our knowledge of the functions of the body. These functions have one by one been investigated and explored, and in consequence the problems of life are step by step becoming solved. "Vital" phenomena are disappearing with the discovery of new facts, founded chiefly on our increased knowledge of the laws of physics.

The application of these laws are readily seen in some of the better understood functions and organs of the body. The heart of man is constructed upon the recognized rules of hydraulics, and with its great tubes is furnished with common mechanical contrivances, valves. The eye is arranged on the most refined principles of optics: its cornea and humors and lens properly conveying the rays to form an image; its iris, like the diaphragm of a telescope or microscope, shutting out stray light, and regulating the quantity admitted. The ear is furnished with means of dealing with the three characteristics of sound; its tympanum for intensity, its cochlea for pitch, its semicircular canals for quality. Atmospheric pressure on the descent of the diaphragm fills the air passages with air. Many other facts of a like nature might be mentioned, all tending to point in one direction, the operation of law.

The novelties in the other branches of the profession I will leave to be dealt with on a future occasion by some other professor, merely mentioning three or four of the more important. Perhaps the most important is the introduction of bloodless surgery by Esmarch, which very much facilitates operative interference. Pneumatic aspiration has been of signal service in a great variety of cases, such as hydrothorax, retention of urine, strangulated hernia and many other diseases. The galvanic cautery and knife has also done much to simplify operations such as the removal of the tongue, naevoid growths, &c.