certainly be said that the relation between those organisms and various specific diseases is the question which at pre­sent most occupies the attention both of pathologists and of practitioners of medicine and surgery. It is now known that there are many varieties of organisms (in Crookshank’s *Bacteriology* sixty are described), some of which are hurtful to the human economy, though others are apparently harmless. Those of the former class give rise to an alteration in the tissue in which they grow ; and during their growth they alter its composition and cause it to break up into various compounds, some of which, when absorbed into the blood-stream, poison the individual. Some, on the other hand, are either in themselves innocuous or are killed when they enter the blood, which is a fluid tissue and acts as a germicide ; hence the tissues in a healthy condition are spoken of as “germicidal.” Some appa­rently grow only on dead tissue, or in tissue the vitality@@1 of which has been lowered.

The alteration in the tissue is strictly analogous to a fermentation—such, for example, as the change which takes place in a solution of grape sugar in which the yeast plant has been planted. The solution breaks up into alcohol and carbonic acid ; along with this change there is an increase in the quantity of the yeast. The most common fermenta­tion is the alteration termed “putrefactive” or “septic.” The cause of this change is in all probability a special organism named *Bacterium termo.* It lives on any dead matter containing nitrogen when exposed to heat and moisture ; dryness and cold are antagonistic to its growth. Its results are so evident and of such common observation that the term “antiseptic” was used long before the primary cause of the condition was understood. Antiseptics origin­ally were substances which interfered with sepsis. The term has now, however, a wider meaning, and includes any substance opposed to fermentation. “ Antifermentative ” or “ antitheric ” would be a better term. An antitheric substance is one which interferes with fermentation by destroying or paralysing the organism which is the primary cause of the condition. The word “ antiseptic,” on the other hand, should be reserved to denote any substance which is opposed to putrefaction or sepsis,—one form of fermentation. Many of the most dangerous fermentations have nothing in common with putrefaction : the products which result are odourless ; the appearances which arise bear no similarity to the changes which occur when putre­factive fermentation is present. Plant the *Bacterium lactis* in milk, and souring, or the lactic acid fermentation, takes place ; plant the *Bacterium termo* in milk, and putrefactive fermentation occurs. The fermentations of smallpox, vaccinia, syphilis, scarlet fever, typhoid, relapsing fever, typhus, erysipelas, and cholera may be taken as examples of fermentations of the non-putrefactive class. Apparently in them the organism enters the blood-stream, there de­velops and forms its products, which, acting directly or in­directly on the heat-centre, give rise to a specific fever. This fever continues until the soil is worn out, and the organism, finding no longer a nidus for its development, dies out, and recovery takes place. Death of course results if the individual has not sufficient strength to withstand the attack. There is a general law regarding all living things which holds true of these lowly organisms as of the highest : remove its food and the organism dies, or at any rate ceases to develop. It may, however, lie quiescent, again appearing when a new nidus is provided for it. These considerations explain the reason why, after one attack, the individual is protected for a longer or shorter period. They also explain why many diseases are becoming through course of time less virulent than they once were : the soil

is becoming exhausted in relation to the special require­ments of the organism, and the organism is therefore incapable of flourishing as it formerly did. Plant the organism in a virgin soil—take, for example, as was un­wittingly done, the organism of measles to Fiji—and a disease which in Great Britain is comparatively harmless becomes a most deadly scourge.

An attempt has been made to divide organisms into two great divisions—the infective and the non-infective. The first class can grow in living tissue; the second cannot. The first form their products in living matter ; the second can only grow in dead or lowly vitalized matter. The in­fective organism can migrate from the original point of en­trance by the vascular and lymphatic streams to distant parts of the body, and may there form secondary foci of infection. As regards the non-infective the manufactory of the poison is principally restricted to the near neighbour­hood of the original point of entrance, generally a wound. It cannot migrate into the living tissues around if they remain healthy. Both kinds of organism form ptomaines (*πτωμα,* a carcase), the products of the fermentation which result from the breaking up of the tissue or discharge in which the organisms grow. They may enter the blood-stream and poison the patient. Their entry into the blood must be differentiated from the entry of the organism itself into the stream. Clinically, the two conditions, although often met with in one individual, are in many cases distinctly separable. This physiological division of organisms into infective and non-infective is at present only tentative, and much work must be done before a strictly physiologi­cal classification can be attempted ; at present the main line of inquiry must be principally morphological. Even in this direction a difficulty meets the observer, because organisms change their shape according to the media in which they are cultivated.

In the present article only a general view of the present aspects of surgical practice can be given. Special stress will be laid upon the principles which guide the surgeon in his daily work. For full particulars with reference to any special points the reader is referred to Holmes’s *System of Surgery,* Erichsen’s *Science and Art of Surgery,* and Gross’s *System of Surgery.*

Surgical affections may be divided into two great classes, —those which are the result (1) of injury and (2) of disease.

I. Injuries.

Before proceeding to the consideration of the different injuries it will be necessary to say a few words about the general condition termed *shock* or *collapse,* which supervenes after a severe injury. Care must be taken not to confound this state with faintness or syncope from loss of blood. Undoubtedly in many cases both con­ditions are present. Syncope from loss of blood is considered below. Syncope from mental emotion differs from shock in degree only. In shock the patient is pale, and bathed in cold clammy perspiration ; his sensibility is blunted ; his pulse is small and feeble ; he is unable to make any active exertion, but lies in bed indifferent to external circumstances, and can only be roused with difficulty ; he frequently complains of a feeling of cold ; and he may have a distinct shivering or rigor. These symptoms may continue for some hours ; the first evidence of improvement is that he shifts his position in bed and complains of the pain of the injury which has caused the condition. The pulse becomes stronger, and he then passes from the state of shock into the condition of reaction. If the improvement continues recovery will take place, but if it is only transient the patient will sink back again into a drowsy condition, which, if it persists, will end in death. In severe cases there may be no reaction ; the patient then gradually becomes weaker and weaker, his pulse feebler and feebler, till death ensues. Shock is due to an impression conveyed to the central nervous system by an afferent nerve of common or special sensation. This impression produces a change in the medulla oblongata, by which the nerve-centres are so affected that a partial paralysis or paresis of the voluntary and involuntary muscular fibres in the body takes place. In consequence of the change in the voluntary muscles the patient is unable to lift his arm or move his leg ; the respiratory functions are performed wearily, and the

@@@1 John Hunter defines “ vitality ” as the power which resists putre­faction.