

tissue. In the former case it is consequent upon the central organ of the circulation (contraction of the heart and respiration), and in the latter it is possible only upon augmented secretion and nutrition.\*

The more rapid change of material operates through the constant effusion from a continued renewal of the stream of blood in the capillaries. Such partial congestions are frequent in certain organs during pregnancy, as in the uterus and the mammary glands. An organ moreover, may receive an increased quantity of blood in consequence of the growth and augmentation of its vessels, as is also exhibited in the organs last mentioned. In the same manner pathologically an organ may receive more blood than usual, a remarkable example of which is presented by tumours.

### 13. *Hyperæmia.*

Hyperæmia consists in an accumulation of blood in a portion of the capillary system, in arteries or in veins, produced by retardation of the circulation. The latter condition in the entire capillary system of the body is incompatible with life; the most remarkable example of this being presented by cholera.

Hyperæmia, or accumulation of the blood within the vessels, occurs in two forms. In the one case all the constituents, the liquor sanguinis and the blood corpuscles, accumulated; in the other, the corpuscles accumulate with a diminution of the liquor sanguinis. The former may occur in the arteries and in the veins, and more particularly the latter, because they possess a high degree of dilatibility. The other form alone occurs in the capillaries, for these cannot receive a large quantity of blood without effusion of the liquor sanguinis (exudation), or rupture of their parietes (capillary hemorrhage). In hyperæmia of the capillaries, the blood-corpuscles accumulate so as to fill up the lymphy-space, and come into immediate contact with the walls of the vessels, to which they adhere, and thus increase the retardation of the circulating current.

In this manner, vessels ordinarily conveying only a single row of blood corpuscles, and imperceptible, become visible to the naked eye; and a tissue, which in the normal condition is pale, becomes bright red. The walls themselves of the capillaries have no participation in the produc-

\*It is often asserted that an unusual flow of blood in any organ is produced by increased contractility of a portion of the arterial system but this is in hypothesis a stronger pulsation of the arteries of an organ is observed only when the return of the blood is impeded by a constriction, which may exist in the organ itself, or in some other, having a functional or anatomical relation to the latter.