

Friction or pressure very much increases this growth, and this is the reason that the skin on the soles of the feet becomes thickened, and also the hands of those who do much rough work. The cuticle also protects from injury the true skin underneath, which is very sensitive—so much so that without it the true skin would not be able to act as an organ of touch or perception. The true skin contains blood vessels and nerves, and is of a very elastic consistency; the deeper part of it contains the fat cells. These blood vessels are called capillaries, and by means of them the blood is brought from the body to nourish the skin. In the skin are also found organs called glands, to which I will allude more fully presently, but will only tell you now that their office is to separate from the blood. There are two sets of glands, or small ducts, formed in the skin, which pour out different secretions on to its surface. First of all there are the sweat glands, which are the most abundant. These, after a spiral course through the cutis, terminate in a straight tube on to the surface between the papillæ, which are little inequalities of the skin which play an important part in the sense of touch. The other, *sebaceous* glands as they are called, also open by means of small tubes on to the surface. They contain an oily matter which has much to do with the softness and pliability of the skin. The sweat glands are most abundant in the palms of the hands and soles of the feet, where the sebaceous glands are absent; the latter are most numerous in the neighbourhood of hair. When the matter contained in these sebaceous glands is allowed to accumulate, it is apt to give rise to small pimples, especially on the face and neck. Sometimes these become inflamed and painful, constituting a disease called acne, which is very difficult to get rid of.

The quantity of perspiration varies according to circumstances, being, as regards its watery vapour, about twice as much as that given off by the lungs; and one of its uses is to cool the heated skin by evaporation. Free perspiration aids much in cleansing from the scales of the scarf skin. For this reason people who lead a sedentary life really require more washing than a working man, and should always use friction as well, for it is of as much importance, and perhaps even more so, than bathing. When I tell you that every inch of human skin is pierced on an average by two thousand eight hundred sweat and other tubes for the purpose of throwing out waste matters from the system, and that if these millions of tubes were put end to end they would, in one person, measure eight and twenty miles, and that, not only are they useful for excretory purposes, but are also capable of taking in a certain amount of

oxygen, you will see for yourselves the importance of keeping the entrance to them free from obstruction.

One of the most important functions of the skin is that of the regulation of the temperature of the body, by means of the blood coursing through the small blood vessels of the skin, called *capillaries*. The blood from the left ventricle of the heart is pumped into the aorta, and so passes along the arteries, a great quantity reaching the capillaries; and, as these small blood vessels are more or less dilated, acting under the influence of the nervous system, so a greater or less amount of blood is exposed to external influences, the temperature of the blood being lost by three methods, *viz.*, *radiation*, *conduction*, and *evaporation*.

In cold weather the capillaries are contracted and less blood is exposed to cooling influences. We then wear clothing which does not favour loss of heat by conduction. On the other hand, in hot weather the capillaries are dilated, and more blood is exposed for cooling purposes: this also takes place in the Turkish and other warm baths.

Evaporation is continually taking place from the skin, but is not noticeable, and is then called *invisible perspiration*; but when this process becomes exaggerated, drops of fluid at the pores of the skin are seen, and it is then called *visible perspiration*, or sweating.

The normal temperature of the blood is 100° F.; but the normal temperature of the body, as taken by the thermometer, is 98·4 F. In abnormally high temperatures, drugs are given to reduce the temperature, as diaphoretics, *i.e.*, drugs which cause sweating, and so increased loss of temperature by evaporation; or wet packing, or cold baths are sometimes resorted to, the patient first being put into a tepid bath and then cold water is gradually added, and thus heat is conducted away from the warmer body to the cold water.

As much as seventy or eighty per cent. of the loss of heat from the body takes place by *radiation*, *conduction*, and *evaporation*. The wonderful extent to which the body can accommodate itself to high temperature, by means of the functions of the skin, is shown by the experiment of Sir Charles Blagden, who remained in a temperature of 260° F. for eight minutes.

Another important function of the skin is that of *excretion* by means of the sebaceous glands and hair follicles, and sudoriferous or sweat glands. From the sebaceous glands and hair follicles (which are absent on the palms of the hands and soles of the feet) you have excreted cast off epithelium scales, oily matter and extractives, and from the sudoriferous glands there is a variable amount of water, from two pounds and upwards, with a certain percentage of salts, extractives, and carbonic

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