

THE WONDERS OF THE SKIN.

The skin of our bodies is a wonderfully complex structure, and in the animal economy its functions are of the most important character. The stomach, the liver and even the brain itself are not so necessary to life as the skin. Persons may live for several days without food, and the liver may wholly cease to act for several days before death results, but death will ensue in a few hours if the functions of the skin are destroyed. Experiments have been made with the lower animals, and the results show that the skin is the most important auxiliary to the lungs in the process of the aëration of the blood. By varnishing the fur of a rabbit or coating the skin of a pig with an air-tight substance, the animal dies in about two hours with all the symptoms which are produced by cutting off the supply of air from the lungs. On the accession of Leo X. to the papal chair of Rome, there was a grand procession in Florence and a little girl was coated all over with gold leaf, to represent "The Golden Age." The child died in a few hours in convulsions, to the horror of the spectators, who were ignorant of the cause. From such facts we may infer how important it is for health to keep the skin in an efficient state, so as to discharge its functions; and this part of the human body has been placed within the control of man, while most of the other organs of the body are beyond his visible control.

In insects the entire respiration is conducted by means of pores in the skin called *spiracles*. These are guarded by minute hairs, but if a feather dipped in oil is applied to the abdominal portions of an insect's body, such as that of a wasp, it dies almost instantly from suffocation.

Aëration of the blood is not, however, the only function which the skin has to discharge. Absorption is also carried on by the lymphatic vessels which permeate the skin everywhere over the whole surface of the body. Persons in whom disease of the throat closed up the natural entrance to the stomach have been kept alive for days and weeks by being frequently immersed in baths of warm milk; the celebrated Duc de Pasquier, who died in France not long ago at the age of ninety years, had been kept alive for several weeks before his death by such means. Various salts have been detected in the secretions of persons who have used baths containing those salts in solution. The skin may also be said to be the special organ of the sense of touch. It forms a beautiful covering for the body, preserves the delicate structures underneath, regulates the intensity of sensations from without, and by excretion it removes from the body materials which are no longer of any use to it, and which, if retained longer, would become injurious.

The structure of the skin shows how beautifully it is adapted to the discharge of its important offices. It is composed of two layers—the outer layer is called the *cuticle* or scarf skin and sometimes the *epi-dermis*, and the inner one is called *cutis* or true skin and sometimes the *dermis*. This latter rests upon an interlaced netted structure called the *areolar tissue*, out of which the granules and fibers of the skin are formed. At one time it was held that there was a third layer called the *rete mucosum* or pigment-layer, between the true and scarf skins, but from later researches it is ascertained that there is no such layer, and that the pigment cells to which the color of the skin in different races is due are but a development of the scarf skin. In general the scarf skin is thin, but the true skin is of variable thickness, and it is so thick in the rhinoceros, hippopotamus, elephant, &c., as to have acquired for them the name of pachydermatous animals. The cuticle consists of several layers of laminated scales which are formed by the flattening of the granules in the deeper layers. These granules, in man, are at first nucleated cells, and the coloring matter of the skin resides in these. They are very minute, being about one three-thousandth of an inch in diameter, then as they approach the surface and assume the scaly form their diameter increases to about one six-hundredth of an inch. In many animals and fish the scales are very large, still they are only a modified form of the epidermal scales in human beings. In the cuticle no nerves or blood vessels penetrate; it is nourished by the transudation of the serum of the blood through the vessels of the true skin and is devoid of sensibility, thus serv-

ing to blunt the sensibility of the true skin underneath. The cutis or true skin consists of two kinds of tissue composed of white and yellow fibers, the former being more dense and resisting and are always allocated wherever resistance to injury is most required, such as in the palms of the hand and soles of the feet. The yellow fibers are a very elastic tissue, and they are interlaced to form minute lozenge-shaped interstices which are principally filled up with the white fibers. The yellow elastic fibers exist in greater abundance at the flexures of the joints, the lips, &c., where elasticity of skin is most necessary. The uppermost surface of the true skin is very uneven, and is elevated into a vast number of papillæ, which are about one one-hundredth of an inch in length and one two-hundredth-and-fiftieth of an inch in diameter. Minute as these papillæ are, each possesses a ramification of nerve fibers which are the essential agents in the sense of touch. They are developed in greatest number along the tips of the fingers and the lips of man. The number of these papillæ is prodigious; a square inch of the palm of the hand contains about 5,000. On the tongue, where the cutis is extremely thin, they are larger than in other parts of the body. The sense of touch is very delicate in some persons, and it may be developed by constant practice. The blind can read by the sense of touch, through the fingers acting on raised letters; and in one case a blind girl, who had her fingers injured, learned to read by applying her lips to the letters.

With respect to the functions of secretion by the skin, it will be observed in looking at the furrows which cross one another on the hand, that there is a little orifice in the center of each; these orifices are perspiratory ducts, and the glands by which the perspiration is secreted are seated at the under surface of the true skin, each imbedded in a cavity. The materials for secretion are furnished by a minute capillary network of blood-vessels arising from arterial trunks which bring the blood to the gland to be purified, and they terminate in venous trunks which carry off the blood when the purifying process has been performed. These glands remove from the blood materials that are no longer required in the body. Their size in the palm of the hand range from one one-hundredth to one two-hundredth of an inch in diameter; but in the arm-pits, where they form a very thick layer, they are about one-sixtieth of an inch and they form little membranous tubes about one-quarter of an inch in length and one-seventeen-hundredth of an inch in diameter. About 3,500 of these little ducts exist in a square inch of the skin of the palm of the hand, and the whole number of them in a man's body, of ordinary size, if laid in a line, would make a string twenty-eight miles in length. This glandular system is a beautiful contrivance for regulating the internal temperature of the body, for the perspiration poured out through the pores carries off the heat of the body as fast as it is generated by the chemical processes going on within the system. It is exceedingly important that these glands should be kept open and in effective action. The burning heat of the skin is a marked sign of some diseases when the perspiration is arrested. The proper action of these glands maintain the temperature of the body constantly at 98° Fah., even under the most violent exercise. And for the same reason a degree of heat can be endured with impunity in dry air (which absorbs perspiration as in a vacuum) that would be perfectly unbearable in a warm moist atmosphere. M. Chabert, called the "Fire-king," who died a few years since at Hoboken, N. J., frequently entered an oven heated from 400° to 500° or within a few degrees of the temperature at which lead melts, and he would remain therein until a beefsteak was cooked. Had the oven been filled with steam of 212° he would have perished in a few seconds. About one pint of liquid evaporates through the pores of a man's body every twenty-four hours, and this contains about an ounce of solid matter in solution, besides a large amount of carbonic acid gas. We can thus form an estimate of the importance of keeping these ducts in perfect order by means of frequent bathing.

In connection with the hairs on the body there are sebaceous glands which furnish an oily substance to nourish the hairs. The ducts of these glands open generally into the hair-pits situated in the subcu-

taneous areolar tissue. These are frequently inhabited by a peculiar little parasite, especially in persons whose skin is torpid in its action. These glands lubricate the skin and serve to maintain its elasticity. Hair may be regarded as a kind of modified cuticle. Around the hair follicles and glands there are microscopical muscular fibers which act involuntarily; and fear and anger stimulate them to contraction and make the hair stand erect. In the Book of Job it is said: "Then a spirit passed before my face; the hair of my flesh stood up." These same muscular fibers extend everywhere throughout the skin, and when they contract by cold it assumes that appearance called "goose skin." The skin, although so simple in appearance, affords a beautiful illustration of the infinite skill and wisdom of the great Creator, not only in its wonderful structure, but with respect to all its varied functions.

Wool—Its Supply and Demand.

The New Hampshire *Journal of Agriculture* states that about 60,500,000 pounds of wool are raised annually in the country, and our manufacturers consume 80,000,000 pounds, thus showing a deficiency of about one-third of the supply to meet the demand. From the scarcity of cotton at present, the demand for wool must increase, and efforts should be made to meet it with American-raised wool. In the British colonies in the South Pacific and Cape Town in South Africa, 86,700,000 pounds of merino wool are raised annually, nearly all of which is sent to England.

At the Ohio Wool-growers' Convention, lately held at Cleveland, the following resolution (as we learn by the *Ohio Farmer*) was adopted:—

Resolved, That the practice of washing sheep should be abolished, because—

1st. It will permit early shearing, which secures a greater quantity of wool, a longer staple and a better condition of sheep and lambs through the year.

2d. Of the exposure to contagious diseases, such as scab, foot rot, &c., in places frequented by different flocks to be washed.

3d. It is an expensive, unpleasant job, and unhealthy, both for man and sheep.

4th. That the manufacturer must cleanse the wool at all events, and he can do it cheaper than the grower.

5th. That it is to the interest of wool-growers to put their unwashed wool in as good condition as possible, by keeping their yards well-littered, and by throwing away all filth that can be separated from the wool.

6th. Some lots of wool are more gross and gummy than others, therefore no rate of deduction could be agreed upon, suitable to all grades and classes, but each lot should be bought upon its own merits for quality and condition.

7th. As generally practiced, washing is little or no improvement to the fleece.

Petroleum for preserving Wood.

The oil wells near Prome, in Burmah, have been in use from time immemorial. Wood, both for ship building and house-building, is invariably saturated or coated with the product of those wells. The result is entire immunity from decay, and the ravages of the white ants that in that country are so generally destructive. M. Crepin, a Belgian Government engineer, who has tried experiments upon the relative advantages of creosote and sulphate of copper for the preservation of timber in marine constructions from the attacks of worms, &c., says that creosoting is the only process he has found to succeed for this purpose. He states that sulphate of copper affords no protection whatever against the action of salt water and marine insects. The Belgian Government now require that all the wood sleepers used in the State railways should be creosoted; and the Government of Holland have also made the same resolution, and upwards of 300,000 sleepers per annum are now being creosoted by the Dutch Government, and more by the Belgian Government.

Rebel-manufactured Fire-arms.

A correspondent (says the *Richmond Whig*) writes us as follows:—"Forty new Sharpe's rifles, with the Richmond stamp on them, were handed, yesterday, to my company. The men were ordered to test them. Nine were fired, and seven of the nine burst!" Our correspondent says that in this business he got his hand badly hurt, and he suggests that the manufacturers of those arms had better be sent to the field, where they can be furnished with Yankee sabres, taken from the enemy, while the time they are wasting can go to the use of the farmers. He also complains of the saddles furnished the cavalry, and says; "They frequently break before we mount the first time."