

AN  
INAUGURAL DISSERTATION

ON  
*the*  
*Human*  
*Integument or Cutis*

SUBMITTED TO THE  
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It may be gravely assumed that no organ entering into the structure of the human body, the cerebrum or seat of intelligence excepted, has so great an influence on mans condition, as the cutis. This assumption is based on the fact that, the cutis presents a moral as well as a physical aspect.

Of the moral aspect of the cutis it is pertinent to our object only to observe that, the distinctions in the social and political relations of the races of men constitute the phase of morals recognised in this division of our subject.

2

Physically, the human cutis presents an object of singular interest and utility to the naturalist. Its analogue in the vegetable Kingdom and its closer resemblance in the animal of the aqueous and aerial oceans.—

Its constitution to be the immediate line of separation between the organic and inorganic world,— Its greatly modified structure in animals and vegetables in their different modes of life.— Its elongations of hair, scale & feather and other characteristics of tribe and species.— These and other peculiarities, though more appropriately the subject of the naturalist should not be wholly overlooked by the physiologist.

5.

The anatomy of the cutis, prior to the time of W<sup>m</sup> Hunter must have been any thing but satisfactory to the curious anatomist. Its physiological and pathological phenomena could not have failed to draw their attention to its structure and perhaps to the nature of its tissue, while for want of facts revealed by chemistry and the microscope they were doomed to rely on conjecture & speculations.

To the less curious among the learned and to the million, then, as now, <sup>it</sup> was little more than a humble investment to protect the body in its "wear and tear" with external objects.

87

From the researches of Hunter begun in 1718, which opened an important era in anatomical science, to the close of the discoveries of Bichat about one hundred years after, greater progress was made in the anatomy and physiology of the tissues than in all preceding time.

It remained, however, for organic chemistry and the microscope in the last thirty years to reveal their minute structure and constituent elements and to give <sup>to</sup> them that prominence their importance demands.

The cutis presents an extended surface with an inconsiderable thickness. If the mucous membrane of internal organs be admitted

as a part of the cutis, which seems necessary in the human economy, its importance is greatly enhanced, indicating a power of function which may not yet be fully appreciated. Adopting this view we have the natural division of an external and internal cutis, distinguished chiefly <sup>by</sup> a mucous or aqueous and a dry or aerial surface.

The external cutis is adapted by its structure to the multiplied atmospheric influences mostly of a desiccating nature and for contact with dense bodies; the mucous to a uniformly moist surface and for contact with water or pultaceous masses. For this purpose the epidermis of the external cutis corresponds to

the epithelium of the internal, both lying on basement membrane and both the product of epithelial or gland cells in a state of constant accretion and waste, the first terminating in a scaly debris, the other in abraded epithelium.

In regard to thickness the cutis may be divided into two layers, an internal, called the derma and an external the epiderma. This division is natural and was doubtless made from the fact that the two layers are easily separated. Each of these is again divided into two other layers, making the papillary of the derma and the [squamous] of the epiderma. It is worthy of note in this further division of the cutis

there is no <sup>mucous</sup> line of separation between the papillary and the derma, the squamous and the epiderma, but the relation is fibrous and continuous.

The epiderma may be regarded as a mucous layer or tissue of gland-cells in progress of formation, desiccation and attrition. This stratum of gland-cells lies immediately on the derma and receives from it its nourishment. The glands elaborate into their own peculiar element the food received and having fulfilled their function give place to succeeding cells, desiccating and hardening in their progress till they fall from the body.

The nails and hair, so



8  
unlike the rest of the epiderma are in all respects parts of it. The hair, like the smoother surface of the epiderma is the product of the gland-cells and by a similar process.

To promote its greater elongation, stability of position, elasticity and flexibility, the derma is pierced with an aperture for each hair into which the epiderma descends in a sac, dipping into the adipose layer beneath it. By this arrangement a very considerable internal surface of the epiderma is brought into contact with abundant nutrition in the adipose layer necessary for the extraordinary growth required; while a like portion of the external surface of the epiderma now becomes

the internal surface of the sac which now constitutes the cell-wall and hair follicle. The perforations of the derma are generally "elliptical or reniform" in outline to which the sacs and consequently the hairs conform. The tubular and pithlike structure of hairs is in consequence of their growth from a circumference and not a line or single point, forming more or less a hollow shaft. It is probable that this pith-like portion of hair contributes by its capacity to take up water or fatty matter, to its pliability and softness.

The nails, like the hairs are the outgrowth of the epidermis and by the same process of development. The only

10  
point of essential difference is the growth of the nail from a flat, close fold of the epiderma, while the hair is from the internal surface of a sac, as before seen.

The epiderma is a product of the blood by an exudation of the liquor sanguinis on the surface of the derma where in obedience to a law in its constitution and a state of comparative rest by being thrown out of the circulation it takes on first the granulated, and cell forms and is finally developed into the epiderma according to another law of likeness and condition, as existing between the derma and the atmosphere. If removed by violence it is as often reproduced,

except in cases of serious injury done to the derma by which the pores are destroyed and the exudation cut off.

In its function the epiderma is to the sense of touch analagous with the iris, eyelid and eye-lashes to the sight and the tympanum to the hearing, each modifying the force of impression on these most delicate structures that they receive no injury and that no painful sensation be conveyed to the mind. By its considerable tenacity and hardened surface it protects the derma from constant injury it would otherwise receive from contact with the objects and forces that surround it.

It takes on additional thickness or elongation for like purpose.

It protects the system against the effects of temperature, aridity and humidity in their alternations by regulating the amount of perspiration.

The derma in point of substance and junction is the essential part of the cutis. Considered as a single layer it presents a dense, strong membrane of the white-fibrous, areolar tissue constituting about nine tenths of its thickness and is the foundation of the cutaneous structure. It is coarser on its internal surface, growing finer and firmer in texture to its surface. Its fiber

10  
is arranged in fasciculi or bundles making a fibrous plexus for the passage of nerves and blood-vessels, giving to it at the same time a slight elasticity and extensibility not otherwise consistent with this tissue. Its deeper portion contains great numbers of follicles and adipose cells. The remaining tenth or external portion is made up of the yellow-fibrous tissue, exceedingly fine, soft and elastic in its structure.

Nerves, blood-vessels and lymphatics penetrate the derma through its areola. At first they are comparatively few in number, but rapidly multiplying their bifurcations they interlace, forming

a compound of vascular and nervous plexus. It is in the stratum of the yellow fibrous tissue that the highest point of subdivision and interlacement of the nerves and blood-vessels takes place. Here the arteries and veins find their connecting capillary and the nerves their convoluted terminus. Here, too, is seated the sense of touch which, more than any other is to man the source of conscious existence.