

A practical treatise on healthy skin; with rules for the medical and domestic treatment of cutaneous diseases / By Erasmus Wilson.

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Rare Edition

a Practical Treatise on
"Healthy Skin"

Erasmus Wilson F.R.S. 1845
with

Author's Card & Letter
in own hand writing

197W
Disease of the Skin
termed Meloides - a Name
given by Albert - the relation of
the Disease to Cancer - It was
described 3 Cases in the Chirurgi-
cal Society - the 1st on the Leg
2^d on the Shoulder & gluteal region
3^d on the Sternum. The
first in its form described by
Albert Meloides radiceforme &
Meloides cylindracea these gave rise
to extreme tenderness & were
characterized by burning stinging &
smarting pain! in the 3^d especially
reduced in size having undergone
a spontaneous cure

55 Upper Charlotte St
City Square,

My Dear Sir,

Permit me to thank you
for your note just received, in con-
nec- with a packet of Petroleum
sent from Mr. Hendrie; - I will
submit it to trial to let you know
the results. Its colour is not in
the former. I am flattered by your
opinion of my little book on Healthy
Living, and am,

My Dear Sir,

Very faithfully yours
Eusebius Wilson.

Nov. 28/46.

E. Wilson

[Faint, illegible handwriting on aged paper]



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Mr. Erasmus Wilson
25, Upper Charlotte Street, City Square

15/-

Wm 3/-
1/08

℞ Linciment Ammoniac
Linciment Saponis et Opul^{is},
āā ℥j

M. ℥. Lincimentum, parte
affecta applicand.

℞ Extract. Colocyth ℥j
Pil: Hydrarg. ʒx
Pulv. Opii Turi
Pulv. Ant. Tart āā ʒij
Pulv. Scammou (aleppo) ʒxij
℞. Caryophyl. m v.

M. ℥. Massa, in pilulas xii
dividendas, capis capt?
1. alternis noctibus.

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DESCRIPTION OF THE PLATES.

PLATE 1.

STRUCTURE OF THE SCARF-SKIN.

FIG. 1. A small portion of scarf-skin from the palm of the hand, magnified nineteen times. The parallel arrangement of the ridges, and the manner in which they terminate abruptly every here and there, is shown in this figure; as well as the circular pores of the perspiratory tubes.

a. A vertical section, showing the elevation of the ridges of the preceding. *b.* Represents the tufts of papillæ of the sensitive skin, which are the cause of the ridges. The spiral coil running up from each tuft is a perspiratory tube.

FIG. 2. The under surface of a portion of scarf-skin from the palm of the hand, magnified, like the preceding, nineteen times. The ridges and grooves are the reverse of fig. 1. In each of the three grooves represented in this figure are seen numerous oval-shaped depressions for the tufts of papillæ of the sensitive skin, and running along the middle of each groove a slightly elevated line, *a*, upon which, at short distances, are the conical sheaths of the perspiratory tubes. *b.* One of the conical sheaths in question.

c. A vertical section of the preceding figure. If this be compared with fig. 1, *a*, the correspondence of the two will be seen. *d.* One of the conical sheaths of a perspiratory tube, projecting from the middle of the groove.

FIG. 3. A portion of scarf skin from the arm-pit, magnified nineteen times. The numerous lines crossing the figure are furrows adapted to the motions of this part of the body. In the compartments between these furrows, smaller divisions are seen corresponding with the little tufts of papillæ of the sensitive layer of the skin. The round spots scattered over the surface are the pores of hair-tubes and oil-glands.

FIG. 4. A portion of scarf skin from the back of the thumb, magnified nineteen times. The lines of motion and compartments have a different arrangement to those in the preceding figure, but in nature are the same. The little prominences caused by tufts of papillæ are more strongly marked, and there are several pores of hair-tubes and oil-tubes scattered over the surface.

FIG. 5. A portion of scarf skin from the back of the hand, viewed upon its under surface, and magnified thirty-eight times. The depressions correspond with the tufts of papillæ of the sensitive skin. This figure illustrates the irregular distribution of the papillæ of the sensitive skin, as compared with fig. 2, in which the depressions are arranged in rows.

FIG. 6. A thin fragment of scarf skin, magnified 155 times, showing its construction of flat, polygonal, overlapping scales, in some of which a small nucleus is seen.

FIG. 7. Vertical section of a portion of scarf-skin from the palm of the hand, magnified 155 times. In the lower part of the figure the section has cut across, and then proceeds nearly parallel with a tortuous perspiratory tube. The cells, of which the scarf skin is composed, are more open in the lowest than in the upper parts of the figure; a nucleus, also, is seen in the cells of the lower stratum, while in the upper the cells are converted into thin scales.

FIG. 8. A series of scarf-skin cells, magnified 310 times, showing the mode of growth of the cells, and their ultimate conversion into scales. These changes take place in the lowest stratum of fig. 7.

a. Primitive isolated granules, measuring about $\frac{1}{20000}$ of an inch in diameter. *b.* Aggregated granules, composed of several of the preceding, measuring about $\frac{1}{10000}$ of an inch. *c.* Nucleated granules, measuring about $\frac{1}{4500}$ of an inch. *d.* Cells measuring $\frac{1}{3000}$ to $\frac{1}{2500}$ of an inch. The deepest layer of the scarf skin is

Fig. 1

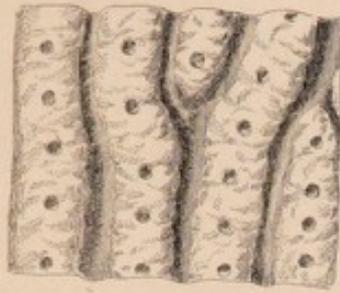


Fig. 2

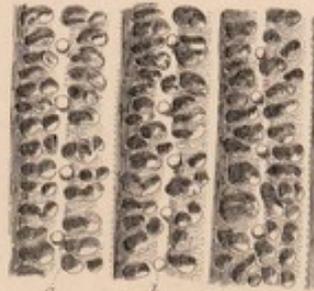


Fig. 6



Fig. 7

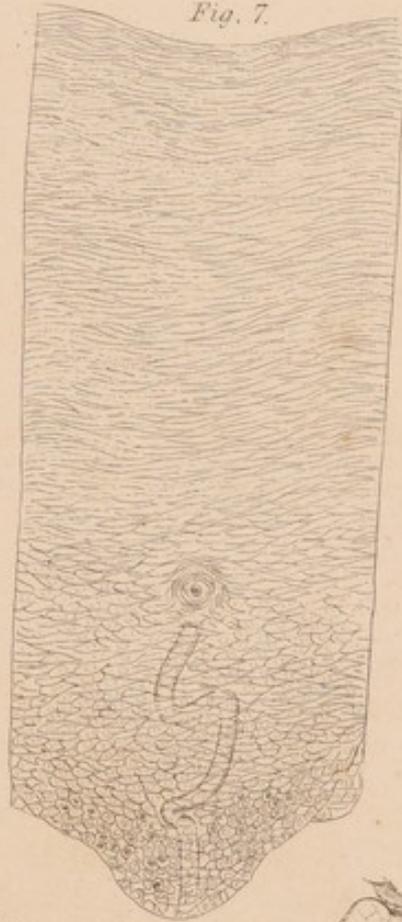


Fig. 8



Fig. 6

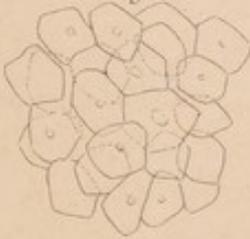
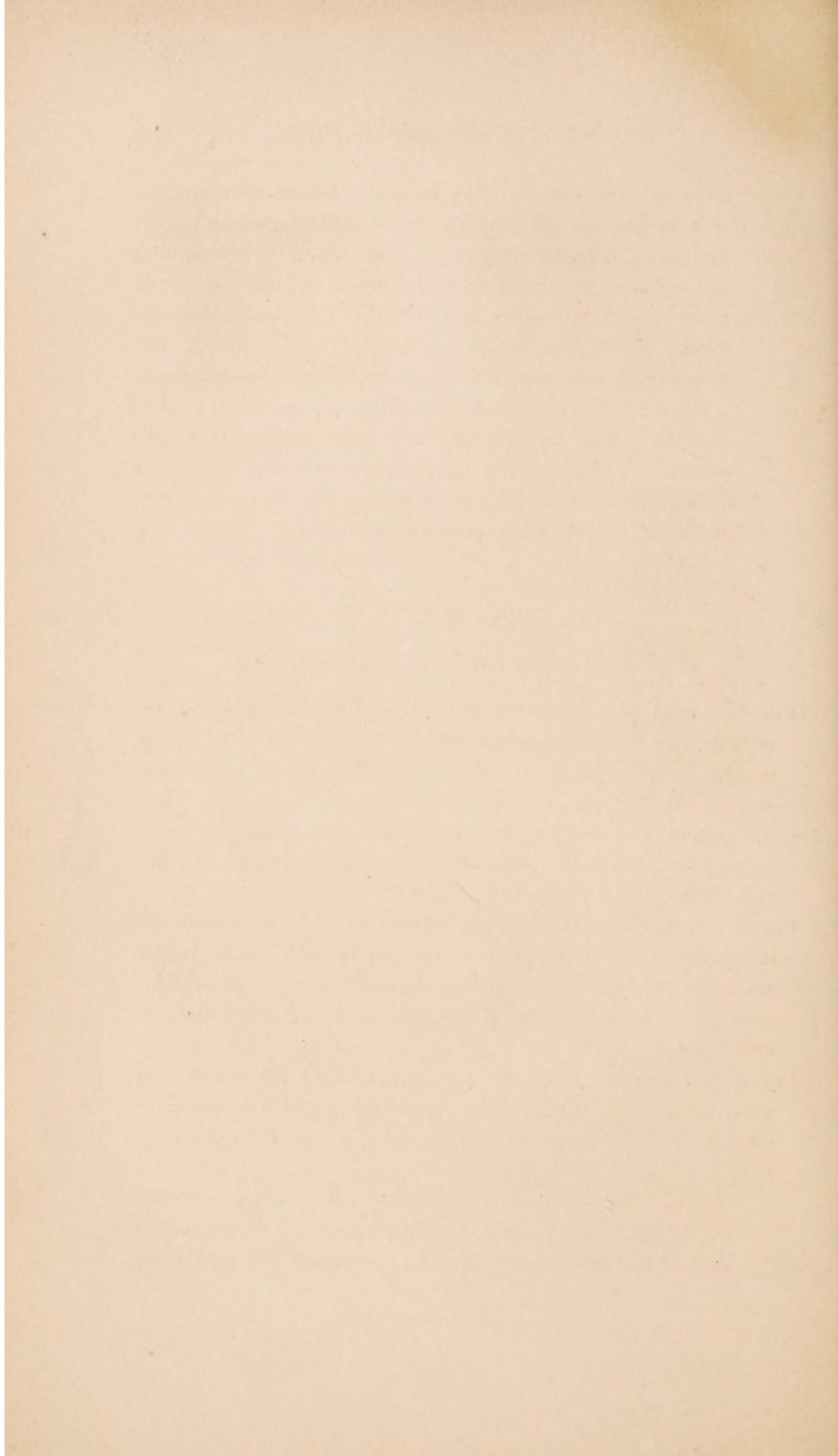


Fig. 3



Fig. 7





made up of the four preceding elements, and has the appearance of a smooth but irregular mosaic. *e.* Cells measuring $\frac{1}{2000}$ of an inch. *f.* Cells measuring $\frac{1}{1500}$ of an inch. *g.* Cells measuring $\frac{1}{1200}$ of an inch. In all the figures from *d* to *g*, the cell is composed of a granular centre or nucleus, and of a number of newly-formed young cells, which are arranged around it. *h.* Two fully-formed cells, measuring $\frac{1}{800}$ of an inch in longest diameter, and converted into flattened scales. These scales have resulted from the growth of the granules and young cells of *g*, so that the perfect cell contains cells of secondary formation, and within some of the latter smaller cells of tertiary formation; the perfect cell being, in technical language, a "parent cell."

PLATE 2.

ANATOMY OF THE SENSITIVE SKIN AND NAIL.

FIG. 1. A small portion of sensitive skin, comprehending two ridges, from the palm of the hand, magnified thirty-eight times. Each ridge is composed of two rows of clusters, and each cluster of a number of papillæ. Between the rows of papillæ, at short distances, are seen the openings of a perspiratory tube. *a.* One of the ridges. It is this arrangement of papillæ which causes the appearances of the scarf-skin, shown in figs. 1 and 2, plate 1.

FIG. 2. A portion of sensitive skin from the back of the hand, magnified thirty-eight times. The papillæ are seen, singly and in small clusters, scattered irregularly over the surface. The scarf-skin, modelled upon such a surface as this, would have the appearance represented in figs. 3, 4, and 5, plate 1.

FIG. 3. A section of the skin of the palm of the hand, the section being made through the middle of one of the ridges, and not across the ridges, as in plate 1, fig. 1, *a.* The figure is magnified thirty-eight times.

a. The scarf skin, showing its laminated texture, and four spirally twisted perspiratory tubes which traverse it. *b.* The papillary layer of the sensitive or true skin; three clusters of papillæ are

seen. *c, d.* The corium of the true skin: in its upper part, namely, at *c*, being close and dense in texture; and in its deeper part, as at *d*, composed of strands of fibres of considerable size. *e, e.* Little cushions of fat, which occupy the interstices of the strands of fibres in the deep part of the corium. The fat, or rather oil, of the body is contained in little globular bags or vesicles, packed together in considerable numbers, as is shown in the figure. *f.* The network of capillary vessels lying at the base of the papillæ, and supplying the latter with blood, by means of capillary loops, of which several are seen in the figure. *g.* One of the supply-pipes, or vessels, termed arteries, which convey the blood to the capillary network; two others of the same kind are seen in the figure. *h.* Two perspiratory glands, with their twisted tubes. Several other glands and tubes are seen in the figure.

FIG. 4. A portion of the sensitive skin forming the bed of the nail, magnified nineteen times. In this situation the sensitive skin is disposed in longitudinal folds.

FIG. 5. One of the longitudinal folds of the bed of the nail, magnified 38 times. *a.* The depth of the plait, in which the capillary vessels are distributed in the form of loops. *b.* The horizontal network from which the capillary loops spring. *c, c.* Supply vessels of the horizontal network.

FIG. 6. Vertical section of a portion of finger nail, made transversely to the longitudinal folds, magnified 19 times. *a.* The nail, which is seen to be laminated in texture, is prolonged by a number of thin plates into the substance of the sensitive skin. *b.* The portions of sensitive skin included between the horny plates of the nail are the longitudinal folds of fig. 4.

PLATE 3.

ANATOMY OF THE OIL-TUBES AND GLANDS.

FIG. 1. An oil-tube and gland from the scalp. The tube is slightly twisted; *a*, is the gland. All the figures from 1 to 11 are magnified 38 times.

Fig. 1.

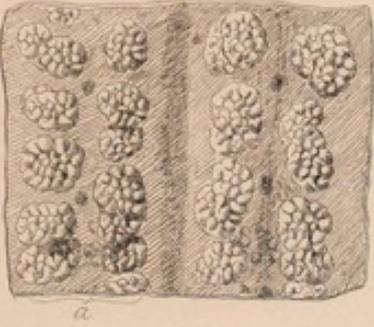


Fig. 2.

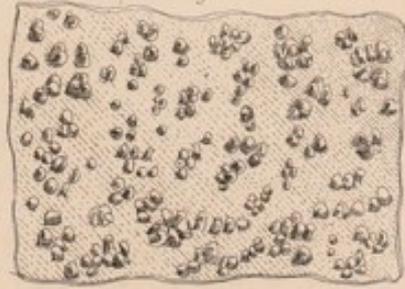


Fig. 3.

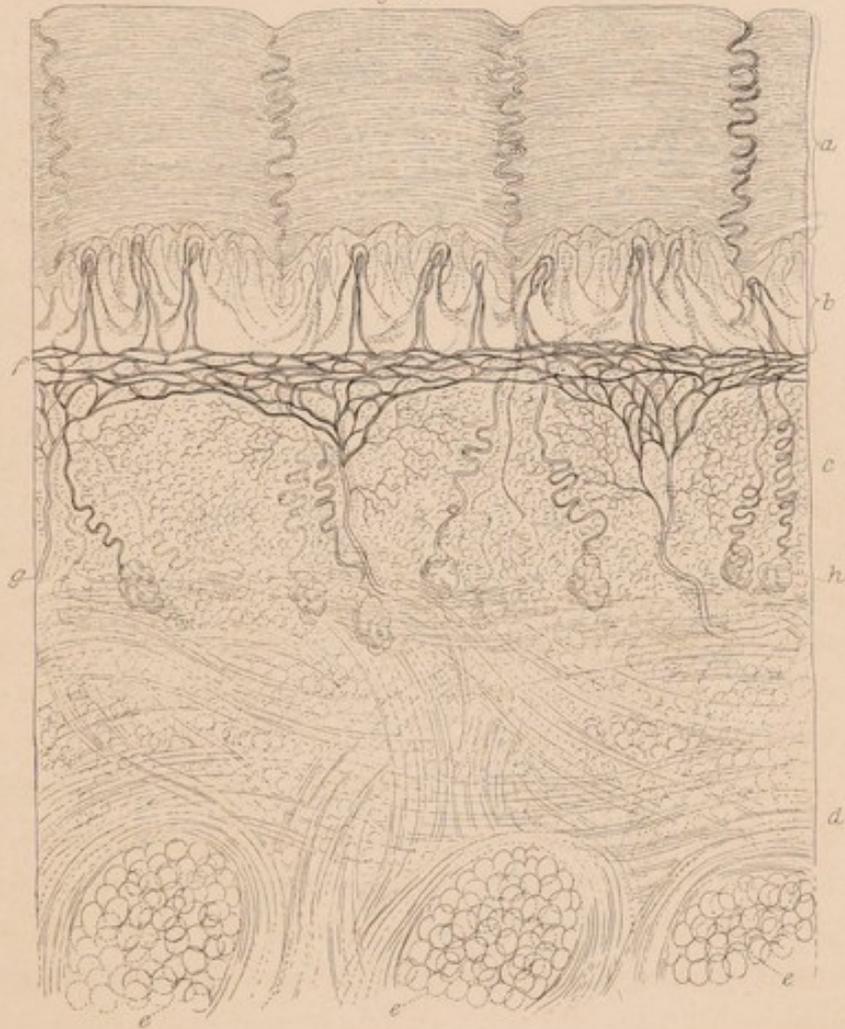


Fig. 4.

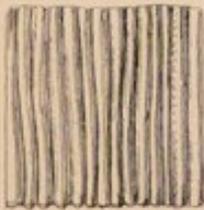


Fig. 5.

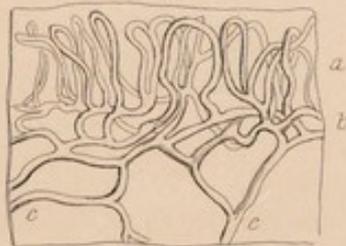
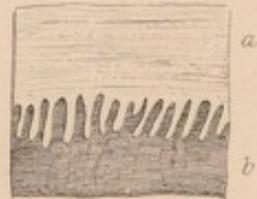
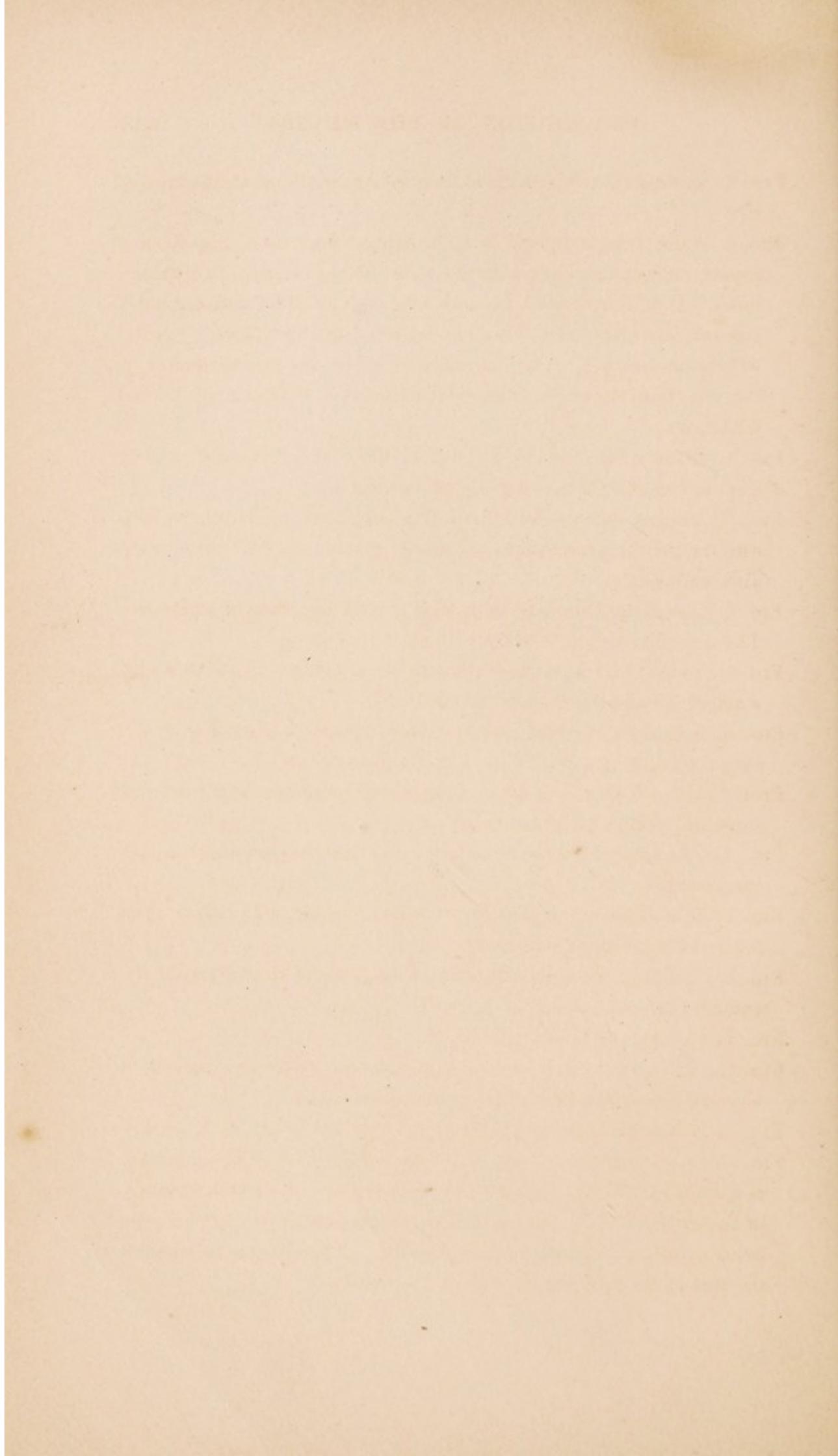


Fig. 6.





- FIG. 2. Another oil-tube and gland from the scalp; showing difference of size.
- FIG. 3. An oil tube and gland from the skin of the nose. The gland is double, and communicates with the main tube by means of two smaller tubes. If it be imagined that the tube *a, b*, is filled with concreted oily substance, the form, size, and situation of the so-called "grub," will be understood. The extremity at *a* will become blackened by the dirt floating in the atmosphere, the rest retaining its natural whiteness.
- FIG. 4. Another oil-tube and gland from the nose. The tube exhibits a spiral twist like that of a perspiratory tube.
- FIG. 5. Another oil-tube and gland from the nose. The tube is filled with the peculiar animalcules of the oily substance; their heads being directed inwards.
- FIG. 6. One of the fine hairs, with its appended oil-glands, from the ear. The hair-tube and oil-tube are seen to be combined.
- FIG. 7. A small hair from the scalp, with its oil-glands. The latter form a cluster around the shaft of the hair-tube.
- FIG. 8. A hair with its tube, and appended oil-tube and gland from the ear-passage.
- FIGS. 9, 10. Oil-glands of more complicated structure from the same situation; connected with hair-tubes.
- FIG. 11. An oil-gland and tube of larger size than the preceding from the ear-passage.
- FIG. 12. An oil-gland from the lower eyelid; magnified 19 times. The lobulated structure is well shown.
- FIG. 13. A full grown specimen of the animalcule of the oil-glands, the entozoon folliculorum.
- FIG. 14. An egg of the same animal.
- FIG. 15. The form assumed by the egg, previously to the development of legs and other characters of the perfect animal.
- FIG. 16. A young specimen undergoing the process of casting its skin.
- FIG. 17. A small portion of the scarf-skin sheath of a perspiratory tube, magnified 310 times. It is seen to be composed of a regular mosaic of nucleated cells, the hexagonal and pentagonal forms of the cells being occasioned by their mutual pressure. The relative thickness of the area of the tube and its walls is also indicated.

FIG. 18. A group of downy hairs, from the compacted oily substance of an oil-tube; they are magnified 19 times. The peculiar shape of these little hairs is shown in the figure; they are rounded at the ends, and very little smaller in this situation than in the shaft. Their *worn-out-paint-brush-like* roots are also seen.

PLATE 4.

ANATOMY OF THE HAIR.

FIG. 1. A small portion of the shaft of a human hair, magnified 310 times. The waving lines caused by the free edges of the overlapping scales are seen, as are their projection along the edge of the hair. The reason of a hair feeling rough when pulled, from point to root, between the fingers, will be perceived at once, on examining this figure.

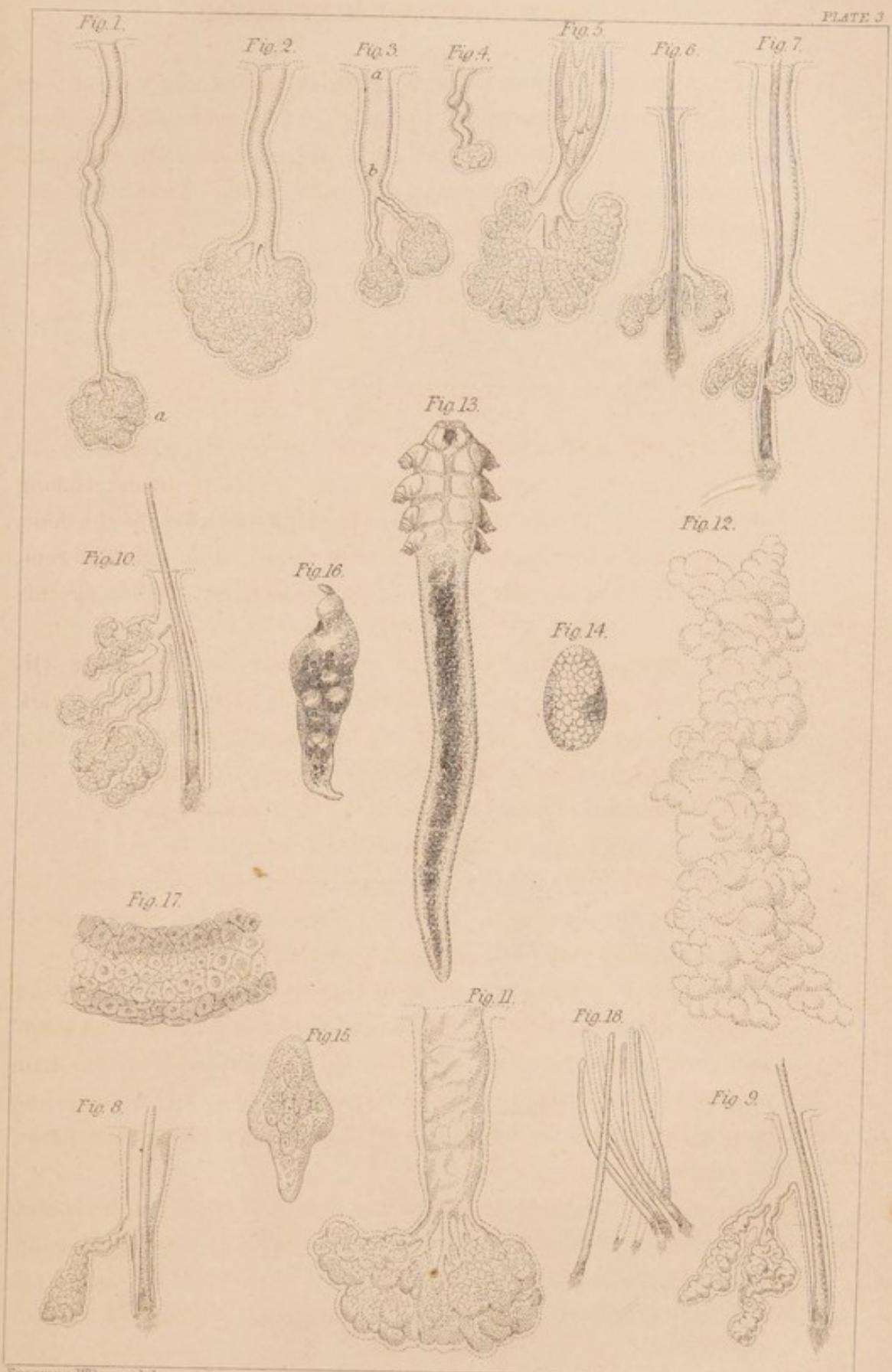
FIG. 2. A small portion of the shaft of a human hair, magnified 310 times, showing the appearance of the fibrous structure. The dark streaks are the seat of colour of the hair, and in proportion to their number the hair is lighter or darker in its degree of shade.

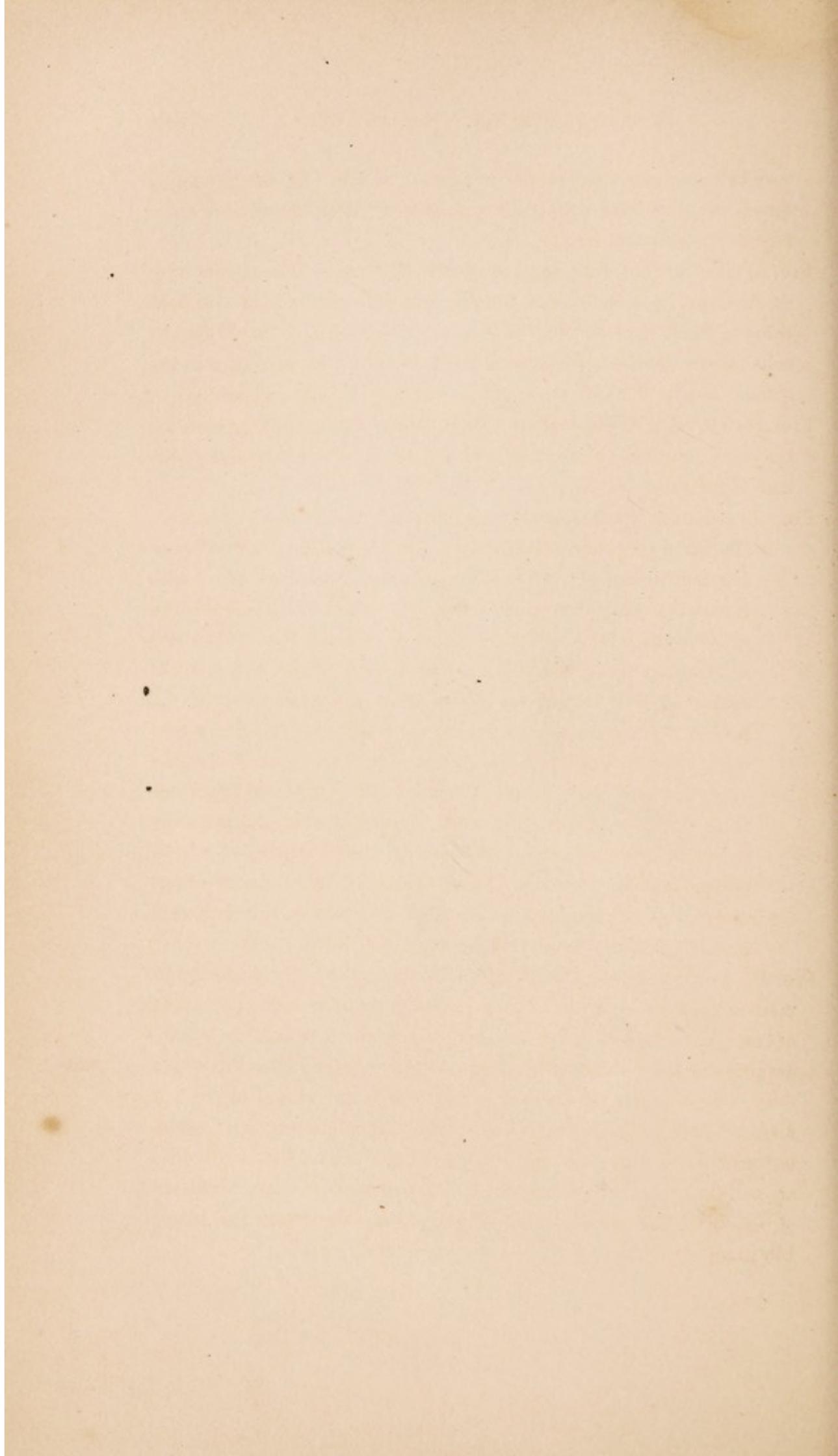
FIG. 3. Horizontal sections of hair from the beard, magnified 155 times. In this figure the oval shape of the shaft of the hair is seen, as well as the three portions of a hair—namely, its central pith; the fibrous part surrounding the pith, and constituting the chief bulk of the hair; and its outer transparent thin layer.

FIG. 4. A hair from the scalp, showing its position in the hair-tube and its mode of implantation at the bottom of the latter. *a.* The scarf-skin sheaf of the hair-tube. *b.* The bulb of the hair. *c.* The hair pulp, composed of cells in process of transformation. *d.* A tissue enclosing the nutrient vessels and nerves of the hair-pulp. The figure is magnified 38 times.

FIG. 5. A small fragment of the fibrous structure of a hair magnified 310 times. It is seen to be composed of elliptical cells, each possessing a central nucleus. The nucleus is the seat of colour of the hair.

FIG. 6. A fragment of the pith of a swan's feather, showing its composition of globular cells, very little altered in shape by contact. This





may be regarded as the primitive form of a cell. In the preceding figure, the cells have undergone a process of lengthening in order to receive the elliptical form.

FIG. 7. Hair of the fallow deer; magnified 38 times. The middle layer of this hair, instead of being fibrous, that is, composed of elongated cells, as fig. 2, is made up of polygonal cells; which are simple globular cells pressed into an angular form by contact, like the cells of a honey comb. These hairs are consequently excessively light and brittle.

FIG. 8. A portion of the shaft of a very small pheasant-feather; showing the exact similitude between its pith and the cellulated structure of the hair of the deer.

FIG. 9. Branchlets from a small pheasant-feather magnified 310 times.

a. Part of a short branchlet from near the shaft of the feather, showing its composition of a series of oblong, flattened cells, with nuclei. *b.* One of the downy branchlets from near the quill; the cells in this figure are longer and more slender than in the preceding, and there is a tendency to division at the upper end of each. *c.* One of the branchlets from the upper end of the feather. It is composed of a series of oblong cells with nuclei like *a*, but the cells are more elongated, and are divided at the upper end into two little spurs. When it is recollected that these three modifications occur in a single small feather, modifications it will be perceived of the same essential parts, the mind will be prepared for modifications of a similar kind in the hairy coverings of different animals, and will be able also to trace through such modifications the identity of the original element, a *cell*.

FIG. 10. Portions of two hairs from the common hare. *a.* A small hair consisting of a single row of cells enclosed by a transparent envelope of scales. At its upper part this hair is beginning to enlarge in consequence of the division of the single cells into pairs. Further still, a third series of cells (not shown in figure) was introduced with a still further increase of bulk of the hair. This structure forms a transition to *b* one of the large hairs, in which a number of series of simple cells are collected together and enclosed in a transparent envelope composed of scales. The smaller hair is magnified 310 times, the larger 155 times.

FIG. 11. Hairs of the mouse magnified 310 times. Figure *a* represents the hair near its root. *b*. Is taken from a portion of hair further onwards in the shaft where it has become thicker and is still enlarging. The structure, it will be observed, is essentially the same as fig. 10, a series of cells separated by interspaces, and enclosed in an envelope of scales, the latter being somewhat more strongly marked. The enlargement of the hair occurs in consequence of the multiplication of the rows of cells as is seen in the upper part of the figure. Moreover, the cells in the hair of the mouse contain the black pigment which gives the grey colour to the little animal.

FIG. 12. The hair of the Indian bat magnified 310 times. This hair is remarkable for the curious modification of its external scales. *a*. Is one of these hairs near its root; at its lower part the peculiarity in the scales is lost, and bears a resemblance to the structure of *a*, fig. 9, while above, it reminds us of *b* and *c*, fig. 9. *b*. A portion of the same hair higher in the shaft. *c*. A portion from the hair at a still higher point. *d*. One of the separate scales; two of these complete the circle around the shaft. Near the upper part of *a* one of the scales is broken away.

FIG. 13. Two fibres of linen magnified 155 times.

FIG. 14. Two fibres of silk magnified 155 times.

FIG. 15. A fibre of cotton magnified 155 times.

FIG. 16. A fibre of wool magnified 310 times. This fibre is, obviously, a hair, and has its characteristic scaly surface. The specimen selected is Berlin wool.

PLATE 5.

THE ACARUS SCABIEI, OR ITCH ANIMALCULE.

FIG. 1. The animalcule 107 times magnified, and viewed upon its under surface.

FIG. 2. The same animalcule, viewed upon its upper or dorsal surface.

FIG. 3. One of the fore-feet of the animalcule magnified 456 times, and viewed upon its plantar aspect.

FIG. 4. Two of the ova of the animalcule magnified 38 times.

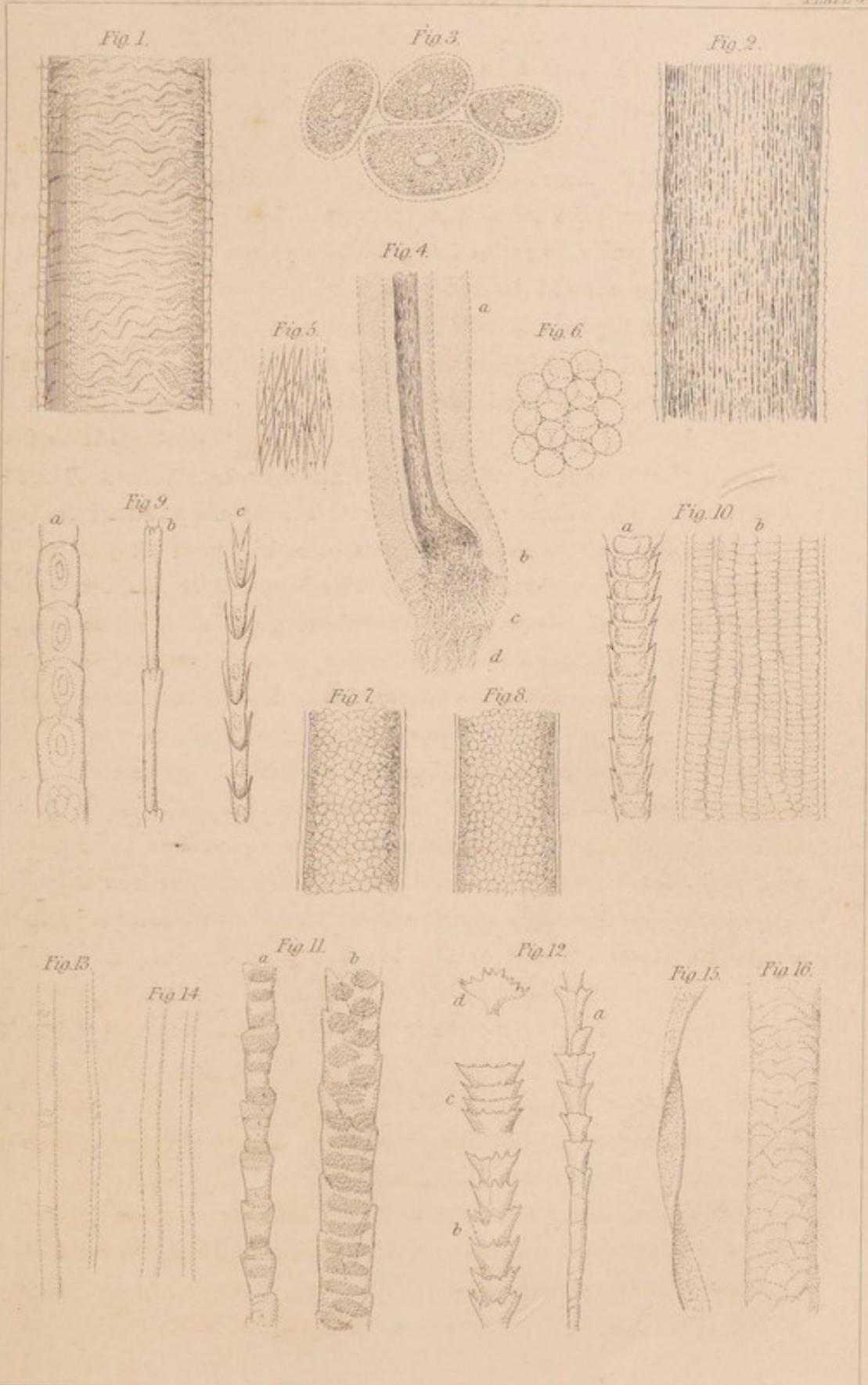


Fig. 1.

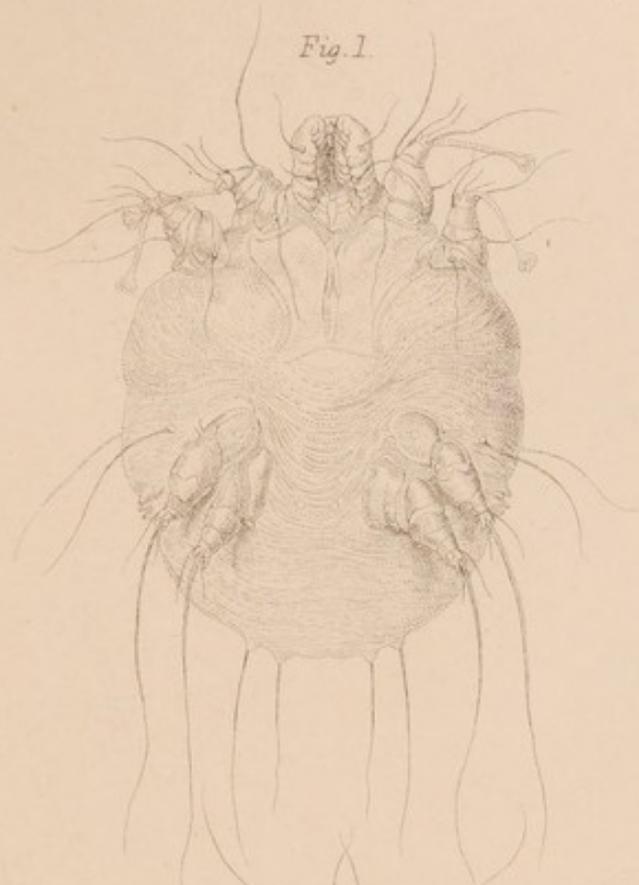


Fig. 4.



Fig. 3.



Fig. 2.



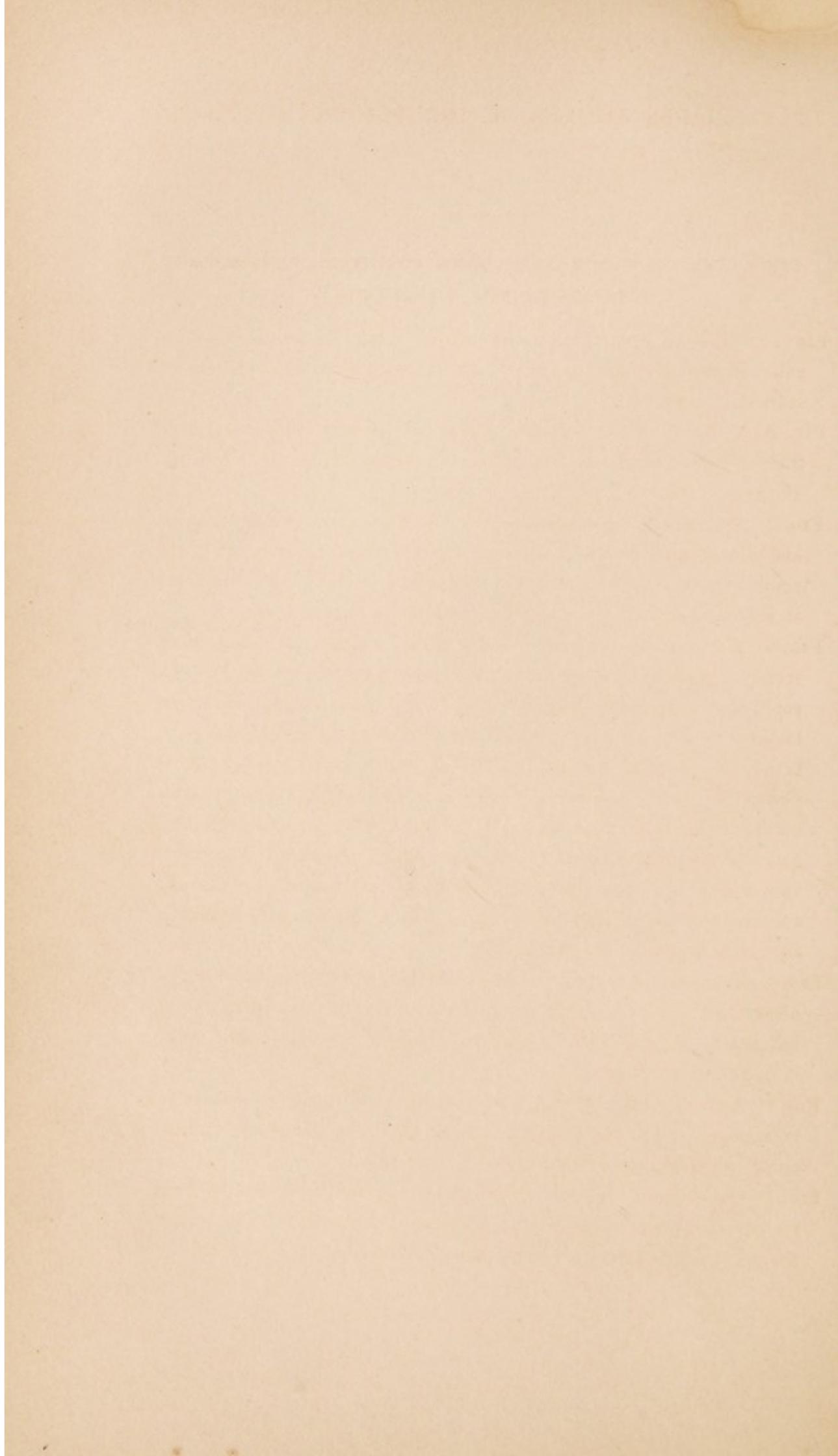


PLATE 6.

STRUCTURE OF WARTS AND CORNS, TOGETHER WITH SOME
DISEASES OF THE OIL-GLANDS.

FIG. 1. Section of a wart, from the arm-pit, magnified 19 times. The enlarged papillæ of the sensitive skin, enclosed in conical sheaths of scarf-skin, are seen.

FIG. 2. A cluster of the enlarged papillæ of the wart, withdrawn from their sheaths of scarf-skin. This figure is magnified, like the preceding, 19 times.

FIG. 3. A portion of the scarf-skin covering of a wart magnified 38 times, and viewed upon its under surface. In this view, the openings of the conical sheaths of the papillæ are seen, and a circle of cells containing an increased proportion of pigment, around the base of each.

FIG. 4. The structure of a corn, illustrated by means of a diagram in section. *a, b, b*. The sensitive skin surmounted by its papillæ, the papillæ at *a* corresponding with the central part of the corn, being larger than at *b, b*. *c*. The scarf-skin of the central part of the corn, being the sheaths of the large papillæ, *a*. This is the part, popularly termed the root of the corn. The sheaths are of precisely the same nature as those of the wart, fig. 1. *d, d*. The thickened scarf-skin, covering the smaller papillæ of the declivity of the corn. The scarf-skin is seen to be laminated, and the broad dark streak, *e*, is the discoloured remains of a stratum of blood, poured out when the matter of the streak rested on the papillæ.

FIG. 5. A spine taken from a boy suffering under the "porcupine disease;" the whole body was covered with spines of this kind, standing out, nearly perpendicularly, from the surface of the skin. The spine is magnified 19 times.

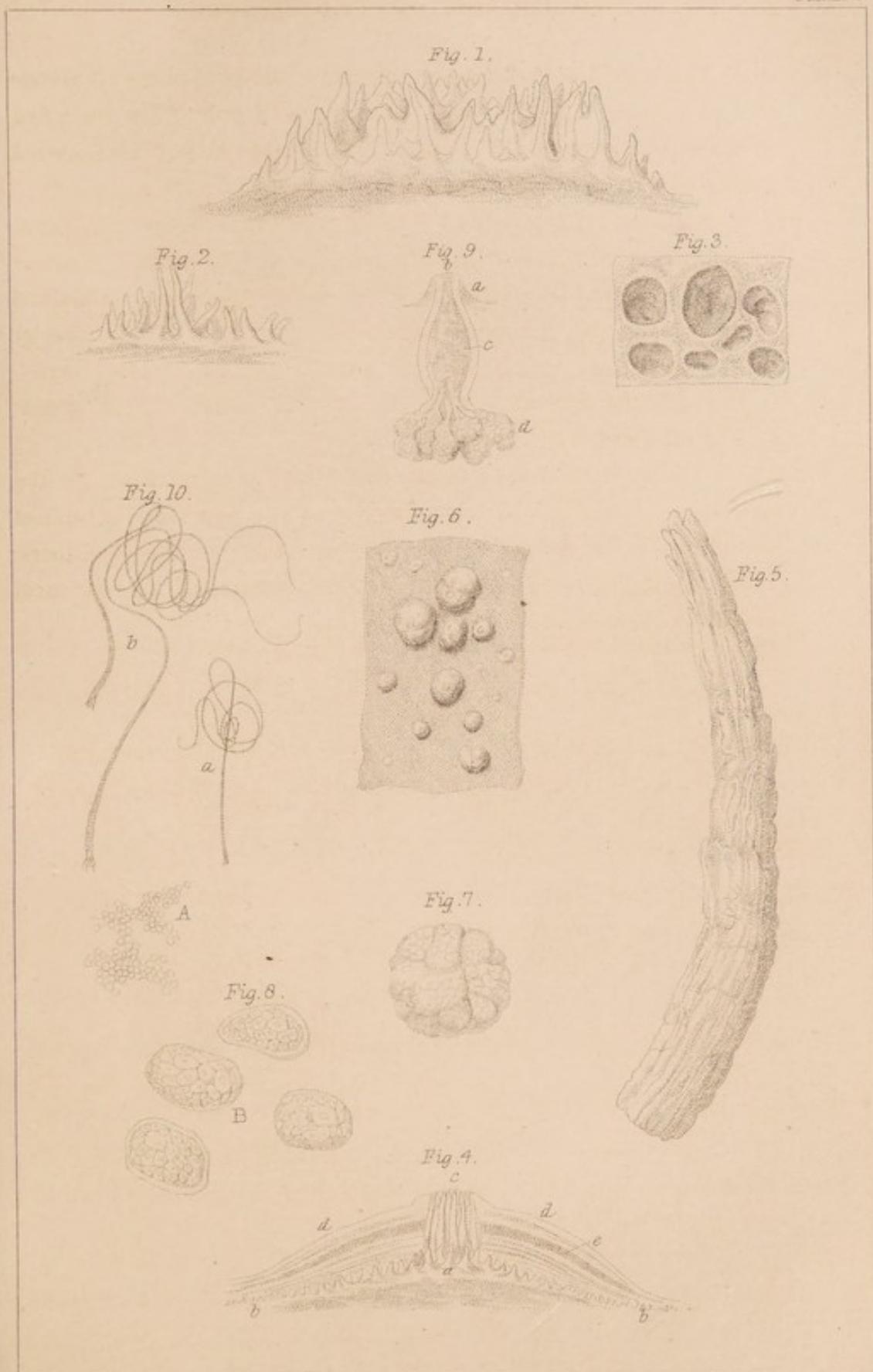
FIG. 6. A small portion of skin, affected with small tumours, caused by enlargement of the oil-glands. This is the disease termed "molluscum." The tumours are drawn to the size of nature.

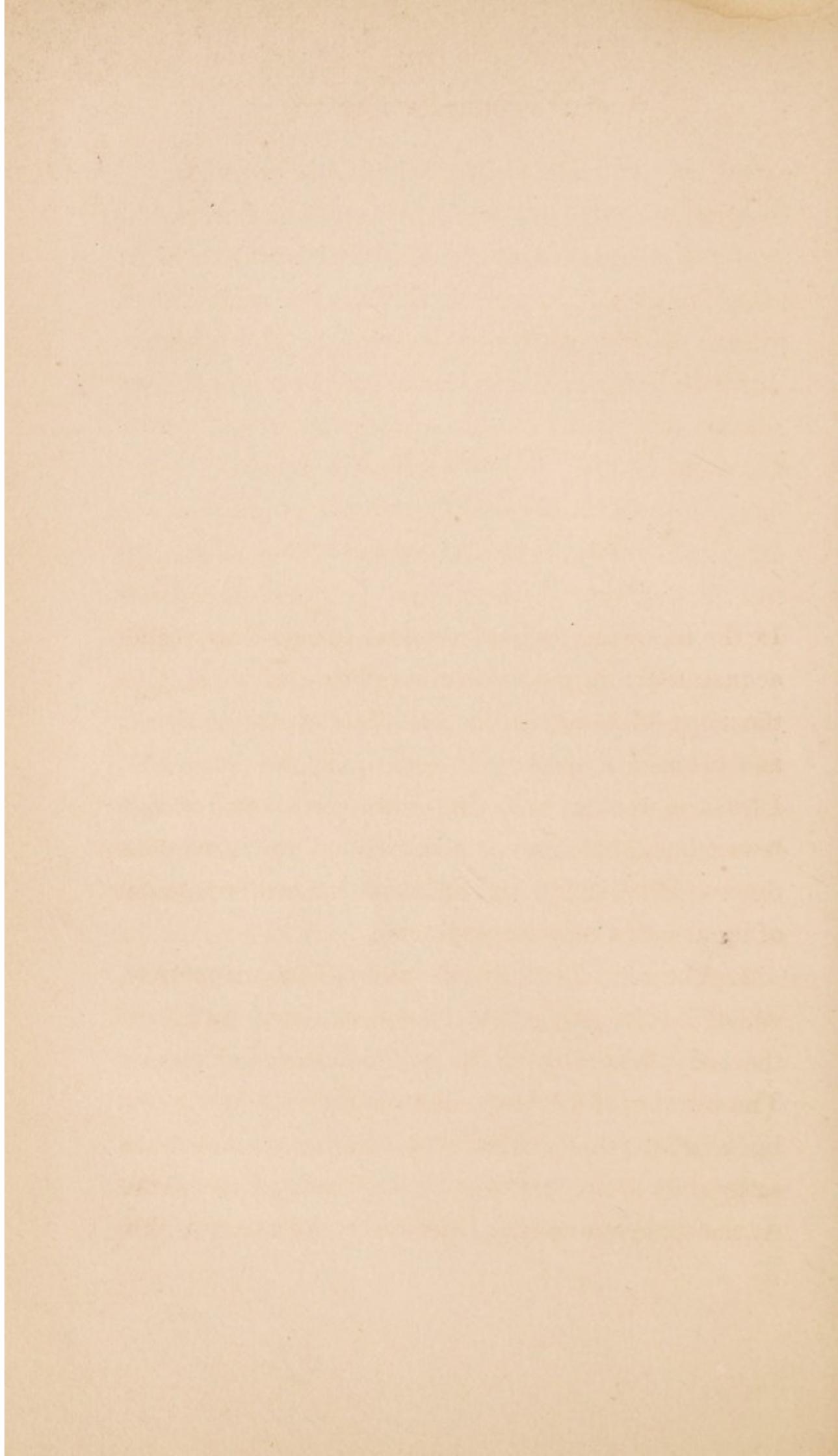
FIG. 7. One of the enlarged oil-glands of the above disease removed from its envelope of skin, in order to show the lobulated conformation of the gland. The figure is several times magnified.

FIG. 8. The altered cells of the oily substance contained in the oil-glands affected with the above disease. The group of cells, A, is magnified 38 times; the group, B, 310 times. The average size of these altered cells is $\frac{1}{850}$ of an inch in diameter.

FIG. 9. Section of the pimple of "acné," with its associated oil-gland, several times magnified. *a.* The conical pimple termed "acné." *b.* The aperture of the oil-tube. When the oily substance contained within the oil-tube becomes blackened at the mouth of the tube by contact with the atmosphere, the case is one of "spotted acné." *c.* The oil tube distended with the oily substance of the gland. *d.* The oil-gland.

FIG. 10. Hairs which have become coiled into a spiral form, by the occurrence of impediment at the aperture of the hair tube; magnified 19 times. *a.* Represents a single hair; at *b*, there are two such hairs. The shaft of the hair is straight up to the aperture of the hair-tube, where the coil commences.





CHAPTER I.

ON THE SCARF-SKIN.

IN the following pages, I propose to make my reader acquainted with the structure and uses of the skin, in the hope of awaking his attention to the necessity and manner of training it to the purposes of health. I trust, moreover, by laying down correct and simple laws, to enable him to comprehend the principles upon which a sound and effective domestic treatment of its diseases may be conducted.

1. The skin is the soft and pliant membrane, which invests the whole of the external surface of the body, following all its prominences and curves. The interior of the body, like the exterior, is covered by a skin, which, from the constantly moistened state of its surface, is denominated *mucous membrane*. At the various orifices of the body, the exterior skin

is continuous with the internal skin, or mucous membrane, and in these situations, from the similarity of their structure, it is difficult to distinguish between them. The difficulty is increased by the circumstance, that when a portion of skin is made to occupy an internal position, it assumes the humid character of mucous membrane; and when a portion of the latter becomes external, it loses its moisture by evaporation, and then takes on the ordinary appearance of skin. This reciprocal metamorphosis of the two great investing membranes, or rather, the two divisions of the one great investing membrane of the body, is occasionally seen in domestic life, and is therefore alluded to in this place. It is dependent, obviously, on the analogy of structure subsisting between the two parts of the same membrane. To illustrate the transition of these membranes into each other, I may refer to the eyelids, on the thin margin of which the skin becomes mucous membrane; the former covering the outside of the lid, the latter the inside of the lid and front of the eyeball. The red surface of the lips is an illustration of a mucous membrane which has become dry by exposure to the atmosphere, its junction with the skin taking place at the abrupt line where the red joins the lighter tinted covering of the face. The entrance-tube of

the ear is a cul-de-sac of about an inch in length, and lined by mucous membrane. This circumstance explains the discharges of matter from the ear which not unfrequently take place in children ; for it is the ordinary character of mucous membrane, when in a state of inflammation, to send forth a discharge, but not so the external skin.

2. An important medical law is founded on the continuity and similarity of structure of the investing and lining membrane of the body. This law resolves itself into three expressions,—namely, *that disease affecting a part of a membrane is liable to spread to the whole* ; secondly, *that disease of the mucous membrane may spread to the skin, and vice versâ* ; and thirdly, *that disease of a part of a mucous membrane may become translated to a distant part of the skin, and vice versâ*. As illustrations of a popular kind of these three positions, I may adduce, in evidence of the first, the spreading nature of St. Anthony's fire, or erysipelas ; of the second, the itching of the nose and lips in children, from irritation in the alimentary canal caused by the presence of worms ; or the eruption around the lips which follows slight attacks of cold or feverishness. The third position explains the coincidence of dyspepsia and other internal disorders with cutaneous rashes and eruptions.

3. It must have been observed by every one, that the skin is composed of two layers; for these we see separated from each other by the action of a common blister. One of these layers, namely, that which is raised by the fluid of a blister, is the *scarf-skin*, or epidermis (plate 1), while that which retains its connexion with the substance of the body is the *sensitive skin*, or dermis (plate 2). These layers perform very different offices in the animal economy, and are widely different from each other in structure. The scarf-skin is horny and insensible, and is a sheath of protection to the highly sensitive skin situated beneath it. The latter feels; but the former dulls the impression which occasions feeling, and in some situations is so dense and thick as to exclude ordinary impressions entirely. Of this we see an example at the ends of the fingers, where the hard and dense nail is the scarf-skin modified for the purpose referred to. It is the scarf-skin which the needlewoman pierces in the operation of sewing on the finger; it is the scarf-skin which the cutler shaves in order to test the sharpness of his blade.

4. Having established a distinction between the scarf-skin and the sensitive skin, I will now proceed to examine the structure of the former, and the mode of its production and growth.

The scarf-skin is originally a transparent fluid exuded by the blood-vessels, and distributed as a thin layer on the surface of the sensitive skin. By a process somewhat analogous to crystallization, the solid elements of this fluid are congregated into innumerable, minute, roundish granules; each granule being an independent organism endowed with life, and possessing within itself the powers of growth and subdivision (plate 1, fig. 8, *a*). As soon as they are fairly formed, the little granules collect together, by a kind of vital affinity, into little masses (*b c*), and the latter seem to acquire, by their concentration, an increase in the attributes of life; they imbibe the fluid residuum of the transparent part of the blood which continues to be poured out through the cutaneous vessels for their nourishment, they increase in bulk in consequence of such imbibition and its attendant assimilation, and they become separated from neighbouring masses by the development around them of a thin and transparent investing membrane; they are, in fact, converted into *cells* (*c*). If we examine the under surface of the scarf-skin when freshly separated from the sensitive skin, the different kinds of particles here described, namely, the elementary granules, the little aggregated masses and the newly-constructed cells may all be

seen forming a beautiful mosaic, the cells being the largest and taking the principal place, and the simple and composite granules occupying the intervening spaces.

But the mosaic layer is no sooner complete, than the operations for a new layer of the same kind are already in progress, and are gradually raising it from its bed and pushing it upwards to the surface. The cells, at the same time, are increasing rapidly in size (*efg*), extending their borders so as to overlap each other on all sides, and quickly attaining the dimensions of the perfect cell—namely, $\frac{1}{600}$ of an inch in diameter (*h*). Now, this rapid and remarkable growth is effected by a series of changes within the cell analogous to those by which the cell is originally formed; thus, new granules are produced, they collect together in little masses, and, after a while, a cell-membrane is developed around the latter, so that when the original cell is fully formed, it is, in physiological language, a *parent cell*, containing in its interior secondary cells, granules and granular masses. These changes, constituting the growth of the cells, occur quite in the deepest strata of the scarf-skin (fig. 7), and as by degrees the deep layers are gradually pushed upwards towards the surface, the cells lose by evaporation their fluid con-

tents, and are converted into dry, flattened scales (fig. 6). The chief part of the thickness of the scarf-skin is composed of these flattened scales, which are closely matted together, and form a dense and laminated texture, adapted, on the one hand, to yield freely to every movement of the body, and, on the other, to resist the influence of chemical and mechanical agents in causing injury to the sensitive skin beneath.

The scarf-skin is therefore undergoing a constant process of formation and growth at its under part, to compensate for the wear which is taking place as continually on its surface. An uniform thickness of the scarf-skin is in this manner preserved, the faculty of sensation and touch are properly regulated, the place of the little scales, which are continually falling under the conjoined influence of friction and ablution, is supplied, and an action necessary, not merely to the health of the skin, but to that of the entire body, is established.

5. The minute scales above referred to must be distinguished from those which are cast off under the influence of irritation of the skin. The latter exfoliate in little flakes like scales of bran, and after some fevers, as, for example, scarlet fever, laminae of scarf-skin of considerable extent peel off. There is

one situation in which the scales always assume the appearance of little flakes, namely, the scalp, where they become entangled with the hair, and give rise to the appearance called "scurf." This observation will show how futile any attempt must be, which shall have for its object to prevent the formation of the scurf. It may be removed, and should be removed every day with the hair-brush; but prevention is impossible, inasmuch as it is opposed to a law of nature. Occasionally, as a morbid action, an unusual quantity of scurf is produced, in which case medical means may be adopted to bring the scalp into a more healthful state.

6. When examined chemically, the scarf-skin is found to be composed of a substance analogous to dried white of egg, in a word, albumen. Now, albumen is soluble in the alkalies, and these are the agents which are commonly employed for purifying the skin. Soap, whatever its specific name, is a compound of the alkali soda, with oil, the former being in excess. When used for washing, the excess of alkali combines with the oily fluid with which the skin is naturally bedewed, removes it in the form of an emulsion, and with it a portion of the dirt. Another portion of the alkali softens and dissolves the superficial stratum of the scarf-skin, and, when

this is rubbed off, the rest of the dirt disappears. So that every washing of the skin with soap removes the old face of the scarf-skin and leaves a new one; and were the process repeated to excess, the latter would become so much attenuated as to render the body sensible to a touch too slight to be felt through its ordinary thickness. On the other hand, where the scarf-skin and the dirt are rarely disturbed by soap, the sensibilities of the skin are necessarily benumbed.

7. The proper inference to be drawn from the preceding remarks is in favour of soap as a detergent for the skin. On the faces of some women, soap acts as an irritant, and patches of red are left after its use. These are exceptional cases, and are generally attributed to an unusually delicate and susceptible skin; but the truth is, that the skin is less in fault than the habits or health of the individual. The former are faulty, where soap is not regularly employed, or where the water used in washing is too warm, and exposes the skin, as in the winter season, to a violent alternation of temperature; the latter supports a charge of too little exercise in the air, late nights, and over-indulgence. Other means than soap for the purification of the skin are highly objectionable, such as the various wash-powders;

they are sluttish expedients, half doing their work, and leaving all the corners unswept. Another and a weightier objection obtains against them: from having no power to remove the superficial laminæ of the scarf-skin, these become stained, and then the skin has the appearance of being mottled, with irregular brown or olive-coloured spots. The remedy for these spots is lemon-juice, an agent of great utility in removing stains from the skin, after the dirt has been completely washed away with soap.

8. The scarf-skin is interesting to us in another point of view, as being the seat of colour of the skin. The difference of hue between the blonde and the brunette, the European and the African, lies in the scarf-skin, in the deeper, and softer, and newly-formed layers of that structure. In the whitest skin, the cells of the scarf-skin and their contents are not perfectly colourless; they always contain more or less of a peculiar pigment, incorporated with the elementary granules which enter into their composition. In the white races the pigmentary tint is extremely slight, and less in the winter than in the summer season; in the darker races, on the contrary, it is deep and strongly marked. The various tints of colour exhibited by mankind are therefore referrible to the amount of colouring principle contained

within the elementary granules of the scarf-skin, and their consequent depth of hue. In the negro, the granules are more or less black; in the European of the south they are amber-coloured; and in the inhabitants of the north they are pale and almost colourless.

9. Colour of the skin has reference to energy in its action; thus, in the tropics, where light and heat are in excess, and the skin is stimulated by these agents to vigorous action, colour is abundant and intense; while in the frigid north, where both are wanting, the lungs, the liver, and the kidneys, relieve the skin of part of its duties. The same observation relates to summer and winter: under the enlivening warmth of the summer sun, with its flood of light, exposed parts of the fairest skin become brown—that is, their pigment-forming energy is increased. But the winter's scarf-skin is white and pigmentless, and restores the fair complexion when the summer's scarf is worn away. The law of colour, as relates to man, is therefore the same as that which sheds its influence over the vegetable world: the winter's flower and the first blossom of spring are cold and pigmentless, while the warm hues of the dahlia are borrowed from the bright sun of summer and early autumn. If these changes follow naturally alternations of

climate and alternations of temperature, we may easily conceive the influence of the scorching rays of the fire, the parching of the east, and the piercing of the north wind, in injuring the complexion. To be preserved in the beauty and freshness of youth, the skin must be protected against these noxious irritants; it must be veiled against causes of irritation acting from without, and guarded against stimulants, not less dangerous, working from within.

10. That state which we call "disease," and which may be defined a disturbance of healthy function, has its summer effects and its winter effects on the pigment of the skin—in other words, its periods of exalted, and its periods of diminished action. These effects are necessarily most conspicuous where extremes of colour are regarded—for example, the African is occasionally visited by a total cessation in the production of the cutaneous pigment on parts, and more rarely over the whole of his body. In the former case, he becomes a "pied negro;" in the latter, if I may use so paradoxical a term, a black Albino. In India the occurrence of the spotted skin is by no means uncommon, and it is met with more frequently than could be imagined in our own climate, and especially under the murky cloud of London. But with us the reverse of the picture is more usually seen;

freckles, coppery patches, liver-coloured patches, sulphur-coloured patches, and patches of the most grotesque form and colour, are far from being rare. Previously to confinement, ladies are sometimes visited by these unsightly spots, but they disappear when their strength returns, and their health resumes its natural standard. When we pass from the spring to the summer of life, there is a summer change in the colour of the skin. A brown patch will sometimes follow the healing of a blister, and I have observed, not unfrequently, dark spots produced under the irritation of gout and rheumatism. I ought not, in this place, to pass over the total abrogation of pigment which exists in the Albino, and leaves not only the skin, but other structures of his body, thoroughly bleached.

11. Having reviewed the scarf-skin in its various relations to formation, growth, renovation, and colour, and glanced at its most obvious function—namely, that of protecting the delicately-organized structure of the sensitive skin—I may now refer to the manner in which this latter purpose is effected. The scarf-skin being, in its first stages, soft, is adapted to the utmost unevenness of surface which the sensitive skin presents; every prominence of the latter has its particular sheath of soft scarf-skin, and the

scarf-skin, as a whole, is a perfect mould of the structure beneath it (plate 2, fig 3, *a*). We can, therefore, by looking at the scarf-skin, judge of the nature of the surface on which it rests, and can perceive, at once, how the little ridges on the palm of the hand (plate 1, figs. 1, 2) must be a model of the structure of the sensitive skin in that situation. It is this beautiful adaptation of the scarf to the sensitive skin that protects the latter from bruises and pressure, injuries which otherwise would be destructive of its integrity, and probably of its life.

12. If possible, a more beautiful adaptation is that existing between the nail and the surface of sensitive skin on which it rests (plate 2, fig. 6). The latter, in this situation, is formed into very delicate longitudinal folds, which stand up perpendicularly to the surface (fig. 4). The nail, upon its under surface, is fashioned into thin vertical plates, which are received between the folds of sensitive skin; and in this manner, the two kinds of laminæ reciprocally embracing each other, the firmness of connexion of the nail is maintained. If we look on the surface of the nail, we see an indication of this structure in the alternate red and white lines which are there observed; the former of these correspond with the sensitive laminæ, the latter with the horny plates,

and the ribbed appearance of the nail is due to the same circumstance. These sensitive laminæ are provided with an unusual number of capillary vessels (fig. 5) for the formation of the nail, and hence they give a red tint to that portion under which they lie. But, nearer the root of the nail, there is a part which is not laminated, but merely ridged longitudinally, and is less abundantly supplied with capillary vessels. This latter part consequently looks pale, as compared with the preceding, and from its half-moon shape is technically termed the *lunula*. Beyond the lunula, the root of the nail is embedded in a fold of the sensitive skin, and has the same relation to that structure that any single one of the thin horny plates of its under surface has to its corresponding pair of sensitive laminæ.

13. The mode of growth of the nail is peculiarly interesting. It must be apparent to every one that the nail is thicker at its free end than in the situation of the lunula, and, consequently, that it must grow in thickness as well as in length. The growth in thickness takes place by the addition to its under surface of an organizable fluid, which becomes converted into cells in the manner already described in the formation of the scarf-skin (§ 4). By this process the horny plates are gradually raised

out of their sheaths, and their original depth is maintained by fresh additions to their free edge. And, moreover, their entire surface, being in a state of progressive formation, is soft and impressible. Let us now turn to growth in length. This takes place by means of a similar process, occurring at the free edge of the root. Additions are made to this edge, and as the cells enlarge, they press the nail forwards, and the latter, being connected with the longitudinal laminae by a soft medium, offers no resistance to the onward growth. Thus we have growth in thickness and growth in length proceeding harmoniously.

14. But, what if we should wilfully oppose Nature in her harmonious course by wearing a shoe that is obviously too short for the foot, and which brings the edge of the nail against the leather? Why, in this case, Nature gives us warning, by means of her agent, *pain*, that such a proceeding is contrary to her laws. We stop our ears, and get accustomed to the pain, which, perhaps, is not severe, and soon goes off; the shoes get a scolding for their malice, and we forget all about it for a time. But does Nature check her course to suit the convenience of thoughtless man? No, no. In a short time we find that the nail, intercepted in its forward course, has become unusually thick and hard, and has

spread out so much upon the sides, that it is now growing into the flesh, and so makes a case for the doctor. Or perhaps, the continuance of pressure may have inflamed the sensitive skin at the root, and caused a sore and painful place there. And instances are by no means infrequent in which the power of production of the nail at the root becomes entirely abrogated, and then it grows in thickness only. When this is the case, it is quite remarkable what a mass the nail will become. I know an instance in which the nail is regularly shed; whenever the old one falls off, a new one being found beneath it. Sometimes, growth in length is not entirely checked, although growth in thickness is induced, and then we get some marvellous specimens of toe-nails. I have several in my possession; one being fully two inches in length.

15. When we reflect upon the delicate mode of formation of the nail, we shall not be surprised to learn that the process is occasionally disturbed, but rather wonder that disturbance does not more frequently occur. The nails, from their position, are continually getting knocks and thumps, particularly in children; and when this takes place, a momentary disturbance of cell-formation is the consequence, which is indicated by an opacity of the cells, pro-

duced under the influence of the impression left by the blow, and is marked by a white spot. In school-boys, it is no uncommon thing to find the nail spotted over with these white marks, which are moved onwards in its growth, and are eventually carried to its free border. To obviate the appearance of such spots, the hands must be taken care of, and the nails as little disturbed as possible. The care of the nails should be strictly limited to the use of the knife or scissors to their free border, and the ivory presser, to prevent the adhesion of the free margin of the scarf-skin to the surface of the lunula, and its growth forward with that part. This edge of scarf-skin *should never be pared*, the surface of the nail *never scraped*, or the nails cleaned with *any instrument whatever* saving the nail-brush. Soap and the nail-brush, with the occasional use of the knife or scissors to the free end, and the ivory presser to the scarf-skin at the root, are *golden rules for the care of the nails*, and will prevent all their irregularities and disorders.

CHAPTER II.

ON THE SENSITIVE SKIN.

16. THE sensitive skin or dermis—the true skin, as it is termed by anatomical writers—performs the dissimilar and, as it might at first sight appear, incompatible offices of an organ of exquisite sensation, and one of defence to the deeper parts of the body. The former of these functions is fulfilled by the superficial stratum of the dermis, which is constructed in a particular way for that purpose (plate 2, fig. 3, *b*); the latter is effected by the entire thickness of the true skin, but chiefly by its middle and deeper strata (*c, d*). In harmony with this distinction of the dermis into a sensitive and defensive portion is the division of it, made by anatomists, into a papillary layer (*b*) and corium (*c, d*). It is the dermis of animals, the scarf-skin and hair having

been removed, that, by a chemical process, is converted into leather. The smoothness of surface of leather, and the peculiar markings which it presents, are due to the papillary layer, while its thickness and strength are the qualities of the corium. Nature has contrived no other substance so beautifully, so perfectly fitted for the countless purposes of utility and elegance, which leather fulfils. But how infinitely more admirable is the living and breathing skin!

17. The defensive portion of the skin, or corium (plate 2, fig. 3), is constructed of excessively minute fibres, which are collected into small bundles, or strands, and these latter are interwoven with each other, so as to constitute a firm, strong, and flexible web. In the superficial part of the corium, the web is so close as to have the character of a porous felt; but more deeply, the pores become progressively larger, and, upon the deep surface, have a diameter somewhat less than a line, or twelfth part of an inch. The pores are round or oval in shape, and are separated from each other by strands of fibres of double their own diameter, which give to the under surface of the skin the appearance of a coarse net. The strands are connected with the fibrous web in which the subcutaneous fat of the body is deposited, and the open meshes are filled with little bags of fat (*e e*). The

mechanical arrangement which is here described is one which is calculated to excite our admiration. A membrane of inconsiderable thickness is so constructed as to offer different qualities, at different points of its depth, upon one surface, being a porous felt fitted to give an even support to the delicately-organized sensitive layer which is bedded upon it; and upon another, a coarse network, capable of adapting itself to distention in every direction, and of returning completely to its original form. That the distention and contraction of the membrane should meet with no check, the open meshes are filled, as we have seen, each with a soft and compressible little cushion of fat, and the entire skin is preserved from the violence of contusion by being pillowed on a soft and elastic medium, the subcutaneous fat of the body, which breaks the force of a blow, by yielding before it. The cricketer, unknowingly, relies on this contrivance, when he receives the flying ball on his outstretched hand; and we all test its importance in the power which we possess of supporting, for hours together, the whole weight of the body upon so delicate a structure as that of the sensitive layer of the skin of the sole of the foot.

18. Much more wonderful, however, is the vital constitution of this membrane. The fibres of which

the strands are composed are of four kinds: the greater part are white and inelastic, the elasticity of the membrane which they contribute to form being derived from their manner of distribution; some are yellow, highly elastic, but brittle; a third set are reddish, and, possessing both strength and elasticity, enjoy a contractile power above and apart from their other properties; while a fourth, without strength or elasticity, possess a faculty of independent motion. It is these two latter that produce the motions occasionally manifested by the skin—namely, that state which is denominated *goose-skin*, and the erection of the hairs under the influence of mental emotion or physical sensation.

19. The defensive layer of the dermis naturally varies in thickness on different parts of the body; for example, on the back of the trunk and on the outside of the limbs, where injuries are most likely to be received, the corium is thick; while on the front of the trunk, and particularly on the inner side of the limbs and in the flexures of joints, it is thin. This peculiarity is associated with the occurrence of certain eruptions in particular situations; some are met with only on the inner sides of the limbs, while others are never seen but in the opposite locality. Watery pimples and moist excoriations are found in

the former; while dry pimples and the scaly forms of cutaneous disease prefer the latter.

20. The sensitive layer of the skin (plate 2, fig. 3, *b*) is thin, soft, and uneven, pinkish in hue, and composed of vessels which confer its various tints of red; and nerves, which give it the faculty of sensation. Its unevenness has reference to an important law in animal organization—namely, that of multiplying surface for the increase of function; and the manner of effecting this object is by the extension of its substance into little, elongated, conical prominences, technically termed *papillæ*. These *papillæ* are microscopic in size, as may be inferred from their being imperceptible to the naked eye; and as they exist, in various degrees of magnitude, on every part of the skin, their number is infinite. In structure, every papilla is composed of a minute vessel (termed *capillary*, from its hair-like size) and a minute nerve. In the smaller *papillæ*, the vessel and nerve form each a simple loop, and the four little cylinders, with their enclosing membrane, are a measure of the diameter of a single papilla. In other *papillæ*, of larger size, and endowed with a power of more exalted sensation, the little vessel and nerve are several times bent upon themselves previously to completing the loop. These little loops spring from

a network (*f*) of minute vessels (capillaries) and nerves, embedded in the porous stratum of the corium (§ 17) at the base of the papillæ; and they receive their supply of blood and nervous influence through small vessels and nerves, which take their meandering course through the fat-distended openings of the deeper strata of the corium. We have seen already, that the openings in the corium are a provision for its elasticity; we have here a second purpose which they fulfil, for in this, as in most of the operations of the animal organism, we meet with constant illustration of the beautiful lines of Pope:—

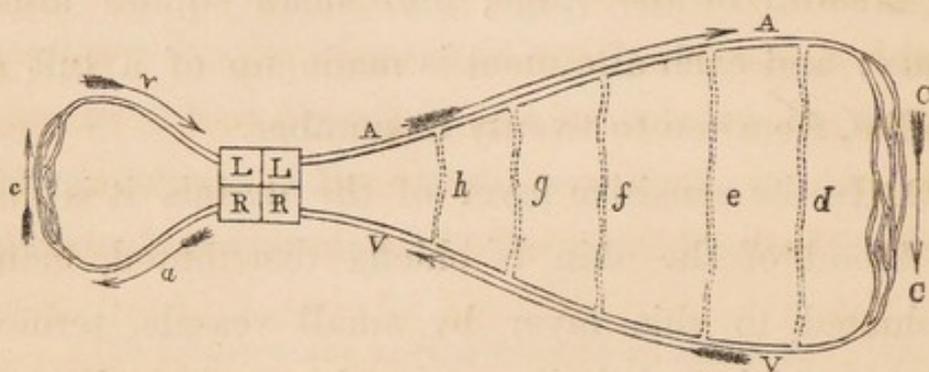
“ In human works, though labour'd on with pain,
A thousand movements scarce one purpose gain;
In God's, one single can its end produce,
Yet serves to second, too, some other use.”

21. It is always interesting to observe the modification of a known principle of structure to suit a special purpose. An instance of this modification is seen in the palm of the hand and sole of the foot, and on the corresponding aspect of the fingers and toes. On the parts indicated, the sensitive layer of the dermis is raised in the form of small ridges (plate 2, fig. 1,) which are curiously arranged, as may be seen by inspecting them on the hand in their epidermic dress (§ 11); some are traced in concentric

ovals ; others, running more or less parallel, pursue a serpentine course ; some separate abruptly and suddenly diverge ; and others are seen to part for a short distance, and again to reunite ; a fitting maze for the mysterious reveries of chiromancy. These little ridges, when examined with the microscope, are found to be marked, at distances corresponding with the breadth of the ridge, into small square allotments ; and each allotment is made up of a tuft of papillæ, from ten to twenty in number.

22. In the sensitive layer of the dermis it is that the blood of the skin is chiefly distributed, being conducted to this layer by small vessels, termed *arteries*, which find their way to the surface through the irregular interstices of the strands of fibres of which the corium is composed (§ 17). Having reached the porous, felt-like layer of the corium, the small arteries empty their blood into a very beautiful and rich network of minute vessels (plate 2, fig. 3, *f*), remarkable for their frequent communications with each other, and for their uniformity of size ; these are the *capillaries*, called also, because they occupy an intermediate position between the arteries and veins, and are the only channel of communication between the two, *intermediate* vessels. From these latter, the blood, having performed its circuit in the

skin, runs onwards into vessels which take a retrograde course through the interstices of the corium, by the side of the arteries, and return the blood to the heart; these are the *veins*. The circulation of the blood through the skin, and its course from and to the heart, may perhaps be better explained by the annexed diagram.



In this diagram, the letters L L R R represent the heart, composed of four cavities, L L being the left, and R R the right, chambers; A A, a channel representing the system of *arteries*, which conduct the bright-red blood from the left chambers of the heart to every part of the body; v v, a channel representing the system of *veins* which return the blood of a dark-red colour, and in an impure state, to R R, the right chambers of the heart; c c, capillary vessels of the surface of the body, conducting the blood from the arteries to the veins, consequently *intermediate vessels*; d, e, f, g, h, intermediate vessels in the interior of the body, supplying with

blood the various organs—the brain, liver, stomach, kidneys, &c. The relation of these vessels to the cutaneous intermediate vessels shows, that if the blood were checked in its passage through *c c*, it would be driven, or repelled, or determined upon *d, e, f, g, h*. If the check were slight, *d* (which may represent the kidneys) only would suffer; if the check were more severe, *e*, the stomach, *f*, the liver, *g*, the spinal marrow, *h*, the brain, or *L R*, the heart, would become overloaded with blood. In like manner, an overloaded state of *c c*, whether the consequence of disease, or artificially produced, will lighten, or, in some instances exhaust, *d, e, f, g, h*. So fearfully and wonderfully are we made! This diagram shows also how an eruptive disease may act the part of a safety valve to the economy. On the opposite side of the heart, *a* represents an artery conveying the impure blood from the right chambers of the heart to the lungs; *v* is the channel by which, when purified, the blood is brought back from the lungs to the left chambers of the heart; *c* represents the intermediate vessels, or capillaries of the lungs, in which the purification of the blood takes place. The circle *R, a, c, v, L*, is the lesser circle, the course of the pulmonary circulation: *L, A, C, V, R*, is the great, or systemic, circle, the course of the circulation through the rest of the system. But the truth is, there is but one circle or circulation, the channels of which are brought into proximity at the heart.

The blood which proceeds from the heart, and is conducted along the tubular vessels, termed arteries, is of a bright vermilion colour, and pure; in the capillaries, it yields up its nutrient principles to the tissues through which it meanders, and, at the same time, gathers the materials of decay cast off during the process of nutrition. Coincident with this change in the vital composition of the blood, is a change in its colour, temperature, and the form of its solid particles, the blood-disks; it has lost nearly one degree of Fahrenheit, its little disks have become biconvex, instead of biconcave, which they were before; and it returns to the heart, through the veins, of a dark-red hue, almost approaching to black, and under the appellation of impure, or venous blood.

23. That which is now stated with regard to the skin, may equally serve as an explanation of the circulation of the blood throughout the entire body. The heart, as I have represented in the diagram, contains four chambers, two on its left, and two on its right side; and, so far as it is concerned in the process of circulation, is a force-pump for propelling the contents of these cavities, the direction which the fluid is to take being regulated by apertures and valves, which permit its passage only in one direction. Thus, from the left chambers of the heart (L L),

the blood is propelled through a system of elastic tubes, called *arteries* (A A), to every part of the body ; the arteries terminate everywhere in minute vessels termed *capillaries* (C C) ; from the capillaries, after a certain course, the blood passes into *veins* (V V) ; and the latter, being the returning channel of the blood, convey it to the right chambers of the heart (R R). The circulation of the blood, therefore, in its simplest expression, resolves itself into, *a transit from the left* (L) *to the right chambers of the heart* (R.) Let us now inquire what purpose it fulfils during this transit. The arteries and veins are the mere carriers of the blood ; but the capillaries are agents of high account in regard to its distribution. They exist so abundantly in all parts of the body, that some of its organs appear to be almost wholly made up of them ; and their abundance in the skin may be inferred from the fact, that the smallest needle-point cannot be inserted into that structure without wounding some of these vessels. For the purpose of facilitating the passage of the blood, and preventing the possible occurrence of obstruction in the circulation, they communicate with each other at minute distances, and thus constitute a network of exquisite delicacy and beauty ; and for the purpose of bringing every portion of the blood into the most favourable position

for performing its office, their size corresponds with that of the solid particles of the blood (the blood-disks), and is pretty uniform throughout the entire body. In structure, the capillaries are porous, and permit the passage outwards of oxygen and of the nutrient elements of the blood, and inwards (that is, into the flowing stream) of the carbonic acid gas and the *debris* of nutrition. Coincident with these changes is the gradual conversion of the blood, from its previously bright scarlet hue, to a dark red. The purpose which the blood fulfils, therefore, is to convey oxygen and the elements of nutrition to the ever-changing tissues of the body; and in return, to become charged with the elements of decay, and thus rendered unfit for the further sustenance of the animal machine, until it is subjected to some process of purification.

24. Having arrived in the chambers of the right side of the heart (R R), in the state of an impure and dark-coloured stream, the blood is now propelled through an artery (*a*) to the capillaries of the lungs (*c*), and through the latter into four veins (*v*), which convey it to the left chambers of the heart (L L). The blood, therefore, performs a second, but smaller, circuit,—namely, through the lungs, and during this course is affected in precisely the opposite manner

to what occurred during its current through the body. From having been dark-coloured, it is now bright scarlet; its carbonic acid and some of its water have been thrown off into the lungs, and its little disks have resumed their biconcave shape, and have become again charged with oxygen. The lungs, it need hardly be said, are the organs of respiration—two cellulated bags filling the chest, constructed almost wholly of capillary vessels, and distended with atmospheric air at every inspiration. The capillaries hold the same relation now to the atmosphere that they did in the greater circle to the tissues of the body; and, being endowed with the same properties of permeability, they give passage, through their pores, to the carbonic acid of the impure blood, which is discharged from the lungs with the expired air, and they imbibe from the atmosphere a portion of its oxygen. The blood, therefore, on its return to the left chambers of the heart, is fitted again to resume its current through the system, and perform the functions of the greater circulation.

25. It may possibly be inferred, from this description of the circulation, that the lungs are the sole purifiers of the blood, and that carbonic acid gas and water are the sole impurities which are thrown off by that fluid. This would be incorrect, for about one-

fourth of the venous blood is distributed, by means of capillaries, through the liver, and yields up the elements of the bile before reaching the right side of the heart. Again, many of the impurities introduced into the blood with the elements of decay pass undisturbed through the lungs, and are separated from the system by organs specially destined to that office—namely, the kidneys and skin. These two latter, in truth, may be styled the purifiers of the arterial blood; while the liver and lungs are the purifiers of the venous blood.

26. All the phenomena of colour of the skin, excepting that which is due to its pigment (§ 8), are referrible to the quantity, velocity, or composition of the blood flowing through its capillaries. When mental emotion causes a sudden turgescence of the capillaries, the natural red hue of the skin is heightened, and the state is termed *blushing*. But an opposite effect may be produced by the same cause, and particularly when the emotion is of a depressing kind, or when an inward struggle ensues for mastery over the feelings, and then we have intense pallor—pallor dependent on the rush of blood from the skin upon some internal and perhaps vital organ, maybe the heart, maybe the brain.* Inflammation

* See description of wood engraving, page 26.

is always accompanied by heightened circulation in the part inflamed; and as most of the diseases of the skin are associated with inflammation, so redness is a concomitant of cutaneous disease. This is remarkably the case in St. Anthony's fire, in scarlet fever, and in measles. In the two latter diseases, another phenomenon also may be observed, which is, that the redness occurs in minute points, an appearance which results from over-distention with blood of the papillæ of the skin (§ 20). Purpleness or blueness of the skin always depends on some cause of retardation of the cutaneous circulation. Thus, on a winter's day, the vigour of the nervous power is reduced by the cold; and in addition to the repulsion inwards of much of the blood contained within the vessels of the skin producing pallor, that which remains behind moves so languidly through the capillaries, that the change from bright-red to deep black-red has time to be established before it completes its circuit and reaches the veins. The mottled appearance of the skin of children in cold weather owes its darker shades to the same cause. As respects the colour resulting from altered composition of the blood, the yellow tints of dyspepsia and jaundice are due to admixture of the colouring matter of bile with the blood, and the varied hues of

chlorosis or green sickness to a similar colouring principle, assisted by an absolute deficiency in the quantity of blood contained within the body.

27. The nerves of the skin, proceeding as they do from the great centre of the nervous system—the brain and spinal marrow—are the source of the sensibility of the skin. The degree of its sensibility offers great and remarkable variety, not only as respects individual circumstance, age, sex, temperament, and state of health, but also in relation to the part of the skin under examination. The differences of sensibility among individuals are so great, that that which amounts to absolute torture in one is a matter of almost indifference to others, and this without any known signs by which such variety of sensibility might be predicted. The medical man is acquainted with this fact, and acts accordingly, attributing to its right cause what might, by the unobservant or the ignorant, be set down to diversity of moral power.

In reference to age, sex, temperament, and health, as modifiers of pain, there can be no question that the sensibilities are more acute in the young than in the adult, and in the latter than in advanced life; they are greater also in the female than in the male; in the sanguine and nervous than in the phlegmatic and bilious temperament; and in those who are enfeebled by disease than in the sound and robust.

28. However various the differences of sensibility may be in different individuals and under different circumstances, it would scarcely be supposed that any great amount of variety could exist in parts of the skin of the same person, and yet such is the case. Dr. Weber, an eminent physiologist of Leipsic, ascertained by experiment, that, to be distinguished as separate sensations, the points of a pair of compasses applied to the skin of the middle of the arm or thigh must be separated from each other to a distance of thirty lines, while on the tip of the finger, two sensations are obtained by a separation amounting only to one-third of a line. On the front of the finger, the distance necessary to give two sensations was two lines; on the cheek, five lines; forehead, ten lines; and on the middle of the breast, twenty lines. The same gentleman has pointed out other curious phenomena in connexion with the sensation of the skin; thus, he observed, that if the two hands were immersed in warm water of the same temperature, that in which the left was plunged would feel the warmest; and that, if the finger of one hand and the whole of the opposite hand be held in hot water, the sensation communicated by the single finger would be trifling, while to the entire hand it would be unbearable. These facts serve more strongly to corroborate the diversity of sensibility existing among individuals.

29. I have hitherto referred only to natural sensations—namely, to sensations determined by the excitation of the nerves of the skin, such excitation being directed either from without or within; but there are other sensations, and those of a painful character, which are dependent on an unnatural and unknown state of the nerves themselves, sometimes involving a single nerve or a part of a nerve, and sometimes more or less of the whole nervous system, including even the brain. Of this kind, is that distressing itching of the skin which, without any external cause, sometimes assails more or less of the surface of the body, destroying comfort and repose, rendering sleep impossible, and eventually injuring the health by continued irritation. In the interval of the attacks, the sufferer is easy and at rest, probably enjoying conversation, and unconscious of his physical tormentor; but the instant the thoughts recur to the seat of suffering, that instant the itching is renewed. A lady, bearing the outward appearance of perfect health, describing to me the torture which she experienced, remarked, “the sensation caused by the sponge dipped in scalding water, and immediately applied to the skin, is perfect bliss when compared with the pungent suffering caused by this itching.” Instances are on record of kings being

afflicted with this frightful malady. Plato, in his old age, suffered under it; as did the Abbé Morellet, in the eightieth year of his age. Other varieties of painful sensation experienced by the skin are tingling, smarting, pricking, shooting, creeping, tickling, burning, scalding, &c.

30. An opposite state of sensation is sometimes met with—namely, where the sensibility of the skin is much diminished, and, in rare cases, even abrogated. This, like the preceding, is a state of the nerves, and sometimes of the brain, although the apparent seat of the disorder is the surface, and a part of the body distant from the real disease.

CHAPTER III.

ON THE PERSPIRATORY SYSTEM.

31. IN the preceding chapters, the skin has been described as a membrane of inconsiderable thickness, constituting the surface of the body, and composed of three layers—namely, scarf-skin, sensitive layer, and corium. I have now to point out the existence of numberless minute tubes, which traverse the three layers of the skin more or less deeply, and open on the surface of the scarf-skin by as many minute apertures, which are termed *pores*. These tubes, with their corresponding pores, belong to three systems of cutaneous organs, now to be examined, namely, the perspiratory glands, oil-glands, and hairs.

32. The perspiratory apparatus consists of very minute cylindrical tubes, which pass inwards through the scarf-skin, sensitive skin, and corium, and ter-

minate in the deeper meshes of the latter. In their course through the scarf-skin, each little tube forms a beautiful spiral coil (plate 2, fig. 3, *a*); in its deeper course through the corium it is also more or less spiral or flexuous; and on arriving at its destination, coils upon itself in such a way as to constitute a little oval-shaped or globular ball, the perspiratory gland (*h*). The perspiratory gland, therefore, is a very small mass, formed by the twisting of a minute tube; and the latter is constructed, and, indeed, is a prolongation, of the three layers of which the skin is composed—namely, the scarf-skin, which lines the interior of the tube (plate 3, fig. 17); the sensitive layer, furnished with a rich net of capillary vessels; and the corium, which forms a protective layer to the exterior for its strength and support. In the language of anatomical science, the tube and gland are an *involution of the skin*. The mouth of the perspiratory tubule on the surface of the scarf-skin, namely, the “pore” (plate 1, fig. 1), is also deserving of attention. Its extremity is the section of a spirally-twisted tube, and in consequence of this peculiarity, the aperture is oblique in direction, and possesses all the advantages of a valvular opening.

33. In this structure, and in the fact of the scarf-skin being prolonged as a tubular sheath into the

perspiratory duct, the reader will perceive the reason of a phenomenon, which puzzled the earlier physiologists, and induced them to declare, that there were no such things as "pores" in the skin. I allude to the retentive powers of the scarf-skin in the case of a blister; it was thought, that if there were pores, the fluid of a blister must necessarily permeate those openings; but it is easy to perceive, that if each pore is, in the first instance, spiral, and then prolonged for some length as a contracted tube (for whenever a blister is formed, the lining of the perspiratory duct is drawn out of the true skin), the entrance of fluid into the tube must be as difficult to effect as its passage through the scarf-skin itself. Again, the distention of the scarf-skin acting with direct pressure on the coils of the spire, must press them together and hermetically close the tube; and as the lining of the first portion of the latter, after it has passed the scarf-skin, is thick and rigid, and projects like a cone from the under part of the skin (plate 1, fig. 2, *b d*), the fluid pressing on all sides will tend to obliterate its passage, while the rest of the tube, in the act of being drawn out and suddenly giving way with an elastic rebound, must be closed equally securely. On the palm of the hand and pulps of the fingers, the openings of the perspiratory

pores (plate 1, fig. 1) are distinctly perceptible to the naked eye; they are situated at nearly equal distances* on the little ridges, and give to the latter the appearance of being crossed by little transverse lines. On the sensitive layer, they make a similar impression, dividing the ridges into little square allotments (§ 21), each allotment being separated from that which precedes and follows it by the shaft of a perspiratory tube (plate 2, fig. 1).

34. Taken separately, the little perspiratory tube, with its appended gland, is calculated to awaken in the mind very little idea of the importance of the system to which it belongs; but when the vast numbers of similar organs composing this system are considered, we are led to form some notion, however imperfect, of their probable influence on the health and comfort of the individual. I use the words, "imperfect notion," advisedly, for the reality surpasses imagination and almost belief. To arrive at something like an estimate of the value of the perspiratory system in relation to the rest of the organism, I counted the perspiratory pores on the palm of the hand, and found 3528 in a square inch. Now,

* They are situated at about one-sixth of a line apart along the ridge, and a little less than a quarter of a line from ridge to ridge. On the heel, there are four and a half pores in the compass of a line along the ridge, and three and a half across the ridges.

each of these pores being the aperture of a little tube of about a quarter of an inch long, it follows, that in a square inch of skin on the palm of the hand there exists a length of tube equal to 882 inches, or $73\frac{1}{2}$ feet. Surely such an amount of *drainage* as seventy-three feet in every square inch of skin, assuming this to be the average for the whole body, is something wonderful, and the thought naturally intrudes itself: What if this *drainage* were obstructed?—Could we need a stronger argument for enforcing the necessity of attention to the skin? On the pulps of the fingers, where the ridges of the sensitive layer of the true skin are somewhat finer than in the palm of the hand, the number of pores on a square inch a little exceeded that of the palm; and on the heel, where the ridges are coarser, the number of pores on the square inch was 2268, and the length of tube 567 inches, or 47 feet. To obtain an estimate of the length of tube of the perspiratory system of the whole surface of the body, I think that 2800 might be taken as a fair average of the number of pores in the square inch, and 700, consequently, of the number of inches in length. Now, THE NUMBER OF SQUARE INCHES OF SURFACE IN A MAN OF ORDINARY HEIGHT AND BULK IS 2500; THE NUMBER OF PORES, THEREFORE, 7,000,000, AND THE NUMBER OF INCHES OF PER-

SPIRATORY TUBE 1,750,000, THAT IS, 145,833 FEET, OR 48,600 YARDS, OR NEARLY TWENTY-EIGHT MILES.*

35. The perspiratory system of the skin is one of the usual channels by which excess of water is removed from the blood, and in effecting this purpose, the perspiratory function becomes a regulator of the temperature of the body. In health, perspiration is always taking place, even in a passive state of the body, and passes off in the form of an imperceptible vapour, which is therefore termed *insensible perspiration*. But when the muscular system is in exercise, when chemical combination is active, and the nervous system excited, the perspiration is no longer insensible; it becomes perceptible, and more or less abundant, and is then denominated *sensible perspiration*. The existence of perspiration in its insensible or sensible state bears relation, however, not merely to the quantity of perspired fluid, but also to the state of the atmosphere. Thus, in a close, damp day, when the atmosphere is warm, and already

* To the medical reader, it may be necessary to explain, that the sebaceous system is included with the system of perspiratory glands and tubes in this calculation. I have ascertained, beyond question, that the sebaceous system is the perspiratory apparatus of the greater part of the body, the true perspiratory glands and tubes being found only in certain parts. Therefore, the calculation which I have made on these premises must be considered as falling within rather than beyond the truth.

charged with moisture, it is incapable of receiving that of the skin, and the ordinarily insensible vapour becomes condensed in a sensible form. On the other hand, when the atmosphere is dry, and the body or the air in motion, the moisture is carried away so rapidly that the sensible, under ordinary circumstances, becomes an insensible perspiration. The term "insensible perspiration," therefore, properly applies to the imperceptible evaporation from the skin when the body is at rest, or in gentle motion.

36. To comprehend in what manner the perspiration is a means of limiting the heat of the body, it will be necessary to glance at the principal phenomena concerned in animal temperature. The ordinary temperature of the body, as ascertained by placing the bulb of a thermometer under the tongue, is 100 degrees of Fahrenheit. This may be regarded as the standard temperature of the human body in health, and it offers very little variation, in summer or in winter, at the equator* or the pole.† In disease, even, the variation is less considerable than might be imagined, the lowest temperature on record,

* In Hindostan, the temperature is occasionally 120 degrees of Fahrenheit.

† In the polar voyages, the thermometer was noted as low as seventy degrees below zero.

namely, that of Asiatic cholera, being 77° , and the highest $110\frac{3}{4}^{\circ}$.* The sources of animal temperature are, the chemical processes constantly taking place in the body during the action of the various phenomena concerned in nutrition, and these, by developing heat, maintain a condition which is necessary to the continuance of life. The minimum of heat to be thus produced is, as we have just seen, 100 degrees of Fahrenheit, and so long as this quantity is developed, the functions of the body are properly performed, and a state of comfort is maintained; but the instant the temperature sinks below this point, the chemical processes have then to be aroused and stimulated by such means as are capable of augmenting the rapidity of respiration and circulation. These are the processes which, in the winter season or at the poles, are engaged in keeping the temperature up to the natural standard; and in this case, the insensible perspiration, although it exists, is at its minimum of activity, and every collateral condition of external warmth and clothing is required to aid in the preservation of the proper amount of heat. But when the human body is transferred to the equator, or when, as has frequently happened, a man has subjected himself to a tempera-

* A case of tetanus recorded by Dr. Edwards.

ture* much greater than that of boiling water, at a moment, too, when his own vital processes were generating more heat than the natural standard required, it is then that the influence of the perspiration, as an agent in limiting the temperature of the body, is strikingly manifested. The thermometer, placed in the mouth of a man who had been exposed to a temperature of 120° for a quarter of an hour, stood at 105° ; and the temperature of animals, when the heat has been raised to a degree sufficient to cause death, has never exceeded in elevation from nine to fourteen degrees above the natural standard.† The reduction of the heat of the body at so elevated a

* The furnace in which Sir Francis Chantrey was in the habit of drying his moulds was heated to a temperature of 350° , and into this his men occasionally entered without inconvenience. The oven used by Chabert during his exhibitions in London was heated to between 400° and 600° .

† It is interesting to note, that in animals made the subjects of these experiments, the blood was found in the opposite position to that which it would have occupied after death from cold. Instead of being collected about the heart and internal organs, as in death ensuing from the latter cause, the heart was empty, and the vital fluid dispersed towards the periphery of the body, in some instances being actually forced out of its vessels into the surrounding tissues. The blood seemed to have been killed by the heat, for it had lost its power of coagulating, and its deep-black hue was not altered by exposure to the atmosphere, a change which takes place in living blood. In a moist atmosphere, the animals died sooner than in dry air of a higher temperature, and without losing weight; in dry air they lost weight.

temperature takes place at the expense of the water of the blood and of the tissues. To be raised in the form of vapour, water requires a large amount of heat, and in this way the excess of heat is employed. Again, as the water becomes dissipated by perspiration, thirst is occasioned, and the fluids taken to alleviate the desire for drink are immediately engaged in the evaporating process. From what has been said in a previous paragraph (§ 35), it is evident that all the above high temperatures have reference to dry air, for when the air is moist, evaporation is checked, and the removal of heat consequently prevented.

37. As an illustration of the influence of a moist atmosphere, at an elevated temperature, on the human system, I may adduce the effects occasioned to a gentleman who recently visited the baths of Nero, near Pozzuoli, the ancient Posidianaë. To reach the bath, he had to pass along a narrow, winding passage, of about 120 yards in length, and seven feet high, by about three in breadth. A little within the mouth of the passage, the temperature was 104° in the upper strata of the atmosphere, and 91° near the ground; farther on, the air was filled with dense vapour, of a temperature of 118° above, and 111° below; and over the bath it was

122°, the heat of the spring being 185°. After proceeding for about one-third the length of the passage, he began to feel a sense of oppression and discomfort, his pulse rising from 70 to 90 beats in the minute. A short distance further, the oppression increased, his breathing became rapid and panting, and he was under the necessity of stooping his head frequently to the earth, in order to obtain a chestful of air of a less suffocating temperature. His skin, at this time, was bathed in a profuse perspiration, his head throbbing, and his pulse beating 120 in the minute. Continuing his progress, the sensations of suffocation became insupportable; his head felt as though it would burst; his pulse was so rapid as to defy calculation; he was exhausted, and nearly unconscious; and it required all his remaining power to enable him to hurry back to the open air. On reaching the mouth of the passage, he staggered, and nearly fainted, and was very uncomfortable until relieved by a bleeding from the nose. During the rest of the day, his pulse remained at 100; he had uneasy sensations over the surface of the body, and did not recover until after a night's repose. The same gentleman bore a temperature of 176° in dry air without inconvenience.*

* Gazette Medicale, April 27, 1844.

38. The regulation of the temperature of the body is only one of the purposes fulfilled by the perspiration; another, and an important one, is the removal from the system of a number of compounds noxious to animal life. It was estimated by Lavoisier and Seguin, that eight grains of perspiration were exhaled by the skin in the course of a minute, a quantity which is equivalent to thirty-three ounces in twenty-four hours. Of this quantity, a large proportion is, naturally, water; but nearly one per cent., according to Anselmino, consists of solid substance; of the latter, one hundred parts contain about twenty-three parts of salts, the remainder being organic matter. An analysis of one hundred parts of the solid matter of perspiration, according to Anselmino, gave the following results—namely:

Ozmazome,* combined with common	
salt	48 parts
Lactic acid salts, with osmazome . .	29 „
Animal matter, with vitriolic salts . .	21 „
Calcareous salts	2 „
	100

To which may be added, carbonic acid gas, ammonia.

* The peculiar animal principle which gives flavour to meats and part of the odour to perspiration.

and iron, and in rare instances, copper. The peculiar odour of perspiration is due to organic matters, and its acid qualities and occasional acid smell to the lactic acid, an organic substance not far removed in composition from distilled vinegar.

39. When the perspiration is checked, from disorder of the skin or cold, the whole of these matters fail of being removed, and are circulated through the system by the blood. Under favourable circumstances, they are separated from the latter by the kidneys, the liver, or the lungs, but not without disturbing the equilibrium of action of those organs, and sometimes being the cause of disease. The perspiration is a fluid, whose regularity and continuance of exhalation are not merely conducive, but absolutely necessary to health; without such regularity, the animal temperature would run riot, and substances of an injurious quality would be allowed to permeate the finest and most delicate of the tissues of the body. Some experimentalists* in France conceived that, by obstructing the perspiration of the skin, and thereby preventing the dispersion of animal temperature by evaporation, they would be enabled to produce internal fever at will. To satisfy themselves on this question, they covered a rabbit with

* Becquerel and Breschet.

an impermeable coating of varnish ; but the result failed to satisfy their expectation. Instead of an increase of temperature, the heat of the body quickly diminished ; and in one hour and a half the animal died of asphyxia.

40. While speaking of exhalation from the skin, it may be proper to consider another phenomenon allied with exhalation, but having no direct relation to the perspiratory system, I mean, the transmission of moisture through the skin from without, "absorption," as it is technically termed. Man, to a certain extent, is an hygrometric machine, and his tissues have a natural tendency to an equalization of moisture with the medium in which he lives ; but as this disposition, in an active state, would be destructive of existence, it is very properly controlled and regulated by the vital powers. Another obstacle to absorption is the scarf-skin ; and so long as this retains its natural texture, and is bedewed with its ordinary oily secretion, absorption by the skin is impossible. Indeed, were it not so, our lives would scarcely be secure for an instant ; for a moist atmosphere, bearing in suspension infectious matter, or miasmata, and traversing, without impediment, the tissues of the skin, would introduce so much of the poison into the system as would be immediately

destructive of life. We are already exposed to great danger by the extent of breathing surface offered to the contact of the atmosphere by the lungs ; more would indeed be a serious evil. When, however, the condition of the scarf-skin is changed by the long contact of fluid, particularly if the fluid be alkaline, or warm, and is thus converted into a moist membrane, the play of absorbing powers becomes active, and is then only limited by the physical laws which govern the transmission of fluids. It is in this way that we must explain the relief of thirst afforded to persons who have been shipwrecked and exposed to the elements for several days without food by saturating their garments with sea-water. Instances are on record, in which bathing in warm milk has been successfully employed as a means of supporting life, when the communication between the mouth and the stomach was impervious ; and numerous experiments tend to show the possibility of absorption of substances in solution through the skin, where the latter has been for some time in contact with the fluid.

41. Whenever we wish to introduce medicines into the system by way of the skin, we find it necessary to select those spots in which the scarf-skin is thinnest ; and then we are not satisfied with simple contact, but rub the substance into the skin, in order

that it may enter the pores, and attain as close a vicinity as possible to the vessels of the sensitive layer of the dermis, which are the agents for conveying the substances so introduced into the blood. By the friction which is used in this process, we also stimulate the cutaneous vessels and nerves, and obtain their co-operation. But even in this way, some few substances only can be transmitted through the skin; and excepting in the instance of a single medicine, the practice is discarded. Another plan, which is occasionally pursued, will serve as a further illustration of the opposition afforded by the scarf-skin to the transmission of substances from without. It is termed the *endermic* method of administering medicine, and is founded on the well-known active absorbing power of the sensitive layer of the skin. To succeed in this practice, the first step is to remove the scarf-skin, by means of a small blister, and then to sprinkle the medicine on the exposed surface. Opium and other powerful medicines have been administered in this way, and have been found to act as rapidly as when introduced into the stomach. In some instances, the endermic method offers advantages, as when, for example, the medicines which it is desired to administer are known to disagree with the stomach, or when the power of swallowing

is lost. The latter was the case in a patient suffering under hydrophobia, in whom opium administered through the skin produced a soothing calm in the height of the most violent struggles.

42. The endermic absorption of the skin is not always, however, the harbinger of good ; deleterious substances are sometimes accidentally introduced into the system in this manner. Violent attacks of strangury occasionally, though rarely, follow the use of a blister, from the absorption of the juices of the Spanish fly into the blood, and its subsequent transmission to the kidneys for removal. A more distressing illustration of this action is that in which arsenic is absorbed into the system from the surface of a sore, a sore being at all times an actively absorbing surface. No medical man would think of applying arsenic to an open sore ; but unfortunately there are such things in society as "quacks," quacks, too, protected by the legislature and the state ; and one of the favourite experiments of these persons is that of treating cancer. Their universal remedy is arsenic ; and happy is the unfortunate sufferer who escapes destruction in their hands. With them, every trifling and temporary enlargement is a cancer, and their CURE is DEATH.

CHAPTER IV.

ON THE OIL-GLANDS OF THE SKIN.

43. THE apparatus for keeping the surface of the skin bedewed with an oily fluid resembles, in general particulars of structure and economy, that of the perspiratory system. It consists of minute tubes, which traverse the scarf and sensitive skin, and enter the substance of the corium, where they terminate in small glands (plate 3, figs. 1—12). These tubes are similar in structure to the perspiratory ducts, being composed of three layers, derived respectively from the scarf-skin which lines their interior; the sensitive skin, which is the medium of distribution of their vessels and nerves; and the corium, with its fibres, which gives them strength and support. Like the perspiratory tubes, they are in some situations spiral; but this is not a constant feature; more

frequently they pass directly to their destination, and they are also larger. The chief characters in which they differ from the perspiratory apparatus are, the straightness and greater diameter of their tubes, their absence in certain situations, as on the palm and sole, and abundance in others where their office is more needful, as on the face and nose, the head, the ears, &c. ; and the degree of complication in the structure of their glands. This latter character is sufficiently remarkable, since they offer every shade of complication, from the simple straight tube, to a tube divided into numberless ramifications, and constituting a little rounded, arborescent mass, of about the size of a millet-seed. In a few situations, these little glands are worthy of particular notice, as in the eyelids, where they possess great elegance of distribution and form (fig. 12), and open by minute pores along the edges of the lids. In the ear passages, where they produce that amber-coloured substance known as the wax of the ears ; and in the scalp, where they resemble small clusters of grapes, and open in pairs into the sheath of the hair, supplying it with a pomatum of nature's own preparing (figs. 8, 9, 10).

44. The mode of formation of the unctuous "distilment" of the skin, the *sebaceous substance*, as it is

called by medical writers, is not the least curious of the phenomena of animal life. In a previous chapter I have explained the manner of formation of the scarf-skin (§ 4), namely, by a fluid, which is successively converted into granules, cells, and scales; the same process takes place in the production of the scarf-skin of the oil tubes and glands, the point of distinction between the processes being the difference in the nature of the fluid imbibed by the cells from the blood, and its subsequent destination. In the case of the scarf-skin, the fluid is mainly water, containing saline matters in solution. In the cells of the oil tubes and glands, besides the water and salts, there is also oil, partly in intimate mixture with albumen or white of egg, partly free and diffused. These substances are all derived from the blood flowing through the capillaries of the walls of the tubes and glands; and when the cells are fully formed, that is, fully distended, they yield up their contents, and collapse into scales, as in the case of the scarf-skin; the fluid matters which they contained are consequently set free, and passing along the tubes to the surface, constitute the unctuous element of the economy of the skin.

45. It will be perceived that, in the preceding description, I have only accounted for the fluid which

is given off by the cells during their collapse, and that the destination of the cells themselves still remains to be explained. These latter are cast off in the form of minute scales, like those of the scarf-skin, and are expelled from the tubes, in company with their fluid product, to be dispersed upon the surface. Such are the phenomena which attend the formation and destiny of the unctuous matter in a state of perfect health, in that state which most nearly approaches one of simple nature. But in the inhabitants of cities and towns, in the midst of the sedentary and irregular habits of refined society, and of the mental "wear and tear" of practical life, such a state of the unctuous system of the skin as I am now describing rarely or never exists. The actions, instead of being completed according to the standard above established, are irregular and torpid, the contents of the cells are unnaturally solid and dense, they are only partly, or not at all, emptied, and are thrown out in a mass upon the surface of the skin.

46. Sometimes, however, the contents of the cells are too dense and dry even for this mode of escape, and then they collect in the tube of the gland, distending it beyond its natural limits, and becoming impacted in that situation until removed by art. While in this state, the impacted matter reaches to the surface, and as it then comes in contact with the dust and smoke

of the atmosphere, becomes dirty and black, and is recognised as a small, round, dark spot. Such spots as these are common on the nose, forehead, and other parts of the face of the inhabitants of towns, and especially in persons who have, constitutionally, a torpid state of the skin. They are removed by squeezing the skin between the finger-nails, and then there issues forth an elongated, white cylinder of unctuous matter, modelled by the tube in which it has been so long confined; in truth, a little candle, which, strange to say, from its form and size, and particularly on account of its black extremity, is reputed to be a maggot or grub, and as such is popularly known. When the impacted matter produces inflammation of the tube, no uncommon occurrence, it then has the appearance of a black spot in the centre of a small, red, conical pimple, and is termed "punctated or spotted acne."

47. Having now glanced at the nature of the unctuous matter of the skin, and pointed out its tendency to remain within the tubes, and referred that tendency to its cause, namely, torpor of the skin, I have, in the next place, to describe a contrivance of modern discovery that may be appropriately introduced with the words of Hamlet:—

"There are more things in heaven and earth, Horatio,
Than are dreamt of in your philosophy."

A few years ago, there were discovered by a German physician, Dr. Simon, in the unctuous matter which collects within the oil-tubes, certain minute animals, of which he published an account in the June number of a German periodical, Muller's Archiv, for 1842. Having read Dr. Simon's account, I set myself to work to seek for the animals in question, and before the end of June had seen some hundreds of specimens, and become so far interested in the subject, that I pursued it with almost exclusive attention for six months. In the course of this investigation, I examined many thousands of these animals, and arrived at some novel conclusions with regard to them. I found that Dr. Simon's description and figures were imperfect; that he had overlooked several points of entomological importance in the structure of the animal, as, for example, the head; and that he had left one vein of the mine, namely, the progressive development of the young from the growth and hatching of the egg to maturity, entirely unopened. Under these circumstances, I was enabled, in the month of December, 1842, to communicate to the Royal Society a paper, since published in the Philosophical Transactions,* containing many

* Researches into the structure and development of a newly discovered parasitic animalcule of the human skin—the Entozoon folliculorum. Philosophical Transactions, Part II., 1844.

original observations and upwards of forty figures of the animal. In this paper, I found myself under the necessity of changing the name given to the animalcule by Dr. Simon, as being founded on a wrong view of its structure and zoological position, and of assigning to it the appellation *entozoon folliculorum*.*

48. The animalcule of the skin is found in the oil-tubes whenever there exists any disposition to the unnatural accumulation of their contents; it is found in numbers, varying from one or two, to twenty, in the interior of the little grub-like cylinder which is squeezed out by the pressure of the fingers (plate 3, fig. 5), and this in an apparently perfect state of health of the skin, or, more correctly, without any appearance of disorder, for the skin cannot be said to be in perfect health, when its functions are performed in a torpid manner. Now, as in the majority of mankind, and certainly in all the inhabitants of cities and large towns, the skin is more or less torpid in its functions, so the presence of this animal in the skin is the rule, its absence, the exception. I have

* The meaning of this term is simply, "the living inhabitant of the follicles (*i. e.*, oil-tubes) of the skin." The word *entozoon* is applied by zoologists to an entire class of animals, namely, the worms of the interior of the body. I do not think this an objection to its use as a generic appellation, and the specific name which follows renders any mistake impossible.

found it at all ages, from youth to old age, more numerous, it is true, at the latter than the former period, and in great and remarkable numbers during sickness. Under these circumstances, I see no other conclusion open than to assume that it performs some beneficent purpose in the economy of the skin; that purpose being, according to my belief, the disintegration of the over-distended cells, the impression of a new condition on the contents of the cells, and the stimulation of the tubes to perform their office more efficiently. In corroboration of this view is the fact, that these little creatures increase in numbers when the vital powers decline, so that, when the energies of the system are reduced by disease, and when the skin, participating in that reduction, is unable alone to fulfil its functions correctly, these little beings are produced to aid it in its work.

49. The entozoon folliculorum (plate 3, fig. 13) is extremely minute and quite undistinguishable by the naked eye, the longest I have seen being but little more than a quarter of a line in length; that is, forty-five, placed end to end, would measure in length only one inch. In form and shape, in the perfect state, they are very like caterpillars, and have a distinct head, with feelers, a chest, with four pairs of legs and a long tail. The whole body is so

transparent, that its interior may be easily seen, and the animal always occupies the same position in the oil-tube, the head being directed inwards, and the tail towards the aperture of the tube, as though it had crept into that situation from without. In some persons, these singular creatures are larger than in others, and in some than in other parts of the face. So much is this the case, that an eminent naturalist to whom I showed figures of their varieties considered the difference between the two, not merely in length, but also in shape, to amount to a specific character. If this be the fact, we may look, I imagine, for the shorter variety on the alpine ridges of the nose or eyebrow, and the longer kind in the glades and valleys of the nose and cheek. But the cause of the difference in length I believe to be a relative diversity in the caliber of the oil-tubes in different situations. In the same group, also, we find eggs (fig. 14), embryonic forms (fig. 15), and young (fig. 16), all mingled together in confusion. In pursuing this inquiry into the animal world, I have examined them in the dog, and have found them more recently in the horse. In both these animals, the entozoa are relatively larger than in man, and, at the same time, more tapering and slender.

50. I now come to the uses of the unctuous

product of the oil-glands: these are twofold, as in most of the operations of nature; the first being mechanical, namely, the protection and defence of the skin; the second, vital, the separation from the blood of matters noxious to life and health. In the exercise of the former office, the unctuous substance is diffused over those parts of the skin which are naturally exposed to vicissitudes of temperature, as the nose, face, ears, and head; to the injurious attrition of contiguous surfaces, as the flexures of the joints; or to the contact of acrid fluids, as is instanced in the excoriations to which infants are liable. The oil of the unctuous substance is the main agent in effecting these purposes, as it prevents, on the one hand, the evaporation or congelation of the water of the scarf-skin, which would cause it to become parched and peel off, and leave the sensitive skin exposed; affords, in the second place, a soft medium to the contact of moving surfaces; and, in the third, repels moisture and fluids. In its vital capacity, as an agent for removing noxious substances from the skin, the unctuous matter is allied with the perspiratory system, being a purifier of the blood. The oleaginous part of the product separates hydrogen and carbon; its animal constituents, a large proportion of nitrogen; and its salts, lime.

51. In considering the purpose of the unctuous matter of the skin, there are two situations in which it deserves especial remark, namely, along the edges of the lids, where it is poured out in considerable quantity, and in the canal of the ears. In the former place, it is the means of confining the tears and moisture of the eyes within the lids, of defending the skin from the irritation of that fluid, and of preventing the adhesion of the lids, which is liable to take place upon slight inflammation. In the ears, the unctuous wax not only preserves the membrane of the drum and the passage of the ear moist, but also, by its bitterness, prevents the intrusion of small insects.

CHAPTER V.

OF THE HAIRS.

52. THE hairs are appendages of the skin contributing to its defence, like the scarf-skin, of which, indeed, they may be regarded as modifications, suited to a special use. They are analogous to the scarf-skin in mode of formation, and are so connected with it, that they come off when the latter is separated from the sensitive skin by the action of a blister, by scalding, or decomposition. They resemble it, also, in the general features of its construction, but are somewhat more highly organized and complex. The hairs traverse the skin like the perspiratory and oil tubes, and resemble both in the extent to which they are prolonged into it, the downy hairs, like the latter, being limited to the superficial strata; the long hairs, like the former, extending more deeply, and even piercing it altogether, so as to reach the subcutaneous fat. Within

the skin, each hair is enclosed in a sheath or tube, closed at its extremity, where it supports the root of the hair, and constructed, like the perspiratory and oil tubes, of three layers derived from the skin, namely, a lining of scarf-skin, a middle layer of sensitive skin, and an external and protective layer, the corium. These sheaths or hair-tubes (plate 3, figs. 6, 7, 10—12), as they resemble the perspiratory and oil tubes in structure, so, also, do they imitate the latter in function. The tubes of many of the downy hairs are, at the same time, oil-tubes and hair-tubes, performing a double function; and even where this simplicity of structure does not exist, oil-tubes are connected with the hair-tubes, and open into them, sometimes one (figs. 8, 9, 10) to each tube, sometimes two (fig. 6), as in the case of the hairs of the head. Indeed, the principle of formation of these three kinds of tubes, namely, perspiratory tubes, oil-tubes, and hair-tubes, would appear to be the same. They all originate on the surface of the skin in the form of little pouches, and grow inwards to the required depth. In the case of the hair-tubes with appended oil-tubes and glands, the former are first formed, and the latter are productions from their sides, growing as mere pouches, and increasing in length like the tubes from which they originate.

53. Every part of the skin, with the exception of the palms of the hands and soles of the feet, is organized for the production of hairs. On the major part of the body they are short and fine, and in many instances so small as scarcely to rise above the level of the skin, while in others, as the scalp, the eyebrows, and in man, the whiskers and the beard, they grow to a considerable length. The length and thickness of the hair, as these instances illustrate, are regulated by a law of nature, the hair of the head being always longer and finer than that of the beard, and the latter longer than the whiskers and eyebrows. When hairs are left to their natural growth, they attain a certain length, and are then thrown off by a process analogous to the change of the coat in animals, or the moult of birds, their place being supplied by young hairs, which grow from the same tubes; and this temporary decadence of the hair occurs, also, where it is kept cut of moderate length. When, on the other hand, hair is closely shaved, it appears to become persistent, and at the same time increases in strength and bulk. It has been calculated by a curious investigator* that the hair of the beard grows at the rate of one line and a half in the week; this will give a length of six inches and a half in the course of a year, and for a man of eighty years of

* Withof, quoted by the celebrated Haller.

age, twenty-seven feet which have fallen before the edge of the razor.

54. The shape of individual hairs is cylindrical for the smaller kinds, and more or less oval for those which grow to any length (plate 4, fig. 3). The hairs of the head are never perfectly cylindrical, and those of the eyebrows and beard are more or less oval in contour. When left to their natural growth, the end or tip is always conical and pointed, and in animals it is common to find that portion of the shaft which is nearest the skin smaller than the more distant portion. These differences in the thickness of the same hair, at different points of its length, are easily explained. The producing organ is at first small; as the formation of the hair advances, it becomes larger, and growth having reached a certain point, it shrinks, becomes again small, and eventually ceases to produce more; the fully-formed hair then falls, and after a period the producing organ resumes its function, in the same order and to the same end. To illustrate this phenomenon, I have referred to animals, because in them it is common, but the same thing is also met with in man: look at a hair pulled from the eyebrow; and the same may sometimes be seen in the hairs of the head. A French anatomist, M. Mandl, has asserted that hairs become pointed at their extremity, by a process of deposition on their cut ends of

certain fluids containing horny matter in solution, which make their way from the roots of the hairs through the centre of their shafts. I regard these views as erroneous, and, in my opinion, they are neither consistent with the known structure of the hair, nor with observation. When the hair is cut, it is liable to split, and become ragged at the ends.

55. The author whom I have before quoted as having calculated the growth of the beard, has made some measurements of the diameter of the hairs of the head, by which he ascertained that black hair was thicker than brown, and brown than blonde. Whether this is the fact or not, I am unable to say, and the point is not of much consequence. The average diameter of the hair of the head, according to my own measurements, is $\frac{1}{550}$ of an inch. The same author likewise instituted inquiries into the number of hairs grown upon a square inch of the skin of the head, and found, of black hairs, 147; chesnut, 162; and blonde, 182. I have not, as yet, had leisure to repeat his observations.

56. At the bottom of each hair-tube is a small conical prominence, analogous to a papilla of the sensitive layer of the dermis, with which latter it is connected by means of the walls of the tube. This conical eminence (plate 4, fig. 4) is the producing organ of the hair, or *hair pulp*, and is richly supplied with capillary vessels and nerves. The mode of

formation of the hair by this pulp is precisely similar to the manner of production of the scarf-skin; a fluid separated from the blood is first poured out on the surface of the pulp; this is converted into granules, then into cells, and the cells are subsequently modified to constitute the texture of the hair. Now, in describing the cells of the scarf-skin (§ 8), I pointed out that more or less of pigmentary matter formed an invariable constituent of the contents of the cells, the skin of the albino only excepted, and that in the negro the cells were abundantly supplied with a deep black colouring matter. This same circumstance is conspicuous in the hair-cells; they contain a large supply of pigment when there is very little in the scarf-cells, and upon it depends the colour of the hair. The hair of the negro may be associated with the scarf-skin of the blonde, or the hair may partake so much of the character of the scarf-skin as to be flaxen.

57. The next consideration which arises relates to the structure of the hair, and here we find the curious phenomenon of a threefold modification of the cells within so limited a circuit as that of the hair pulp. At the point of the cone the cells undergo very little alteration from their original spherical form; around them, and comprising the chief thickness of the hair, by a process of lengthening and splitting common in

the economy of cells, they are converted into fibres; and quite at the outer circumference, a thin circle of cells are flattened into the form of scales, like those of the scarf-skin, or the contiguous layer of cells which constitute the lining membrane of the hair tube. So that a hair, in its pigmy section, presents three different textures, a loose cellular texture in the centre, a strong texture of parallel fibres, and becoming more and more dense towards the circumference externally to this, and a thin, varnish-like layer of flattened cells, constituting the polished surface of the hair (plate 4, fig. 3). We may compare this structure very aptly to the section of a twig, or stem of a plant, with its cellular pith in the centre, its dense wood encircling the pith, and its smooth and polished bark at the surface.

58. Although the central part of the hair of man is a loose pith, in which the original spherical form of the cells is more or less completely lost, yet in many animals this form is retained with the most exact precision, and such hairs appear to contain in their axes a very beautiful string of beads, rendered strikingly obvious, in dried hairs, by the emptiness of the cells. Such is the appearance of the very fine hairs of the hare or mouse (plate 4, figs. 10, 11). In thicker hairs from the same animals, there are two or three or more rows of cells, and the

largest hairs from the number of these rows bear a resemblance in structure to an ear of maize (fig. 10, *b*). This is the chief modification which the pith of the hair undergoes in the animal kingdom, being more completely or less cellulated, and holding a greater or less proportion to the entire bulk of the hair; sometimes, indeed, as in some hair in my possession from one of the deer tribe, the whole texture of the hair is cellular, the other two portions being condensed into a thin envelope (fig. 7). In the feather of a bird, which is a modification of hair (fig. 8), the white pith with its dense external covering is very evident in the shaft, while the quill is an illustration of the outer parts alone, the transparent puckered membrane, which is drawn out of the quill when first cut, being a single row of dried up cells. In the growing feather, the contents of the quill would be found distinctly cellulated (fig. 6).

59. The fibrous portion of hair (plate 4, fig. 2) is the source of its strength, and, at the same time, the principal seat of its colour. In viewing a hair with the microscope, it is evident that the pigment is not diffused uniformly through the fibrous texture, that there are some cells which contain more than others, and appear as black spots amongst the rest, while, in all, that portion of the cell which is termed its

nucleus, is the most deeply tinted. It is upon this unequal mingling of the coloured with the uncoloured portions that the tint of the hair depends. Thus, the grey of the hair of the mouse is produced by a succession of coloured and uncoloured cells in alternate pairs (fig. 11), the blending of the colourless and the black giving their compound grey, just as alternate lines of blue and yellow produce upon the eye the impression of green; blue and red, purple; and red and yellow, orange.

60. The exterior layer of the hair (plate 4, fig. 1), composed, as we have seen, of flattened cells or scales, of an oval form, exhibits a peculiar arrangement of these little pieces. They are so disposed, that each newly formed circle overlaps the preceding, like tiles upon a house-top, so that if the reader will imagine a convex surface coated with oval tiles, disposed, not in measured rows, as upon the roof of a house, but irregularly, he will have a perfect idea of the appearance of the surface of a hair. The scales of a fish, or of a serpent, would give just the resemblance that I want, only, that in these animals, the plates are arranged with the most perfect and beautiful regularity. With this structure in our recollection, we have a key to the well-known phenomenon of a hair feeling rough when drawn between the

fingers in one direction, and smooth in the opposite, or to the movement of a hair from its root to its point when rubbed longitudinally between the fingers. These are natural consequences of the projection of the edges of the scales. It also explains the circumstance of hairs working their way into wounds when the latter are not properly protected from their contact; the irritation to the skin caused by woollen garments; the adhesion of dust and dirt to the hair, and the difficulty of separating from it the particles of scurf which become entangled in its midst.

61. A more important consequence of the projection of the edges of the scales which form its exterior surface is the fact that the process of *felting* depends upon this peculiarity. Without this, hair would be unfitted, from the smoothness of its surface and shortness of its staple, for combining with the strength necessary for the production of felt. But in this fitness for felting, there is great variety in hair, and an equal difference in the degree of prominence of its raised edges. In human hair, they are very slightly marked; but nevertheless, felting is not uncommon when the hair is neglected, and there are some diseases of the hair which turn wholly on this property of felting. When particles of dust collect on the edges of the scales and form projections, or

the edges themselves become loosened and raised, they give the idea of branches from the shaft of the hair, an appearance which misled Leeuwenhoek into the belief, that hairs, like feathers, were naturally furnished with branches.

62. In the preceding description, I have explained that the pulp is the producing organ of the hair, and that, in its earliest state, the latter is composed of cells distended with fluid like those of the scarf-skin. Pursuing this resemblance further, the fluid, in the next place, is given up by the cells by evaporation, and these latter are converted into fibres and scales. Now, it follows from this process, that the cellulated portion of the hair, namely, that which is in contact with the pulp, must be the bulkiest portion of the organ, and for this reason it is called its *bulb* (plate 4, fig. 4); while the evaporation, which occurs subsequently, explains the lesser thickness of the shaft. Without some explanation, it might be difficult to understand how a hair could be thicker at its root than in its shaft, unless the root itself were stationary, and the producing organ of the part beyond it, which is not the fact. When a hair is freshly plucked, its root has a rounded, swollen appearance, well expressed by the term *bulb*, and presents certain varieties of aspect, being sometimes obtuse, some-

times conical, sometimes perfectly straight, and sometimes clubbed or bent. These appearances are the consequence of the violence used in its removal, there being more or less of the membranous portion of the hair-tube torn away with it, which latter, being drawn across the root, or rolling up on one or the other side, produces the irregularity in question. When, however, this membranous matter is washed away, the fibrous structure may be seen with the microscope to be the chief constituent of the root, and the fibres being different in thickness, colour, and length, the root has precisely the appearance of an old paint-brush, worn away to a rough, conical stump.

63. That portion of the shaft of the hair which is contained within the hair-tube is steadied in its position by contact with the lining scarf-skin of the tube, and as the latter is continually undergoing the process of formation and exfoliation (§ 4), the superficial scales of the sheath are moved towards its aperture with the growing hair, and are then scattered on the surface in the form of "scurf." The scurf, therefore, is a natural and healthy formation, and though it may be kept from accumulating, it cannot be prevented (§ 5). It is produced on every part of the body where hair is found, although, from the

more active growth of the hair of the scalp, the facilities for collecting, and the contrast of colour, it strikes the eye most disagreeably in that situation. Sometimes it happens, that instead of obtaining a free escape at the outlet of the tube, it becomes impacted, as I have previously noticed to be the frequent condition of the unctuous substance of the skin (§ 46). In this case, the hair also is impeded in its onward movement; for, although from the position of its scales, the hair is an agent in the prevention of such an occurrence, and would naturally carry the obstacles before it, yet the impaction is sometimes too great for the power which it is capable of exerting. When a condition of this kind occurs, the hair makes pressure on the pulp at the bottom of the tube, and the impression, so produced on a vital tissue, transmitted to the brain by the nerves of the pulp, is felt as a sensation of itching, that is to say, a sensation which, falling far short of pain, is nevertheless disagreeable. A natural remedy for the unpleasant sensation is at hand, the nail is conveyed to the seat of inconvenience, it disturbs the impacted matter at the aperture of the tube, probably dislodges it, and the hair resumes its accustomed state. Those who are subject to a dry scalp know the suffering which this trifling impaction occasions, for where the

unctuous substance is deficient, it is most likely to occur. In a natural state of the skin, the comb and brush are contrivances to prevent such a circumstance from arising; hence comfort, as well as nicety, demands their regular use.

64. Having dwelt, I fear at too great length, on the economy of the long hairs of the skin, I may now advert to those of minor growth. On the general surface of the body, the hairs are less closely set than upon the head, and in consequence of this arrangement, the tubes enjoy a more independent position in the skin. It would seem, also, that the corium which surrounds them is supplied with contractile fibres (§ 18) in greater number than in the parts between the tubes, and that, moreover, these fibres have a circular arrangement around their cylinders. When, therefore, the skin is stimulated to contract by cold, these circular fibres, closing the tube around the hair, maintain it erect, and, at the same time, render the tube rigid and prominent. The interspaces of the hair-tubes, on the contrary, having no such fixed support, are drawn closer to the deep tissues, and form a level below that of the hair-tubes, which are thereby thrown into strong relief. It is this appearance which is commonly denominated "goose-skin," and, as will be seen by

observation, it is an appearance which is due to the presence of the hairs.

65. The short hairs of the skin are not unfrequently disturbed, in their growth, by a cause previously referred to in connexion with the hairs of the head (§ 63), namely, deficient oleaginous qualities of the product of the oil-tubes. When this happens, the dry scales and cells of the oil and hair-tubes collect at the aperture of the latter, and become a source of impediment of growth to the hair, which, as a consequence, assumes a coiled and twisted appearance. But sometimes, this closure of the orifice of the hair-pore takes place after the fall of the old, and previously to the growth of the young hair, in which case, the latter is imprisoned in the tube, and there grows, although unable to escape. I have occasionally seen nearly the whole of the hairs of a limb thus imprisoned, and forming little spiral circles, which are visible through the thin horny scale of desiccated cells which covers them and keeps them down (plate 6). The obstruction occasions, as may be anticipated, a good deal of itching and uneasy feeling in the skin, and is more or less alleviated, by tearing up the filmy covering. For the relief of this inconvenience, I am in the habit of recommending a lotion which softens and partly

dissolves the horny films. After its application, the skin requires to be thoroughly dried by a rough towel, and then brushed briskly for a few minutes with a flesh-brush, or horse-hair glove. With two or three repetitions of this process, the hairs are entirely liberated; and an occasional return to its aid prevents the recurrence of the same state. The lotion is as follows:—

SOLVENT LOTION.

Fluid potash, half an ounce;

Oil of sweet almonds, a quarter of an ounce;

Rose water, two ounces;

Common water, fourteen ounces.

Shake well together, and rub upon the skin for five minutes, then rinse with fresh water, and dry.

66. The invisible, or downy hairs of the body, rarely appear above the level of the skin, for when they do, they necessarily fall into the category of the short hairs. I may best illustrate them, by referring to a position in which their presence is invariable, although seen in that situation as an exceptional occurrence: I allude to the nose. The nose is ordinarily bald; but if the unctuous product of an oil-gland be squeezed out of its tube, and examined beneath the microscope, one or more of these little hairs will constantly be detected in the centre of the

mass (plate 3, fig. 18). Indeed, when the unctuous matter has been detained in the oil-tube for any length of time, the number of hairs may be considerable, as, for example, twenty, thirty, or even forty. Now, the whole of these hairs have, as far as we at present know, been produced by a single pulp, and having attained maturity, have been shed, to be carried out of the oil-tube with the unctuous substance; but the latter being retained, they have had time to collect, as we have seen, in astonishing numbers. I should be inclined to infer, from this circumstance, that these little hairs grow very quickly, and are shed at short intervals of time. On no other hypothesis can their numbers be satisfactorily explained.

67. In their normal state and position, these little hairs are colourless and transparent, having rounded blunt points and brush-like roots, but under the influence of augmented action in the skin, they are susceptible of growth to a considerable extent, both in length and bulk, in fact, of becoming equal in dimensions to the short hairs of the body. Of this, we have an example in the occasional growth of visible hairs upon the nose. I may refer, also, to the disproportionate development of hair in the male and in the female, and may adduce, besides, some

curious illustrations of augmentation in the growth of hair, recorded by various writers. Schenkus and Ambrose Paré have left accounts of cases in which the entire body was covered with hair; and Daniel Turner, quoting from Peter Messias on the authority of Damascenus, relates, "that, upon the confines of Pisa, at a place called the Holy Rock, a girl was born all over hairy, from the mother's unhappy ruminating and often beholding the picture of St. John the Baptist, hanging by her bedside, drawn in his hairy vesture." A French physician, Ollivier, writing recently, narrates the case of a young lady, remarkable for the fairness of her skin and beauty of her deep black hair, who was the subject of fever, and while recovering, perceived the whole surface of her body to be in the state termed "goose-skin." In a few days, the little elevations looked dark at the summit, and were surmounted each by a short black hair, which grew very rapidly, so that at the end of a month, every part of the body, with the exception of her face, the palms of the hands, and soles of the feet, was covered with a short hairy coat, of about an inch in length.

68. In the arrangement of the hairs on the surface of the body, it might be inferred, that little existed to excite attention; but this is not the fact, if we are

to judge by the careful investigations to which the subject has given rise. The hair-tubes are not placed perpendicularly, but obliquely, in the skin; hence the direction of the hairs, after their escape from the tubes, is in the same sense inclined towards the surface; and the "set" of the hair, from the root to the point, is governed by a law as precise as that which regulates any other of the secondary vital functions. Thus, on the head, the hair radiates from a single point, the crown, to every part of the circumference, making a gentle sweep, behind, towards the left, and in front, to the right. The direction of this sweep is naturally indicated on the heads of children, and is that in which the hair is turned. On the forehead, the downy hairs proceed from the middle vertical line, with a gentle curve to the right and left, curving downwards to the situation of the whisker, and forming, by their lower border, the upper half of the eyebrow. Occasionally, the line of divergence of the forehead is oblique in its direction, running from the left of the forehead to the root of the nose. At the inner angle of each eye is situated another radiating centre, like that of the crown of the head; and a vertical line of divergence is continued downwards from this point, by the side of the nose, mouth, and chin, to the under part of the latter,

where it curves inwards to the middle line. The upper and inner rays from this centre ascend to the line between the eyebrows, where they meet those which are proceeding from the opposite centre, and those, also, which are diverging from the vertical central line of the forehead; so that here a lozenge is formed, which is the point of approximation of hairs from four different quarters. It is this circumstance that gives to the hairs of the inner end of the eyebrows a direction towards the middle line; and occasionally we see instances in which, from the unusual development of these hairs, the eyebrows meet at the base of the forehead, and form a little crest, for a short distance, along the root of the nose. The lower and inner rays from the angle of the eye diverge from the preceding, and are directed downwards and inwards upon the side of the nose; when strongly developed, they meet those of the opposite side on the ridge of the nose, and at their point of divergence from the ascending current necessarily form another lozenge. This latter is a lozenge of divergence, that of the forehead being one of convergence. The upper and outer rays from the angle of the eye curve along the upper lid, forming, by their upper margin, the lower half of the eyebrow, and at the outer angle of the eye, being lost in the

converging currents of the whisker. The lower and outer rays from the centre at the angle of the eye, together with those from the vertical line of the side of the nose, mouth, and chin, make a gentle sweep over the cheek, side of the face, and jaw, to be lost, the upper ones in the front of the whisker, the middle rays, after passing beneath the ear, in the middle line of the back of the neck, and the lowest rays in the angle of bend of the jaw, in which latter situation they come into coalition with an ascending current from the chest. The rays from the inner margin of the vertical line of the side of the nose, mouth, and chin, are directed inwards upon those parts. On the upper lip, they are met by a current directed from the apertures of the nose, outwards, and forming the sweep of the mustachio; a similar disposition is observed in the middle line of the lower lip, near its free edge, while the beard is formed by the convergence of two side currents meeting at the middle line. The current from the side of the head divides at the ear, those which pass in front of that part, and some, also, from the skin before the ear, contributing to form the posterior border of the whisker, and then passing backwards beneath the ear, with the current from the face, to the middle line of the nape; while those which pass down behind the ear con-

verge with those from the back of the head also to the middle line of the nape.

69. On the trunk of the body, there is a centre of radiation from each armpit, and two lines of divergence, one of the latter proceeding from this point horizontally to the middle of the front of the chest, the other from this horizontal line, just in front of the armpit, vertically along the side of the trunk, across the front of the hip, and down the inner side of the thigh to the bend of the knee. From the armpit centre, and from the upper side of the horizontal line, a broad and curved current sweeps upwards and inwards over the upper part of the front of the chest, and outwards, around the neck, to the middle line of the nape, the outermost part of the current passing over the shoulder to the middle line of the back. From the lower side of the horizontal line, and from the vertical line, the set of the current is downwards and inwards, with a gentle undulation to the middle line in front, and from the armpit centre, and vertical line downwards and backwards, also with an easy undulation to the middle line of the back. The inner extremity of the horizontal line of the chest is the seat of a lozenge of divergence, and that of the line of the bend of the lower jaw, at the front of the neck, of a second.

70. From the armpit centre just described there proceeds another line of divergence, which encircles the arm like a bracelet, immediately below the shoulder. From the upper margin of this line the direction of the current is upwards over the shoulder, and then backwards to the mid-line of the back. Another line commences at this ring on the front part of the arm, and runs in a pretty straight course to the cleft between the index finger and thumb on the back of the hand: this is the line of divergence of the arm; from it and from the ring the stream sets, at first, with a sweep forwards, and then, with a sweep backwards to the point of the elbow. In the fore-arm, the diverging currents sweep downwards in front, and upwards behind, also tending to the point of the elbow, which is thus a centre of convergence; while on the back of the hand and fingers the sweep outwards, with a curve having the concavity upwards, is quite obvious.

71. On the lower limb there are two vertical lines of divergence: the one being the continuation of that of the side of the trunk, proceeding around the inner side of the thigh to the bend of the knee; the other, an undulating line, beginning at about the middle of the hip, running down the outer side of the thigh to the bend of the knee, then continuing down the outer

side of the leg, reaching the front of the ankle, and terminating on the foot at the cleft between the great and second toe. A short oblique line connects the two vertical lines at the bend of the knee. On the front of the thigh, the streams from the two lines converge, and descend towards the knee. On the back they converge also at the middle line, but ascend towards the trunk of the body. On the leg, where there is but one line, the diverging currents sweep around the limb, and meet upon the shin, while on the foot they diverge with a sweep, as upon the back of the hand.

72. Chemical analysis shows the hair to be composed of a basis of animal matter, of a certain proportion of oily substance, of the salts of lime which enter into the composition of bone, of flint, sulphur, and two metals, namely, manganese and iron. The quantity of sulphur is somewhat considerable, and it is this substance which is the principal cause of the bad odour evolved by hair during its combustion. The constituents of hair of various colours also present some differences, for example, red hair contains a reddish-coloured oil, a large proportion of sulphur, and a small quantity of iron; fair hair, a white oil, with phosphate of magnesia; and the white hair of the aged, a considerable quantity of

bone-earth or phosphate of lime. According to the latest ultimate analysis, fair hair contains the least carbon and hydrogen, and most oxygen and sulphur; black hair follows next; while brown hair gives the largest proportion of carbon, with somewhat less hydrogen than black hair, and the smallest quantity of oxygen and sulphur. The hair of the beard was found to contain more carbon and hydrogen than the hair of the head, and less oxygen and sulphur. The quantity of nitrogen is the same in all.

73. We come now to the question, what purpose does hair perform in the animal economy? That it effects an important one, we have evidence in its almost universal distribution among the mammiferous class of animals, and if we admit the analogy between the feather and the hair, among all warm-blooded animals; additional evidence is obtained in the perfection of its structure, and again, in its early appearance in the progress of development of the young. As a bad conductor of heat, it tends to preserve the warmth of the body, and in man it would have that effect upon the head, and serve to equalize the temperature of the brain. It is also an agent of defence against external irritants, as the heat of the sun's rays, and the bites of insects; and against injuries inflicted with violence, as we see illustrated

in the use of the horse's tail on the helmets of warriors. Of special purposes fulfilled by the hairs, we have instances in the eyebrows and eyelids, which are beautifully adapted for the defence of the organs of vision; in the small hairs which grow in the apertures of the nostrils, and serve as guardians to the delicate membrane of the nose; and in similar hairs in the ear-tubes, which defend those cavities from the intrusion of insects. Among the larger mammiferous animals, the hair of the tail is used as a whisk to remove flies that pierce the skin to suck its blood or deposit eggs; and in those parts of the body which the tail cannot reach, a flowing or bushy mane serves to supply its place. By a power of conduction of outward impressions common to the hairs with all rigid bodies, these organs are calculated to perform the office of an apparatus of touch. We feel distinctly the disturbance of the hairs of the head by the movements of a fly, although the little animal is at some distance from the skin; and, on a similar principle, the long and rigid hairs of the upper lip of feline animals are an agent of touch, transmitting whatever impression they receive to the sensitive pulp upon which they are implanted. Indeed, animals of the cat tribe have the power of erecting these hairs, and rendering them fixed, so

that the slightest impression of contact is transferred to the nerves of the sensitive pulp.

74. Of the delicacy and beauty of structure of the hair, I have endeavoured already to adduce evidence ; and with regard to its early development, I will now make a few observations. At the period of birth, the human infant, without reference to sex, is covered with a thick down, and it is then that we have the best opportunity of observing the direction of the hairs (§ 68); for during the first year, the greater part of the temporary hairs have fallen, and are succeeded by others which appear upon the surface only in some situations. The first hairs that are developed are those of the eyebrow, then those of the upper lip and around the mouth, and, at a later period, those of the head. The last which push through are the hairs of the fingers and those of the external ear and nose. At the period of adolescence, the hairs acquire a new impulse of growth in co-relation with the more active development of the frame ; and when the powers of the system are on the wane, the hair is among the first of the organs of the body to evince an associated infirmity. It seems to be established that the hairs, at their first formation, do not issue directly from the hair-tubes, but become bent upon themselves, so that they form a loop, whereby

the point of the hair is directed towards the root, and the bend of the loop towards the aperture of the hair-tube, or pore. The cause of this position of the hair would appear to be some obstruction at the pore, from the accretion of the unctuous substance of the oil-glands, and the cast cells of the hair-tube, for the little scale formed by this accretion is gradually raised by the elasticity of the hair, and when the latter attains sufficient power is cast off, and the hair bursts from its temporary imprisonment.

75. In reflecting on the purposes of the hair in the animal economy, we must not pass over its chemical constitution. A large quantity of carbon and hydrogen are by its means separated from the system; and although several other organs are concerned in the more abundant removal of the same elements, yet it would not be judicious to deny, that the comparatively trifling aid of the hair is, under some circumstances, of importance in the exact counterpoise of the manifold operations of the animal organism. A learned French writer, Moreau, narrates the case of a young lady who was cured of mania by the cutting of her hair. Another relates that a Capuchin friar was cured of a serious disease by shaving his beard, and several instances are recorded in which headache has subsided on the removal of the hair. Vauquelin

and Fourcroy have given it as their opinion, that the hair, in conjunction with the other products of the skin, is capable of supplying the office of the kidneys. Again, it has been observed that the growth of the hair is unusually rapid in that disease in which the functions of the lungs are more or less completely abrogated, namely, pulmonary consumption; and we are but too well acquainted with the long silken eyelashes, and long and streaming hair, of the sufferers from that distressing malady.

76. It is a question whether the hair, when once formed, receives any supply of fluids from the vital tissues of the pulp: I am induced to think that this is the case, but only to a modified extent; my belief stops far within the range necessary to admit, with Mandl, a movement of fluid to the tip of the hair capable of depositing its dissolved material in a regular manner on the cut extremity (§ 54); or to acknowledge, with other authors, the occasional commencement of whiteness at the tip. Much less can I give credit to the bleaching of the hair in a single night, or even in a single week; the first step in the change may have been made in a single night, and on that night week the whole of the hairs of the head may have become white at their roots; this is perfectly possible, and the only reasonable explana-

tion of the circumstance. Thus we learn that Marie Antoinette became grey in a short period from grief, as did the unfortunate Queen of Scots. But the error has a foundation in poetry, as well as in fiction, and hence may not easily be dethroned. Lord Byron gives it the weight of his authority in the "Prisoner of Chillon :"—

" My hair is grey, though not with years ;
 Nor grew it white
 In a single night,
 As men's have grown from sudden fears."

Sir Thomas More, we are told, became grey during the night preceding his execution. According to Borellus, two gentlemen, the one a native of Languedoc, the other a Spaniard, were so violently affected, the first, by the announcement of his condemnation to death, the latter, by the bare thought of having incurred a serious punishment, that both became blanched in the course of a single night. The gravity with which Daniel Turner relates the following case, which he attributes to Schenkius, is amusing :—" Don Diego Osorius, a Spaniard of a noble family, being in love with a young lady of the court, had prevailed with her for a private conference, under the shady boughs of a tree, within the garden of the King of Spain, but by the unfortunate barking of a little dog,

their privacy was betrayed, the young gentleman seized by some of the king's guard, and imprisoned ; it was capital to be found in that place, and therefore he was condemned to die. He was so terrified at the hearing of his sentence, that one and the same night saw the same person young and old, being turned grey as in those stricken in years. The jailer, moved at the sight, related the accident to King Ferdinand, as a prodigy, who thereupon pardoned him, saying, he had been sufficiently punished for his fault." And again, this, from the same author : a young nobleman " was cast in prison, and on the morrow after, ordered to lose his head ; he passed the night in such fearful apprehensions of death, that, the next day, Cæsar sitting on the tribunal, he appeared so unlike himself, that he was known to none that were present, no, not to Cæsar himself, the comeliness and beauty of his face being vanished, his countenance like a dead man's, his hair and beard turned grey, and in all respects so changed, that the emperor at first suspected some counterfeit was substituted in his room. He caused him, therefore, to be examined if he were the same, and trial to be made if his hair and beard were not thus changed by art ; but finding nothing counterfeit, astonished at the countenance and strange visage of

the man, he was moved to pity, and mercifully gave him pardon for the crime he committed." Dr. Cassan records the case of a woman thirty years of age, who, on being summoned before the Chamber of Peers to give evidence upon the trial of Lovel, underwent so powerful a revulsion, that in the course of one night the hair was completely blanched, and a furfuraceous eruption appeared all over her head, upon her chest, and upon her back. Henry of Navarre, on hearing that the edict of Nemours was conceded, was so exceedingly grieved, that in the course of a few hours a part of one of his mustachios whitened. In one person, some of the eyelashes became blanched from mental agitation. And Moreau narrates, that he once knew an aged man for whom snow-white hair and a countenance deeply marked by the furrows of care inspired the respect which we owe to age and misfortune. "My hair," said he, "was as thou seest it now, long before the latter season of my life. More energetic in their effects than assiduous toil and lingering years, grief and despair, at the loss of a wife most tenderly loved, whitened my locks in a single night. I was not thirty years of age. Judge, then, the force of my sufferings; I still bear them in frightful remembrance." The catechist forgot, however, to ask the old gentleman at what period after the sad night

his feelings became sufficiently calmed to permit him to examine his hair; and in some of the other cases, taking them as they stand, there is ground for suspicion that the colour of the hair had unfortunately been washed off. But to make the thing intelligible, a modern French author has advanced an hypothesis to explain the supposed phenomenon; and this I add, as a last, and I think, a fatal "counterblast" against the belief. "We must suppose," says the author in question, "we must suppose, to explain the sudden change of the hair, that at the critical moment when Nature is in revolution, and when, consequently, the natural functions are suspended or changed in nature, that an agent is developed in the animal economy, and passing into the hair, decomposes the colouring matter. This agent must be an acid."

77. It is by no means uncommon to find instances of a gradual change of colour of the hair referrible to a particular period of suffering, as was the case with the greyness of Mary Queen of Scots and Marie Antoinette. Alibert records, that after severe illness, a head of brown hair was exchanged for one of bright red, and in another person, from having been previously brown, the hair became deeply black. Several instances are narrated, in which brown hair

became fair, and in an old person, the white hair fell off, and was replaced by brown. Dr. Isoard, detailing the constitutional peculiarities of a particular family, observes, with regard to one of its members, a young lady of seventeen, deaf and dumb from birth, that each time she is attacked by a fever peculiar to herself, she undergoes a change in the colour of her hair, from a pleasing blonde to a dusky red, but that so soon as the febrile symptoms diminish, the natural colour returns. A more perplexing case is the following, communicated by Dr. Bruley, a physician of Fontainebleau, to the Society of Medicine, in Paris, in 1798 :—A woman, sixty-six years of age, afflicted with consumption, had fair hair, transparent as glass ; four days before her death, this hair became jet-black. On examining the roots of the hair, Dr. Bruley found the bulbs distended to an unusual size, and gorged with a black pigment, while the roots of those of the fair hairs which yet remained were pale and shrivelled. The case, however, is imperfect, from the circumstance of the length of the hair being unmentioned.

78. The brief history of the hair which I have now given would be incomplete were I not to refer to the numerous fabulous stories to which ignorance of the economy of the hair has given birth ; and this

is the more necessary, from the circumstance of such fables being sometimes met with in high places, and having the sanction of high names. A more celebrated name than that of Bichât is hardly to be met with among medical authorities ; and yet Bichât has propagated a serious error, in declaring that he has found hairs growing from the mucous membrane (§ 1). Similar statements have been made by more recent writers, and amongst the places named as the seat of hairs is the tongue. But the fictions of the ancients on this subject far outweigh all that the moderns have ever written or imagined. Thus, in the "Philosophical Collections," it is recorded, that "Pliny and Valerius Maximus concur in their testimonies, that the heart of Aristomanes was hairy. Cœlius Rhodiginus relates the same of Hermogenes, the rhetorician ; and Plutarch of Leonidas, the Spartan."* A prevalent belief, strengthened by the opinion of several modern French writers on this subject, is, that the hairs grow after death. It is true that they lengthen, but their lengthening results from the contraction of the skin towards their roots, and not from the continuance of a vital process, after the death of the individual. But the olden writers outstrip the moderns again in invention ; for in the

* "Encyclopædia Britannica." Article, Hair.

same "Collections," Wulferus gives the "account of a woman buried at Nuremberg, whose grave being opened, forty-three years after her death, there was hair found issuing forth plentifully through the clefts of the coffin, insomuch, that there was some reason to imagine the coffin had sometime been covered all over with hair." And Mr. Arnold gives "the relation of a man hanged for theft, who in a little time, while he yet hung upon the gallows, had his body strangely covered over with hair."*

* "Encyclopædia Britannica."

CHAPTER VI.

ON THE INFLUENCE OF DIET ON THE HEALTH
OF THE SKIN.

79. IN preceding chapters, I have endeavoured to show, that whether we regard the skin as an independent organ, or consider its function in connexion with the entire system, we cannot fail of coming to the conclusion that it must be an important agent, for good or for evil, in the animal economy. In addition to the power of sensibility which it confers on the system, it is the means of conveying to the mind a knowledge of the state of temperature of the body ; it is, as it were, the thermometer of vital heat, the degrees upon its scale being computed by the expressions *agreeable* and *disagreeable*, in place of the terms of the common thermometer. The value of these expressions to health is not, however, sufficiently estimated, but it is nevertheless certain that

a disagreeable impression of temperature in the skin is a warning note of something mischievous to health, acting either within or out of the economy. If the temperature be elevated above the agreeable point, without an evident cause, there is fever; if it be lowered below the agreeable point, upon only a part of the body, there is need of vigilance. The temperature of health is a genial summer over the whole surface, and when that exists, the system cannot be otherwise than well. This brings me to the rule of health which I wish to establish, namely, *by food, by raiment, by exercise, and by ablution, to maintain and preserve an agreeable warmth of the skin.* Everything above this is suspicious; everything below, noxious and dangerous.

80. Food is in a twofold manner a source of warmth: firstly, by supplying the material of nutrition requisite to balance the continual waste taking place in the body; and secondly, by conveying into the system those elements which, by their chemical combinations, elicit heat. To ensure these results, food must be wholesome and sufficient, and must combine all that variety of animal and vegetable which a Divine Providence has bestowed upon man. Dr. Prout has grouped all nutritive substances into four classes, which he terms aqueous, saccharine,

albuminous, and oleaginous. The first of these needs no elucidation, it is an abundant and necessary constituent of the body, and an universal component of our food. The saccharine class is derived from the vegetable kingdom; the albuminous chiefly from the animal realm; and the oleaginous from both. "A diet," writes Dr. Prout, "to be complete, must contain more or less of all the four staminal principles; such at least must be the diet of the higher classes of animals, and especially of man." And the same author beautifully remarks—"This view of the nature of aliments is singularly illustrated and maintained, by the familiar instance of the composition of milk. All other matters, appropriated by animals as food, exist for themselves, or for the use of the vegetable or animal, of which they form a constituent part. But milk is designed and prepared by nature expressly as food, and it is the only material throughout the range of organization that is so prepared. In milk, therefore, we should expect to find a model of what an alimentary substance ought to be, a kind of prototype, as it were, of nutritious matters in general. Now, every sort of milk that is known, is a mixture of the four staminal principles we have described, in other words, milk always contains, besides water, a sac-

charine principle, a caseous, or, strictly speaking, an albuminous principle, and an oily principle. Though, in the milk of different animals, the three latter of these staminal principles exist in endlessly modified forms, and in very different proportions, yet neither of them is at present known to be entirely wanting in the milk of any animal."

81. To those who are unacquainted with the principles of chemistry, it will be a startling announcement, that all organic matters, whether animal or vegetable, are composed essentially of the same elementary principles; and, moreover, that these principles are only four in number, namely, oxygen, hydrogen, nitrogen, and carbon. The two first of these gaseous elements are the constituents of water; nitrogen exists in the atmosphere, in conjunction with oxygen; and carbon is the impurity of the air exhaled from the lungs during respiration. Thus, in the air which we breathe, and in the water which we apply to our commonest uses, these four essential elements of everything organic on the face of the globe, these four constituents of ourselves and of our means of life, are present, as almost sole components. The saccharine staminal principles are composed of oxygen, hydrogen, and from forty to fifty per cent. of carbon; the albuminous of oxygen, hy-

drogen, nitrogen, and from fifty to seventy-five per cent. of carbon ; and the oleaginous of oxygen and hydrogen, with eighty per cent. of carbon. Now, as these three nutritive principles embrace an extensive variety of substances, for example, the saccharine includes sugar, acid juices, starch, and gum ; the albuminous, all the varieties of flesh, jelly, curd, and gluten ; and the oleaginous, a great variety of oils, besides fat, suet, butter, and alcohol, it follows that the whole of these substances, however dissimilar they may appear in character and properties, differ, in reality, only in the possession of a little more or little less of one or more of the primary gaseous principles of which they are all composed.

82. When alimentary substances are taken into the stomach, they are submitted to the chemical process termed *digestion*, which has for its object the separation of the four above mentioned primary principles from their state of union in the food, and their combination anew, in order to constitute an animal nutritive principle, capable of being received into the blood, and of undergoing successive transmutations. For example ; this newly-formed nutritive substance, having been mingled with the blood of the right side of the heart, and propelled through the lungs, combines with the oxygen of the atmo-

sphere. It is then conveyed to the left side of the heart, and transmitted by the arteries to the capillary vessels in every part of the system (see diagram, page 26). Here, another chemical process, termed *nutrition*, is effected, the newly-formed nutritive principle transudes through the coats of the capillaries, and yielding up its oxygen, becomes deposited as new matter in the living tissues. The oxygen combines with the old material, just supplanted by the new, and forms, among other effete substances, which are separated from the body in various ways, carbonic acid gas. The latter enters the blood particles, communicates to them a different form and different refractive power, gives the deep colour which is characteristic of impure blood, and, finally, is cast off from the blood, in the lungs, to be removed from the body with the expired air.

83. Thus it will be seen that a succession of chemical changes is taking place: firstly, in the stomach, then in the blood, then in the tissues, and then in the lungs; and the whole of these changes are attended with the development of heat; the most important, in reference to the present subject, as giving rise to the greatest amount of heat, being the chemical change which accompanies nutrition. Whenever an unusual proportion of carbon exists in

the system, a larger supply of oxygen than common is required for its removal, an active chemical combination is consequently taking place in the tissues of the body, and an energetic development of heat is the necessary result. Now we have seen that the alimentary principles differ from each other in the proportion of carbon which they contain, and if we are desirous of increasing the amount of heat, we should have recourse to that kind of food which promises the maximum of carbon, and *vice versâ*. Thus, the diet of invalids suffering from feverishness should be of the saccharine kind, as containing the least carbon; and the same remark applies to the summer season; while in the winter, and cold climates, the oleaginous must necessarily be the prevailing and favourite aliment. Of this principle, we have a remarkable illustration in the natives of countries near the pole, whose food is almost entirely composed of fat and oil, and they are enabled, by its use, to withstand the excessive cold of their climate. How wonderful is the Providence that guides the seal and the whale, whose blubber is the chief source of the oil they use as food, to the seats of these desolate regions!

84. The chemical process which has now been described is identical with that which takes place in

a burning candle ; the carbon of the fatty matter of which the candle is composed combines with the oxygen of the atmosphere, and carbonic acid gas results ; the process, in man and animals, is therefore very correctly likened to combustion ; the same chemical change occurs, and heat is, in like manner, elicited. But the whole of the carbon of the body is not got rid of by this process alone ; some is deposited, as fat, in the tissues and bones ; a large quantity is separated, as a fatty emulsion, by the liver ; some is disposed of in the formation of the hair and unctuous substance of the skin ; and some is eliminated by the skin as carbonic acid gas. The nitrogen of the food forms compounds in the blood and in the tissues, which are of a stimulant nature, and hence are very proper to assist in the development of heat ; but when these substances are produced in excess, they act as a cause of irritation, and, indeed, are so violent in their effects as sometimes to cause death. The kidneys and the skin are the organs which separate these irritating matters from the body, and their detention in the skin I believe to be the cause of some of the eruptions and diseases of that membrane.

85. In the preceding remarks, I have endeavoured to bring before the reader a view, as extensive as

my limits will allow, of the nature of food, and of the chemical and vital processes by which it is subjected to the purposes of nutrition. I need say little with regard to the goodness of the food selected; that is a matter to be left to the judgment and taste of the consumer; but it may be as well to remark, that all aliment, to be nutritious and beneficial to the system, must be sound and fresh. When decomposition has taken place, combinations of a dangerous kind are generated, which act as poisons on the system. Of the articles of food which are thus to be eyed with suspicion are fish, potted meats, sausages, game, &c. There are, of course, individual peculiarities of constitution, which cannot be taken into consideration here, in which the most wholesome food may prove noxious, as in the example, mentioned by Dr. Prout, of a person who was unable to eat mutton without being seriously ill. In his case, the peculiarity was supposed to depend on caprice, and the meat was repeatedly disguised; but in every instance it produced the same injurious effects. As relates to the quantity of food taken, it is best, at all times, to err on the side of moderation, and the appetite must be made the test of sufficiency. I have no hesitation in condemning variety in a single meal, however much variation of diet may be generally useful, for variety

of dishes is simply an ingenious device for heaping an unnatural load on the stomach. Dr. Combe, in his work on digestion and dietetics, has the following excellent remark on this subject: "It may be alleged, that a glass of brandy after a heavy dinner facilitates digestion, and therefore cannot do harm. I admit at once, that when we eat too much, or fill the stomach with indigestible food, a dram of brandy, from its temporary stimulus, enables us to get rid of the load sooner than we could do without it. But it seems to me, that a far wiser plan would be, to abstain from eating what we know to be oppressive to the stomach, and that by this means we shall attain our end infinitely better than by first eating a hearty meal, and then taking a stimulus, the efficacy of which is diminished by every repetition of its use. If we were compelled to exceed the bounds of moderation in eating, there would be some apology for our conduct."

CHAPTER VII.

ON THE INFLUENCE OF CLOTHING ON THE
HEALTH OF THE SKIN.

86. NEXT in importance to a judicious and rational diet, as a means of maintaining the temperature of health, is the raiment selected for its preservation. It is a fact, which must be apparent to every one, that clothing, in itself, has no property of bestowing heat, but is chiefly useful in preventing the dispersion of the temperature of the body, and, in some instances, of defending it from that of the atmosphere. This power of preserving heat is due to the same principle, whatever form the raiment may assume, whether the natural covering of birds and animals, or whether the most beautiful and elegant tissues of human manufacture. In every case it is the power which the coverings possess of detaining in their meshes atmospheric air that is the

cause of their warmth. We have an exemplification of this principle in the lightness of all articles of warm clothing as compared with water; the buoyancy, for example, of a fleece of wool, or the lightness of a feather. In the eider-duck, or the sea-bird, it is the accumulation of warm air within their downy covering that defends them alike from the temperature of the water, and from its contact. The furs from the piercing regions of the north, which we prize so highly as articles of dress, are, to the animals which they by nature invest, so many distinct atmospheres of warm air, and the same principle is carried out in the clothing of man. Our garments retain a stratum of air, kept constantly warm by its contact with the body, and as the external temperature diminishes, we increase the number of layers by which the person is enveloped. Every one is practically aware that a loose dress is much warmer than one which fits close; that a loose glove is warmer than a tight one; and that a loose boot or shoe, in the same manner, bestows greater warmth than one of smaller dimensions. The explanation is obvious: the loose dress encloses a thin stratum of air, which the tight dress is incapable of doing; and all that is required is, that the dress should be closed at its upper part, to prevent the dispersion of the warm

air, and the ventilating current which would be established from below. The male summer dress in this climate consists of three layers, which necessarily include two strata of atmospheric air ; that of females contains more ; and in the winter season we increase the number to four, five, or six. As the purpose of additional layers of dress is to maintain a series of strata of warm air within our clothes, we should, in going from a warm room into the cold, put on our defensive coverings some little time previously, in order that the strata of air which we carry with us may be sufficiently warmed by the heat of the room, and may not be in need of borrowing from our bodies. Otherwise, we must walk briskly, in order to supply heat, not only to keep up the warmth of the strata of atmosphere nearest ourselves, but also to furnish those which we have artificially made by our additional coverings. When we have been for some time in the air, if we could examine the temperature or climate between the several layers of our dress, we should find the thermometer gradually falling, as it was conveyed from the inner to the outer spaces.

87. These observations on dress have reference to the number of layers of which the covering is composed, but they are equally applicable to the texture of the garment itself. The materials employed by

man in the manufacture of his attire are all of them *bad conductors of heat*; that is to say, they have little tendency to conduct or remove the heat from the body; but, on the contrary, are disposed to retain what they receive; hence they are speedily warmed, and once warm, preserve their temperature for a certain period, and convey the sensation of warmth to the hand. They are also bad conductors of electricity, and on this account become sources of safety in a thunderstorm. They are all derived from the organic world, some from the vegetable, and some from the animal kingdom; for example, hemp and flax are the fibres of particular plants, while cotton is a covering of the seed of a plant. Silk, wool, hair, feathers, and leather are animal productions; silk being a kind of tenacious gum drawn through minute tubes, like those of the spinneret of the spider, in the body of the silk-worm, and dried in the form of excessively delicate threads. Wool is a soft and elastic hair; while hair, feathers, and leather have been already described in preceding chapters of this work. Of these materials, the first five are chiefly employed as articles of clothing, and in order to be fitted for that purpose, are spun into threads, and then woven into a tissue of various degrees of fineness and closeness. It is evident that

this tissue will have the effect of retaining a quantity of air proportioned to the size of its meshes ; hence, besides the strata of atmosphere imprisoned between the different articles of clothing, each article is in itself the depository of an atmosphere of its own. Thick textures are warmer than thin ones made of the same material, because the body of air retained in their meshes is great, as we see illustrated in blankets and woollen garments. Wool, moreover, being, in reality, hair, is cellulated in its structure, and each of its little cells is the separate casket of a collection of air (§ 58). Hair differs from wool only in the greater solidity of its structure ; but from its attendant hardness is little adapted to the purposes of weaving ; it is employed chiefly in the production of manufactures termed *felts*, for which, from the nature of its formation (§ 61), it is peculiarly fitted. Hats, and sometimes bonnets, are made of felt, and so likewise is a particular kind of thick shawl recently introduced. Felts are necessarily porous in their texture, besides being composed of a cellulated fibre, and are proportionally warm. Leather is a kind of natural felt, but of much closer and firmer texture than an artificial manufacture. The thinner and softer kinds of leather are sometimes used as body-clothes, but its special and proper purpose is the manufacture of coverings

for the feet, to protect them from cold and wet. To the inhabitants of colder climates, feathers are a source of peculiar comfort, but, from their bulk, are not easily convertible into body garments. From their lightness and warmth, they are fitted to supply the wants of the most refined and fastidious Sybarite, and they serve to cover and protect us during the ever-recurring winter of the twenty-four hours, when, as I shall have presently to show, our power of generating heat is temporarily diminished.

88. LINEN differs from other textures used as clothing in the roundness and pliability of its fibre (plate 4, fig. 13). These qualities give a smoothness and softness to its tissue which adapt it peculiarly, as a soft and agreeable covering, to be worn next the skin. Hence we find, that in temperate climates, linen is an universal favourite. But linen has its objections; it is a good conductor, and bad radiator, of heat, and therefore the very opposite of a warm dress, which should be a *bad conductor* and *good radiator*. It is on this account that, despite its excellence in other particulars, it feels cold when it touches the skin. But linen is open to a stronger objection than that which I have just mentioned; from the porosity of its fibre, it is very attractive of moisture, and when the body perspires, it absorbs

the perspiration actively, and displaces the air which, in a dry state, it held within its meshes ; so that, in place of an atmosphere of dry air, it becomes the means of maintaining a layer of moisture. Now, water is one of the best conductors of heat, and removes it so rapidly from the body as to cause a general chill. But this is not all ; the moisture in the tissue of the linen has so great a capacity and attraction for heat, that it continues to rob the body of more and more of that element until the whole of the fluid is evaporated. These circumstances have caused the entire abandonment of linen as a covering next the skin in hot climates, where the apparel must be necessarily thin. But in temperate and cold climates, we get over the inconvenience by wearing a bad conductor and good radiator outside the linen, in the form of a woollen or leather covering in the winter, and cotton or thin woollen in the summer season.

89. COTTON is a warmer covering than linen, from being a better radiator and worse conductor of heat, and, in the present excellence of its manufacture, offers most of the advantages of softness and pliability of that texture. But it must be admitted that it is wanting in the freshness of linen, a quality which, in this climate, we could not easily dispense with.

But cotton has the advantage over linen of not absorbing moisture to anything like the same amount, and consequently does not destroy its own radiating powers by substituting a good conductor, water, for a bad conductor, dry air. Hence cotton is, with good reason, the favourite and proper body-linen of hot climates. Besides the absence of freshness in cotton, there is another objection to its use; it is not, like linen, composed of fibres which are perfectly rounded; but, on the contrary, its fibres are flat and have sharp edges (plate 4, fig. 15), which latter are apt, in delicate skins, to excite irritation. It is on this account that we carefully avoid the application of cotton to a graze or wound, and employ for such a purpose its smoother and softer rival, linen.

90. SILK occupies the third place above linen as a bad conductor and good radiator of heat, and comes next to cotton as a means of bestowing warmth; its fibres (plate 4, fig. 14), like those of linen, are round, but softer and smaller; and woven into a tissue, it has less disposition to absorb moisture than cotton. Therefore, so far as roundness of fibre, softness of texture, absence of attraction for moisture, and power of communicating warmth, are concerned, silk is greatly superior to both linen and cotton; moreover, it gives the sensation of freshness to the

touch which is so agreeable in linen. But with all these advantages, silk has its defects; on the slightest friction, it disturbs the electricity of the skin, and thus becomes a source of irritation. Sometimes, it is true, this irritation is advantageous, as causing a determination of blood to the surface; but when this action is not required, it is disagreeable, and quite equal, in a sensitive constitution, to producing an eruption on the skin. I have seen eruptions occasioned in this manner, and when they have not occurred, so much itching and irritation as to call for the abandonment of the garment.

91. WOOL is open to several of the objections brought against the three preceding tissues; thus, from the nature of its structure (plate 4, fig. 16), being similar to hair in the formation of its fibre, it is highly irritative to sensitive skins, and, moreover, disturbs the electricity of the cutaneous surface, on friction, even more than silk. On these accounts, there are persons who find it quite impossible to wear woollen garments next the skin in any shape, whether as flannel, worsted, or merino. Happily, this is not absolutely necessary, for all the advantages of wool, and they are many, may be obtained by wearing the woollen garment outside one of linen; indeed, this is preferable, in warm weather, to wear-

ing the wool next the skin, since the linen absorbs the perspiration, while the woollen garment preserves the warmth of the body and prevents the inconvenience resulting from its evaporation. Wool, as may be inferred from these observations, is one of the worst conductors and best radiators of heat, and is, on this account, a valuable and indispensable means of preserving the bodily heat in the winter of cold climates like our own; and even in the summer it is a serviceable defence against colds and rheumatism.

92. The influence which colour exerts over the apparel, as modifying its power of preserving warmth, is very remarkable. As a general rule, all the dark colours absorb more light and more of the sun's rays than those of a brighter kind, and in proportion to this quality is their power of absorbing heat. A good absorber is also a good radiator; hence dark colours are good radiators of heat, and according to the nature of their material, bad or good conductors. White, on the contrary, reflects the rays of light, and with them, the heat, and thus is a bad absorber and bad radiator of heat. Franklin, many years since, placed a number of small squares of various coloured cloths of the same material on the snow, and found, after a time, that the snow covered by the black piece was the most, and that beneath the white, the

least melted. More recently, a similar experiment was made by Stark. He enveloped the bulbs of a number of thermometers in pieces of cloth of the same material, but of different colours, and immersed the whole in boiling water. The thermometer around which the black cloth was wound, was the first to indicate a given heat; then that which was covered with green, then red, and last of all, white; the difference between the black and the white being twenty-five per cent. This influence of colour is antagonized by the nature of the material, and as it acts superficially, produces very little change on thick, although considerable on thin, textures, such as gauze.

93. We have now discussed the principles which render clothing a means, firstly, of *preventing loss of warmth by the body*; secondly, of *increasing its degree*; thirdly, of *guarding it against alternations*; and fourthly, of *protecting it from intensity of heat*, both of the atmosphere and sun; but there is one point in connexion with clothing that still remains to be observed, which is, that it permits the free transpiration of the skin so necessary to comfort, and even to life. This property is due to the porosity of the textures employed in the fabrication of dress, and that it is an indispensable quality will be admitted at

once, when we recollect that the skin is an important agent in respiration, receiving oxygen through its tissues, and giving back carbonic acid in return, and an equally important agent in separating from the blood those impurities that otherwise would oppress the system and occasion death. In a previous chapter, I have referred more particularly to these circumstances, and, especially, in the instance of those remarkable cases where death was occasioned by the application of an impermeable covering to the skin. This is a reason why any close dress, such as one impregnated with caoutchouc (macintosh) would be objectionable next the skin; and it explains how a lady, too anxious for the protection of her person against cold, may be suffocated in her own dress. The apparel must be such as shall permit free transpiration from the skin, and, moreover, convey the transpired fluids from the surface; otherwise, cold, irritation to the skin, and other bad consequences, must follow. Those who have worn india-rubber socks or shoes must have experienced the first of these discomforts from the puddle of transpired fluid in which their feet are bathed in a few hours after putting the coverings on; and, as an instance of the second, I shall adduce a quotation from my work on the diseases of the skin on the subject of a disorder

termed *sudamina*, or *miliary eruption*. “ Since the days of Sydenham, who advocated so powerfully the adoption of a cool temperature and cooling regimen in fevers, *sudamina* have become rare; but previously to his time, they were exceedingly frequent, and, from their connexion with fever, were regarded as a specific disorder, preceded and accompanied by a severe and dangerous fever. This fever was termed *miliaria*, and for many years was regarded as a dangerous and fatal disease, spreading like an epidemic, and destroying multitudes of lives; but, as I before remarked, since a more rational method of treatment has been employed in medicine, *miliary fever* has ceased to exist.” On the same subject, Bateman remarks: “ Among the various circumstances under which the *miliaria* was formerly excited, the puerperal state appears to have been most frequently the source of it, insomuch, that it was described as an epidemic among puerperal women. This is sufficiently accounted for by the treatment which was unhappily pursued during the confinement after childbirth, of which an impressive description is given by Mr. White; for not only was the mother immediately loaded with bed-clothes, from which she was not allowed to put out even her nose, and supplied with heating liquors from the spout of

a teapot; but to her room, heated by a crowd of visitors and a fire, all access of air was denied, even through a keyhole. From these causes, fever was almost necessarily induced, with the most profuse sweats, oppression, anxiety, and fainting, and these again were aggravated by spicy caudles, spirits, opiates, and ammoniacal medicines. That a number should perish under such management with every symptom of malignity, and that many who survived it should escape with broken constitutions, will surprise no person who is acquainted with the baneful influence of over-excitement in febrile complaints."

94. In the preceding remarks, I have endeavoured to establish as a law of health *the necessity of preserving an agreeable temperature of the body*, and I have pointed out the means, so far as food and raiment are concerned, of effecting this object. I should wish it to be understood, also, that the feelings, if the nervous system be sound, are the proper channel for arriving at a knowledge of the state of warmth of the system. I will now proceed to describe certain phenomena, in connexion with the temperature of the body, necessary to be known, in order to derive the proper benefit from these observations. We have seen that the temperature of man varies very little in the whole extent of range

between the tropic and the pole ; that he can support the intense heat of the former without much elevation of his inward heat ; that he can live where mercury is a solid mass, like lead, with the most trifling depression of his vital warmth. But it must not be supposed that the constitution of the man is the same in these two opposite conditions ; it is, indeed, widely different ; in the one he enjoys what may be termed a *summer constitution* ; in the other, a *winter constitution* ; and we all, without being aware of it, have a summer constitution, to harmonize with the warmth of summer, and a winter constitution, to enable us to resist effectually the inclemency of that season. In other words, we become inured or accustomed to the existing atmospherical state, so that, familiarized with the warm breath of June, the moderate temperature of a summer's night strikes cold and chill, while, a few months later, in the winter season, that same temperature would feel oppressive, from its heat. I may better illustrate this topic by relating an experiment performed by Dr. Edwards, of Paris. In the month of February, this gentleman removed five sparrows from a warm room, and placed them in a cage surrounded by snow and ice. At the end of three hours they had lost less than two degrees of temperature. In the month of July, four sparrows, under the same cir-

cumstances and in the same lapse of time, lost upwards of twenty-one degrees of temperature. They were, in point of fact, nearly frozen by a degree of cold which, in the winter, they could bear without discomfort. Man is in precisely the same position during the two seasons ; in the winter, he possesses a power of generating within himself sufficient heat to resist the cold ; in the summer, he loses this power, and is proportionally dependent for his heat on the temperature of the surrounding atmosphere.

95. It is this power of endurance of cold at one period, and the absence of its necessity at another, that enables animals, in their wild and unprotected state, to bear the vicissitudes of winter with so little preparation in clothing, and so little real inconvenience. And, in like manner, man, in our climate, and in a state of health, does not require an amount of covering at all proportioned to the difference of temperature between summer and winter.* Indeed,

* The inhabitants of Terra del Fuego, belonging to the Petcheree or Yacanacu tribe of Indians, are naked, with the exception of a small piece of sealskin, which they hang upon the shoulder next the wind. Their climate is much colder than that of North Britain, no season being quite free from frost. In the month of March, when the thermometer stood at 46° , an infant about a week old lay in the bottom of one of their canoes quite naked ; and the " little children were seen capering, quite naked, on the beach, although the thermometer was at 40° ." The colour of the people is a light copper hue, the hair being " long, lank, and black." — *Abstract from Chambers' Edinburgh Journal for July 5, 1845.*

we not uncommonly, from inattention or want of due consideration, make no difference between our summer and our winter dress; and the poor, from necessity, are compelled to know no distinction. But sickness has the same effect on our system as the summer constitution, and by reducing our power of generating heat, renders us more than ordinarily susceptible of cold, even when the temperature is comparatively mild. Thus, when we suffer from what is popularly termed "a cold," or a slight attack of indigestion, we are acutely sensible of a low temperature; and it is then, as under other circumstances producing a like sensation, that we should protect ourselves by warmth and warmer clothing. Indeed, while we neglect this rule, we are augmenting the state of congestion of the internal skin, or mucous membrane, which is the essential cause of the ailment under which we suffer, while by encouraging and promoting the warmth of the skin, we tend to dissipate it.

96. The same remarks apply with equal force to sedentary occupations in a warm room, whether in the summer or the winter season, or to employment conducted in a warm atmosphere in the winter time. Such conditions are equivalent to the effect of a warm climate, and bring with them the summer con-

stitution, which is unsuited to withstand the severity of cold. To persons in this state, a greater amount of warm clothing is needful than to those whose constitution is hardened by out-door occupations and exercise in the air. Thus, from the influence of circumstances, the upper classes, and particularly the female sex, who are too frequently indisposed to take the exercise necessary for health, are more in need of warm clothing than the out-door labourer and the very poor, but not more so than a class equally necessitous with the latter, namely, the needlewoman and in-door labourer. This observation, it must be recollected, applies to the article of clothing only; for although in this the poor are no worse off, as regards the mere necessity, than the rich, yet, in another and a more important condition, their position is very different, namely, in the possession of means for obtaining good and sufficient food. It may not be irrelevant to the present subject to inquire whether the difference in the condition of the poor and the rich exerts any influence on their longevity: that it does upon their health there can be no question. The answer to this inquiry is contained in the following table, published by M. Benoiston. The first column contains the ages examined, and the three succeeding ones the mor-

tality in one hundred persons ; the first being the common rate of mortality, according to M. Duvillard ; the second, mortality in the rich ; the third, the mortality in the poor.

Ages.	Common rate of mortality.	Rich.	Poor.
30 to 40	1·69	1·08	1·57
40 — 50	2·15	1·17	2·13
50 — 60	3·24	1·99	3·59
60 — 70	5·78	3·60	7·50
70 — 80	11·49	8·04	14·36
80 — 90	19·78	13·22	100·00

The inspection of this table speaks volumes for the results to health of the ease and comfort of the rich, as contrasted with the consequences of the deprivations and contingencies of the poor.

97. In addition to the difference of power of preserving warmth dependent on the differences of health, climate, and season, there are other modifications which have reference to the activity of the vital energies at different periods of life. The infant, for example, and the aged person, are more susceptible of cold ; that is, they have less power of generating heat than the adult, and consequently are more open to the injurious influences originating in a low state of the external temperature. The temperature of a seven months' child, well clad, and placed before the

fire, was ninety degrees of Fahrenheit.* In an infant of the full period, at birth, the temperature vacillates between 95° and 99° .† During the first week, the average temperature of infants is 98° ; during the period ranging between four months and fourteen years, nearly 99° ; in the adult, 100° ; and in eight old persons, between 87 and 95, the average was a little above 98° .‡ In further illustration of the decreased power of generating heat, Dr. Edwards ascertained the temperature of young puppies and kittens lying near their mother to be one or two degrees inferior to that of their parent, but when he removed them, they rapidly cooled down, until within a degree of the level of the atmosphere. Seeing this to be the case, we are not surprised to learn that many infants die from cold, and that the mortality of infants of the first month is nearly doubled during the winter season.§ According to M. Lombard, of Geneva, *one-sixth of these deaths result from inflammation of the lungs!* The mortality of infants during the first year of their life amounts, in Paris, to nearly nineteen per cent.; in the whole of France, to twenty-

* Edwards.

† Roger, who makes his observations in the armpit.

‡ Dr. Davy.

§ Observations made in Belgium, Geneva, Russia, and Paris.

one and a half per cent. ; in Philadelphia, to twenty-two per cent. ; in Berlin, to twenty-five per cent. ; and in St. Petersburg, to thirty-one per cent.*

98. What is now said of children must be repeated with regard to those who have outlived the energies of adult life. I have shown, above, that the natural temperature of old persons is inferior to that of the adult ; and if they feel the cold less, it is that their sensibilities are blunted by age, that the same cause which occasions their diminished power of generating heat makes them unconscious of the want, but not the less liable to its effects. Indeed, the position of the aged, under these circumstances, is not a little hazardous ; it is like that of a man handling heated iron with gloved hands, who is unconscious of the warmth until he is burned to the quick ; or like the fish, protected by a hard and massive shell, that is unaware of danger until the knife is struck into its heart. Dr. Davy found that old persons, having a natural temperature of 98° when their feelings of warmth were agreeable, had their temperature reduced to 96° and 95° when subjected to cold. The winter season is always a period of fatality among the aged ; and in our establishments for the poor, the

* Duvillard and Rau.

number of deaths immediately following the temporary excitation of the cheer of Christmas is quite remarkable.

99. The remedy for the modifications of vital temperature resulting from age is so obvious as to need but a passing remark. Infants must be warmly fostered; young children must be warmly and judiciously clad; and old persons must learn to apportion their clothing to their age, and not to their desire of maintaining a perpetual and artificial youth. These propositions are so reasonable and so obvious, that I may perhaps fall under the accusation of "adding perfume to the violet;" but are they followed in practical life? Are the little highlanders whom we meet during three out of the four quarters of the year, under the guardianship of their nurserymaids, dawdling about the streets, in our public walks or squares, properly protected from the cold? Are the fantastically attired children whom we see "taking an airing" in carriages in our parks, sufficiently and properly clad? If this question can be truly answered in the affirmative, then, and then only, my remarks are needless. There can enter into the parent mind no more baneful idea than that of rendering children "hardy" by exposing them unnecessarily to cold, and by clothing them inefficiently.

I have known instances wherein parents acting on this principle have failed entirely in rearing their offspring. Does Nature treat her progeny thus? Does she not, first of all, ensure the birth of her young only at a kindly season, and then provide them with downy coverings, warm nests, and assiduous protectors? And WE must imitate Nature, if we would give to Britain a race capable and worthy of maintaining her independence and honour. The little denizens of a warm nursery must not be subjected, without a carefully assorted covering, to the piercing and relentless east or north-east wind; they must not be permitted to imbibe the seeds of that dreadful scourge of this climate, consumption, in their walks for exercise and health; they must be tended, as the future lords of the earth, with jealous care and judicious zeal. *One-sixth of the deaths of young children, it must be remembered, result from cold* (§ 97).

100. I come now to a subject teeming with interest, as of more general and universal application than, perhaps, any that I have hitherto touched, I mean the subject comprehended under the popular expression, "draughts," and their consequences. The principle on which the operation of this source of serious disease depends is the partial cooling of the

body through the medium of the skin, and is illustrated in the following experiment by Edwards and Gentil. They immersed the hand, having a natural temperature of 98° , in cold water at 41° , and kept it there for twenty minutes. Five minutes after its removal, its temperature was ascertained to be no higher than 55° , and at the end of one hour and a half, 69° . So that, as an effect of the application of cold, for a short period, to a part of the body, a depression of temperature occurs to the amount of forty-three degrees of Fahrenheit, and the part recovers only fourteen degrees of its heat in one hour and a half; and if we suppose the heat to increase in this ratio, the system would require nearly five hours to regain the temperature which in twenty minutes had been removed. Now, this is precisely the condition of a person who exposes a part of the body, usually covered, to a cold but still atmosphere, or of a person properly clothed, but seated in a draught or current of cold air. The warmth of the part so exposed, or of the side of the person directed towards the draught—the uncovered parts first, and then the covered—is reduced; and, as an effect of the chill, the transpiration is checked. But soon, another principle comes into action, and one of greater importance than even the preceding; it is thus experimentally

illustrated. When the hand is immersed for some time in cold water, and its heat consequently lessened, the temperature of the opposite hand is also reduced, and to a very remarkable extent, so that the mischief of partial cooling is not limited to the first effect produced upon the exposed or chilled part of the body, but is gradually spread over the frame, until the person feels completely chilled through. Have we not all, at some time or other, felt this? Have we not felt, when a part of the body is cold—as, for example, the feet—the chill strike through the entire frame? Yes, it is too frequent an occurrence not to have been experienced, on more than one occasion, by every one, and to his sorrow. It is in this way that thin shoes, wet shoes, wet dress, or damp sheets, do their work of mischief and disease, and cannot, therefore, be too carefully avoided. Youth will resist much, strength much, health much, but it must be recollected that WE DIE BUT ONCE, and although we escape ninety and nine times, yet the hundredth may be near, and the last.

101. Now, the dangerous results which sometimes flow from causes of the above description, are popularly ascribed to “checked perspiration;” but the truth is, that the suppression of perspiration is merely one of the effects of the shock received by

the constitution, and by no means the cause. The first effect of the cold upon the part is a lowered tone of the cutaneous nerves, and a consentaneous contraction in diameter of the capillary bloodvessels. As a consequence of these preliminary changes, the skin becomes contracted and shrunk; less blood than natural is sent to the surface; nutrition and its chemical actions are suspended; perspiration is suppressed; and the surface becomes pallid and bloodless (see diagram, page 26). The blood, in fact, no longer able to enter the contracted capillaries, its cutaneous circulation being at an end, retreats upon the internal membranes and vital organs, affecting one part or other of the mucous membrane, or one or other of the vital organs, according to the constitutional peculiarity of the individual. In one, the blood will be determined on the lungs, causing cough and inflammation; in another, upon the throat, producing sore-throat; in a third, upon the membranes lining the nose, eyes, and ears, producing "migraine," or cold in the head; in a fourth, upon the stomach, causing a bilious attack; in a fifth, upon the bowels, causing pain and inordinate action; in a sixth, on the kidneys, producing severe pain in the loins; in a seventh, on the joints, producing rheumatism; in an eighth, on the nerves, producing neuralgia or tic-

doloureux ; in a ninth, on the brain, producing faintness, insensibility, convulsions, and even apoplexy, and so on. In a minor degree, it may be observed, that whenever we are slightly chilled, as by too light dress, by cold shoes, &c., any sensitive organ of the body immediately evinces discomfort or distress ; thus, if we have suffered at any period from tic-doloureux or rheumatism, we immediately feel a warning twinge, or if our lungs are delicate, we begin to cough ; while, on the other hand, the very instant we get warm, the twinge ceases, and the cough subsides.

102. In contradiction to what I have just advanced, it may be thought that when a person is warm, or in a state of perspiration, and is then exposed suddenly to the cold, that the checked perspiration is certainly the cause of the subsequent disorder. But that is not the case ; the perspiration is suppressed only as an effect, and that with which the skin is moistened at the moment of exposure merely increases the effect of the cold by its rapid conduction of heat (§ 88) and evaporation.

CHAPTER VIII.

ON THE INFLUENCE OF EXERCISE ON THE
HEALTH OF THE SKIN.

103. It is quite true that the whole body of known hygienic principles and laws are applicable to the health of the skin, as conducive of that of the system in general. But there are parts of those laws which have reference to the skin alone, and it is my present purpose to separate these as much as possible from the rest, that their importance may be more prominently seen. It is thus with the subject of exercise. Well-directed exercise favours the preservation of the general health, by calling into direct action the majority of the organs of the body ; and it also acts powerfully on the skin, by stimulating its functions, increasing its temperature, awakening its tone, and subjecting it to a current of atmosphere favourable for its respiratory offices. The conditions

subservient to health, which have been previously discussed, namely, food and raiment, are, in one respect, different in their nature from those which are to follow, namely, exercise and ablution; the former are simple and easy in their application, appealing, on the one hand, to a sense of appetite, on the other, to a sense of comfort for their regulation, and making a demand on the judgment only so far as selection and experience are concerned. The latter are more complicated in their bearings, calling in the aid of judgment at the very outset of their application, and frequently requiring to be employed in opposition to the feelings and present enjoyment. In other words, they require the mind to direct and go with them; and although the mind regulates by reference to the inferior faculty of sensation, yet, to ensure their benefits, the soul must be present.

104. What is it that makes the difference between the exercise of youth, and that of the felon on the treadmill; between the pedestrian in the Isle of Wight or Switzerland, and the pedestrian from Chelsea to the Bank; between the light and quick footstep wending to Greenwich Park, and the dull tread of the nursery-maid at home? Is it not mind? Is it not the young and buoyant joy of the schoolboy that inspirits his laugh and his leap? while, silent

and morose, humiliated, not convinced, the felon suffers his monotonous existence, moving, it is true, but not in exercise. Is it not the novelty, or the beauty of the scene, the pleasant weather, or the immunity from customary labour, that gives spirit to the pedestrian's tour, as compared with the dull, desultory repetition of the same sights, same persons, same things, and same path from and to business? Is it not the prospect of enjoyment, of gaiety, or pleasure, that makes the difference between the elastic step of the maiden enfranchised from present duties, and the same person in the pursuit of her necessity-impelled and ordinary offices? We need not ask which is most calculated to be beneficial to health; which to arouse the dormant functions of the skin; to promote the removal of irritating elements from the blood; to increase the vigour of the frame, purify the complexion, and enrich the beaming tints of beauty. In mind lies the great secret of *beneficial exercise*, and without it, exercise is a misnomer, and a fraud upon the constitution.

105. Exercise, in so far as practicable, should be *regular*; a daily purpose is to be answered by its use; and therefore it is unreasonable to expect that benefit should arise when it is neglected for days consecutively, and made to be secondary to occupations and

pursuits of a trivial nature. We are impelled by hunger to the daily use of food, and by our sensations to the employment of dress. To those who know themselves, who have a proper acquaintance with the animal organization, there are also sensations which indicate the want of exercise ; they have the power of supplying that want, or of rejecting its calls ; but nature, in the end, must triumph ; punishment will assuredly follow the breach of her appointed laws. We have seen that exercise promotes the removal of the impurities of the system. Suppose them to remain, the human frame immediately becomes a source of destruction to itself, and of evil to others ; matters which should be cast off, as useless and noxious, are mingled with the blood, and, fermented by its heat, are developed on the skin in the form of flushes and eruptions ; or they are exhaled as fetid emanations from the lungs, or disposed of in some other way equally disagreeable. The brain also suffers in its turn ; the mental faculties are disturbed, the intellect enfeebled, and the sentiments lowered. The injurious effects of neglected exercise cannot be better illustrated than in the medical history of those who are compelled to lead a sedentary life. In such persons, we find a pallid and discoloured skin, depressed spirits, incapacity for exer-

tion, headache, frequently palpitations of the heart, fulness of the head, dyspepsia, tendency to biliousness, and general imperfection and irregularity of the alimentary functions.

106. Another condition of "beneficial exercise" is, that it should be *moderate*. A short walk, in agreeable society, either of thoughts or friends, is infinitely preferable to one of greater distance, and taken as a task. But there is a feeling, too prevalent among the unthinking, that if a little be good, a great deal must necessarily be better. It is this principle, carried out to the utmost limits of extravagance and absurdity, that called forth the re-action in Medicine known under the name of Homœopathy. People, left to themselves, would have converted their insides into medicine chests; the endless inquiry after *something* to do this, and *something* to do that, was fast amounting to a suicidal mania for drugs, when the opposite extreme rushed in, and became the cause of a rational equilibrium. So, in exercise, we must neither have excessive nor infinitesimal doses; we must endeavour to maintain a proper medium between mischievous extremes, and be guided by our sensations, not only present, but succeeding. Our first walk should be short, the next a little further, and of somewhat longer duration;

succeeding walks a little increasing on their predecessors, varied, as much as convenient, and the most agreeable in associations that can be selected. We thus put ourselves under a kind of training; we discover our powers of maintaining muscular exertion, and we eventually arrive at a point when we feel that our exercise is *enough* and profitable. This is the point towards which all our endeavours should tend; our main object should be to use as much exercise as shall keep our bodies in health, and our minds cheerful and in vigour. We should not be desirous of exerting ourselves as much as possible, any more than we should conform to the same practice at the table; at a given point, our appetite, in health, whispers, "enough;" the same expression will be elicited by our feelings in relation to exercise, when we have made ourselves as well acquainted with the practice and influence of it, as of the more urgent necessity of taking food. In the recommendation of exercise to ladies, I am continually met by replies such as this: "My household duties give me sufficient exercise; I am sure that I am tired enough by bedtime;" or, "I do take exercise; there are my occupations at home, and then my calls." Now, it will be seen at once, that household occupations are not exercise; for, in the first place,

they are duties, generally desultory, often irksome, and often anxious; calculated to engender fatigue both of body and mind, but wholly wanting in the attributes appertaining to true exercise, namely, change of thought, change of scene, and muscular action accomplished in the open air. Again: it is well known, that after being thoroughly fatigued by employments of this nature, a walk is often refreshing and agreeable. Fashionable calls are open to the obvious objection of merely changing the air of one house for that of another, and often without any mental satisfaction arising out of the accomplishment of the duty. Shopping is more animating; but here also, more perhaps than in the call, the objection of an impure and confined atmosphere steps in, while the open, fresh, unbreathed air, should be the main object of search.

107. The part of the day selected for exercise should be that when the temperature is most agreeable; for example, midday in the winter; or the morning and evening in the summer season. In the morning of winter, the atmosphere is too cold for any but the soundest lungs; and if the weather be not frosty, there is more or less moisture in the air, which is insalubrious. The evening is much more objectionable, for the same reasons. In large cities,

another objection attaches to the morning and evening, namely, the quantity of smoke retained near the earth by the cold air, which becomes dissipated by the middle of the day. In the summer season, the middle of the day is objectionable from its great heat, and the night air from the fogs and mists which collect near the earth's surface.

108. Consideration must also be made of the period of taking food ; exercise should not be taken either immediately before or soon after meals ; and here I must remind my reader, that the word exercise is not applied to a gentle walk, or lounge, but to motion, performed to the point of sufficiency with all the energies engaged. Such exercise requires the whole power of the nervous system for the time, and a certain quantity of nervous power is necessarily expended. Now this loss must be regained before the nervous system is directed upon another effort, such as digestion ; which, to be performed well, requires the whole of a sound and fresh nervous apparatus. It is a law in the animal economy, that no two actions requiring a large expenditure of nervous force, can be carried on at the same time. Now exercise, properly effected, is such an action as I am now considering, and consequently, if it be accomplished immediately before a meal, the latter

must suffer. On the other hand, digestion absorbs the powers of the system so completely, that it is a common thing to find it succeeded by lassitude and drowsiness. It is evident, therefore, that if exercise be taken the instant the meal is swallowed, the latter must remain an undigested load on the stomach until the moment arrives for rest, and then the function will be exceedingly imperfect, if performed at all.

109. Another consideration, in the observance of healthy exercise, is the clothing employed during its use. It is evident that some arrangement should be made in this respect. It would be unwise to commence a long walk with clothing adapted to a state of rest, and equally so, to relax from exertion without having an additional covering to throw on. Indeed, without precautions on this head, exercise would become a cause of disease. Again: as all the energies of the muscular system, and the chief of those of the nervous system, are to be thrown into exercise, the body should be relieved of all incumbrances to its free motion. All ties about the person should be easy, ladies should leave their stays at home, and shoes and boots should be ample and strong.

110. Of the kinds of exercise, it may be premised that all motion for this purpose should, if possible,

be performed in the open air, and in every departure from this principle, the nearest approximation should be adopted. There is no condition more necessary to the enjoyment of health than pure air; and as we consume more air when the muscular system is in activity than at any other time, we must endeavour to obtain it as pure as possible at that period. In cities, the air is necessarily impure, from the exhalations which arise on all sides, and the large quantity of smoke diffused through the atmosphere. On this account, schools, where the physical as well as moral education of children is regarded, should be as far removed from the smoky atmosphere as possible; and where this is not practicable, the purer air should be sought for, for the purposes of exercise, in the nearest outlet from town. Rooms in which a number of persons are breathing soon become contaminated, and we are frequently made acquainted with this condition of an apartment by the detection, on entering it, of a peculiar faint odour, which is soon lost when we mingle with the crowd. I have previously remarked on the necessity of attending to the admonitions of our senses, and in no case is this more necessary than in that of the organ of smell. As disagreeable impressions of temperature or appetite are bad, so also are those of smell. By a wise

Providence, odours dangerous to life are generally disagreeable, and cannot be too carefully avoided. What is more disagreeable, for example, than the smell of the smouldering wick of a tallow-candle, and a case is recorded of destruction to life from holding such a wick under the nose of a sleeping boy ; or what more delicious than a chestful of pure air on some bluff hill in the country. It is true that our senses become dulled by use, or the pursuit of other objects ; the man or woman of the world would despise the thought of being indebted for any portion of their enjoyments to “ common air,” “ air that everybody breathes.” But after a season of London smoke, pure air has a chance of being estimated. What a delicious beverage water would be regarded, if it were rare ; can we conceive anything more grateful ? It is perhaps true, that to be an epicure in water requires a residence in London or a large city of some years’ duration, and the same may be said of air.

111. In determining the kind of exercise suitable for the sexes and different periods of life, we must observe nature, and bear in mind the conditions of exercise previously considered. Childhood is a period of excessive mobility, and demands excessive action. Games, wild, rude, and rapid, are the fitting

exercise and enjoyment of boys. Nature commands it, and the refinement of cruelty would be to restrain them. They are precisely in the condition of one who is inspiring laughing-gas, a necessity for muscular action exists, which cannot be restrained without danger to the individual. Indulge the necessity, and in a certain time the tumult ceases, and a tranquil thrill of enjoyment, not fatigue, remains. Such are the feelings of children uncontrolled in their exercise. Such has nature ordained. The games of boys are so numerous, and in general so well adapted for the purposes of health, that I shall not stop to enumerate them. Gymnastics also have advantages when they are practised from inclination, or with a professional object, but are open to objections when they incite to exertions beyond the powers of the body.

112. For girls, the catalogue is hardly less than for boys, hoop played with each hand alternately, the skipping-rope, dancing and singing, being among the best. The whole of these games must be practised to sufficiency, and unrestrainedly, to be of any use. Stays before womanhood are instruments of barbarity and torture, and then they are needed only to give beauty to the chest. It is the duty of every mother and every guardian of children to inquire the purpose for which stays were introduced into

female attire. Was it for warmth? If so, they certainly fulfil the intention very badly, and are much inferior to an elastic woollen habit. Was it to force the ribs, while yet soft and pliable, into the place of the liver and stomach, and the two latter into the space allotted for other parts, to engender disease and deformity to the sufferer and her children for generations? Truly, if this were the object, the device is most successful and the intention most ingeniously fulfilled. But few, I think, will believe that this really is the purpose which mothers and guardians have in view in confining their little victims in stays, whatever the result may be. Yet these are not the days when ignorance can be pleaded as an excuse for such wrong-headed folly and wickedness; it is obvious that the stay is an appurtenance of woman only when she has arrived at a state of full development; but then it should be divested of all the apparatus of busks and bones that frequently encumber it, and its main bearing should be limited to the upper half of the chest. The stay is, in reality, a support for the bust; such is its purpose, such alone its intention. How very ludicrous it would appear to put it on boys; and yet boys have as much need of it as girls up to the period of womanhood, and I may say further, up to the period

of marriage. But as stays form a staple article of female dress in this country, it may be well to point out their physiological action on the frame.

113. It is well known that the upper half of the trunk of the body, the *chest*, as it is properly termed, is constructed of a framework of twelve pairs of narrow bones, the *ribs*, which bend round from the spine behind, to the breast-bone in front. These bones constitute the defence of the chief organs of the body, namely, the heart, the lungs, the liver, and the stomach, the two former being above, the two latter below. Upon these bones are spread out certain muscles of respiration and the muscles which support the spine, and the muscles are covered in by a layer of fat and by the skin. Muscles, it will be recollected, are the parts of the body termed flesh; they are red in colour, moderately firm, receive a large quantity of blood and many nerves, and are the agents by which motion is effected. Moreover, they possess the property of becoming large and firm with exercise, and small and soft or flabby from disuse. Hence the expression *muscular* is synonymous with "powerful." Now, the first effect of stays is to limit the bending and other movements of the trunk of the body; it moves, as it were, "all of a

piece;" and the obvious consequence is, the degradation of the muscles from their firm to a soft and flabby state. Next, the stays press upon the muscles; how much young ladies could tell if they would! but the muscles become injuriously squeezed between the unyielding stay and the hard bones of the chest. As a consequence of this treatment, the circulation of blood through the muscles and the freedom of the nervous fluid is interrupted. If it could be seen when thus compressed, the muscle would be found pale and exsanguine, and being deprived of the quantity of blood necessary for its nutrition, much less its action, it becomes *wasted*, or in technical language, *atrophied*. The muscles, then, by the use of stays are weakened and rendered powerless, and the spine, at the growing period of life, is limited in its expansion and in its proper amount of muscular support. The consequence is inevitable; the spine sinks under the pressure of the superincumbent weight, or the child throws the pressure against one or the other side of the stay, and curved spine or spinal disease are established. How can it be otherwise? If we wished to produce curved spine, could we adopt a more scientific or certain plan? But stays are not the sole cause of curved spine, spinal

disease, and deformity in girls and young women. Another cause is, insufficient food; the stomach, forsooth, must be schooled to a lady-like appetite; Nature is turned off as a dunce. Another cause is, insufficient clothing, and another, insufficient exercise. That horrid word, "lady-like," haunts the poor girls of the middle and higher classes through years which should be devoted to physical education, and leaves them at last the prey of deformity and disease. It may be wholesome to reflect that spinal deformity is scarcely known in schoolboys, and is almost universal in schoolgirls.

114. Fashion is the war-cry of tyranny, and some years ago, it was the fashion for women to appear with deformed bodies. Happily, fashion has become more rational at the present day, and it is most sincerely to be hoped that British children will be educated, physically as well as morally, to perform the duties of British mothers. I have described the manner in which small waists and deformed spines may be made; I will now cite a parallel from the work of my friend Mr. Tradescant Lay, entitled, "On the Chinese as they are." "At five," writes Mr. Lay, "the rich man's daughter has her foot so firmly bound, that, in the native phrase, the whole is killed.

The foot, below the instep, is pressed into a line with the leg, to add to the height of the little sufferer, while two of the toes are bent under the sole, that its breadth may be only of the least dimensions. The agony of such a process, it would be hard to estimate ; but it is said to last about six weeks, when, I suppose, the wasting of all the parts, and the cessation of many of their functions, have rendered the whole insensible to pain. This insensibility to pain is perhaps confined to the outer parts, for the chief person belonging to the temple on the island of Honam, stated that his sister suffered much anguish in the sole of the foot, or rather, in its lower and more central parts."

115. The exercise best adapted for the adult is walking and riding on horseback, and for the elderly, walking, and the more gentle exercise of riding in a carriage. Walking, when practised with a proper regard to the conditions mentioned in preceding paragraphs, bestows all the advantages which are to be derived from exercise. It favours digestion and nutrition, facilitates respiration, stimulates the skin, and promotes its action ; increases the temperature of the body, and invigorates the physical and mental powers. Equestrian exercise offers similar advantages

to those whose strength is unequal to walking a sufficient distance, or a sufficiently long time, to derive benefit, and is therefore peculiarly adapted for invalids or persons of a weakly constitution. The action of the skin is speedily excited by riding on horseback; an agreeable warmth is diffused over the entire body, and all the advantages of walking exercise are obtained with greater variety and less fatigue.

CHAPTER IX.

ON THE INFLUENCE OF ABLUTION AND BATHING
ON THE HEALTH OF THE SKIN.

116. THE preceding chapters on the structure and purposes of the skin, and particularly those parts which treat of the constant abrasion and reproduction of the scarf-skin and the functions of the oil-glands and perspiratory system, afford the groundwork upon which much of our reasoning on the necessity of ablution must rest. The scarf-skin is being constantly cast off in the form of minute powdery scales; but these, instead of falling away from the skin, are retained against the surface by the contact of clothing. Moreover, they become mingled with the unctuous and saline products of the skin, and the whole together concrete into a thin crust, which, by its adhesiveness, attracts particles of dust of all kinds, soot and dust from the

atmosphere, and particles of foreign matter from our dress. So that, in the course of a day, the whole body, the covered parts least and the uncovered most, becomes covered by a pellicle of impurities of every description. If this pellicle be allowed to remain, to become thick, and establish itself upon the skin, effects which I shall now proceed to detail will follow. In the first place, the pores will be obstructed, and, in consequence, transpiration impeded, and the influence of the skin, as a respiratory organ, entirely prevented. In the second place, the skin will be irritated both mechanically and chemically; it will be kept damp and cold from the attraction and detention of moisture by the saline particles, and, possibly, the matters once removed from the system may be again conveyed into it by absorption. And, thirdly, foreign matters in solution, such as poisonous gases, miasmata, and infectious vapours, will find upon the skin a medium favourable for their suspension and subsequent transmission into the body. These are the primary consequences of neglected ablution of the skin; let us now inquire what are the secondary or constitutional effects.

117. If the pores be obstructed and the transpiration checked, the constituents of the transpired fluids will necessarily be thrown upon the system, and as

they are injurious, even poisonous, if retained, they must be removed by other organs than the skin. Those organs are, the lungs, the kidneys, the liver, and the bowels. But it will be apparent to every one, that if these organs, equally, or one more than another, which is generally the case, be called upon to perform their own office *plus* that of another, the equilibrium of health must be disturbed, the oppressed organ must suffer from exhaustion and fatigue, and must become the prey of disease. Thus, obviously and plainly, habits of uncleanness become the cause of consumption and other serious diseases of the vital organs. Again: if the pores be obstructed, respiration through the skin will be at an end, and, as a consequence, the blood, deprived of one source of its oxygen, one outlet for its carbon, the chemical changes of nutrition will be insufficient, and the animal temperature lowered. As a consequence of the second position, cutaneous eruptions and diseases will be engendered, the effects of cold manifested on the system, and the reabsorption of matters once separated from the body will be the exciting cause of other injurious disorders. The third position offers results even more serious than those which precede. If a pellicle of foreign substance be permitted to form on the skin, this will inevitably become

the seat of detention of miasmata and infectious vapours. They will rest here previously to being absorbed, and their absorption will engender the diseases of which they are the peculiar ferment.

118. With such considerations as these before us, ablution becomes a necessity which needs no further argument to enforce strict attention to its observance. But I fear that water, the medium of ablution, hardly receives a just appreciation at our hands. Water is the most grateful, the most necessary, and the most universal, of the gifts of a wise Creator, and in an age when man drew his luxuries more from nature and less from works of his own production, when water was his friend more than his servant, water was regarded as a representative of the Deity, and was raised to the dignity of a mythological god. Thus the rivers of Greece and Rome were represented allegorically by a tutelary god, with his attendant nymphs, and to this day the Ganges is adored by the votaries of Brahma. The practice of the worship of rivers has undoubtedly, in some instances, obscured its principle, a remark applicable in the most modern times, in the most civilized countries, and to most serious objects; but the principle evidently is, *the utility of water to man*. From the first hour of existence to his latest breath, in health

and in sickness, on the throne or in the cellar, water is an universal good. Baths were dedicated by the ancients to the divinities of Medicine, Strength, and Wisdom, namely, Æsculapius, Hercules, and Minerva, to whom might properly be added, the goddess of health, Hygeia. The use of water has been enforced as a religious observance, and water has been adopted as one of the symbols of Christianity.

119. Let us now turn our attention to water in its several relations to cleanliness, health, and the relief of disease. In its former capacity, it enables us to remove the pellicle of impurities previously spoken of from our bodies, and also from the clothes which we wear nearest our skin, and it effects this purpose by its quality of dissolving saline matters, and holding in temporary suspension those which are insoluble. There are, however, certain substances for which water has a natural repulsion, and over which it consequently exerts no influence until assisted by a chemical power. These substances are oily matters of all kinds, and the skin, as we have seen, is abundantly provided with an unctuous secretion. The chemical power which is called into use for the subjection of the oil is soap; soap renders the unctuous product of the skin freely miscible with water, and hence is an invaluable agent for purifying the

skin. I may affirm that it is an indispensable aid, for in no other way can the unctuous substance of the surface of the skin and the dirt which adheres to it be thoroughly removed. I am aware that certain substances termed "wash-powders" are occasionally used as substitutes for soap; they are rubbed on the skin with the hands, and act in the same manner that crumbs of bread do upon a chalk drawing. But draughtsmen well know that they cannot remove the chalk which has entered the crevices of the paper, nor can they, indeed, restore the surface to its original whiteness and purity. Neither can wash-powders follow the innumerable apertures of the skin, nor enter the mouths of the pores otherwise than to obstruct them. A skin cleaned in this manner may always be detected by a certain kind of shining, not to say greasy, polish, and the whole complexion looks mellowed into a kind of *tone*, as we say of pictures, in which dirt and time have softened and chastened the tints. But surely no one would care to put up for the reputation of resembling *an old picture*, however rich its tints or admirable the art developed in its painting. Soap is accused of being irritative to the skin, but this is an obvious injustice done to soap, *for soap never irritates the delicate skin of infants*. Depend upon it, that when soap does cause irritation,

the error is in the condition of the complainant, and betokens either an improper neglect of its use, or a state of susceptibility of the skin verging on disease of that membrane. If we would have health, we must use soap. If soap act as an irritant, we must train to its use by beginning with a small quantity and increasing it gradually. I may be asked, What is the best soap? I reply, Good white curd soap, without scent, or scented only by its contiguity to odorant substances. The use of soap is certainly calculated to preserve the skin in health, to maintain its complexion and tone, and prevent it from falling into wrinkles; and if any unpleasant sensations are felt after its use, they may be immediately removed by rinsing the surface with water slightly acidulated with lemon-juice.

120. The unpleasant qualities usually attributed to soap are frequently referrible to the temperature of the water used in ablution. In this, as in most other of the rules of health, extremes should be avoided. To a man whose duties call him to brave the cold of winter in all its intensity, water at its lowest temperature is appropriate and refreshing. But to woman or an invalid, such a degree of cold is not merely painful, but really injurious to the skin. The temperature of the water should be raised to a

point at which it feels lukewarm, but no higher. For if cold water be hurtful to the skin, that which is hot is infinitely more mischievous, particularly in the winter season. The heat excites the circulation of the part and stimulates its nerves; it is then, perhaps, immediately exposed to a cold atmosphere, sometimes a piercing wind. Can we be surprised that, with such an extreme, the skin should be irritated, roughened, and chapped, or that the complexion should suffer. In alternations of temperature, as of food, clothing, and exercise, moderation and judgment must be used; and if we are in doubt, we had better trust the casting vote to our sensations, which will rarely deceive us. As regards the frequency of ablution, the face and neck, from their necessary exposure to the atmosphere and the impurities which the latter contains, cannot escape with less than two saponaceous ablutions in the twenty-four hours; the feet, from the confined nature of the coverings which are worn over them, require at least one; the armpits, from their peculiar formation in reference to the detention of secretions, and also from the peculiar properties of the latter, at least one; and the hands and arms, so many as nicety and a refined taste may dictate. No harm can arise from too frequent ablutions, much evil may result from their neglect.

121. Such is ablution when intended for the purpose of cleanliness, but it must be in the experience of every one, that other effects originate from its use ; that nothing is more refreshing than a thorough ablution ; that, in point of fact, to those who conduct the operation properly and with a due attention to temperature, nothing can be more luxurious, nothing restore the energies more surely and agreeably, after hours of toil or exertion ; and, as I am about to show, nothing can be more healthy. The common term which we hear applied to the effects of a thorough ablution is “ bracing ;” in professional language we speak of them as being “ tonic ;” and in truth there exists no better means of restoring the “ tone” of the system than the judicious employment of water ; and this leads me to the modes in which water may be used with the best prospect of benefit to the health.

122. It must not be supposed, that because water is a good and excellent tonic, that our health would be better for being thrown into a fever by it, or even drowned in it, any more than that a parallel argument would be tenable with regard to food, clothing, or exercise. I know very well that equilibrium is not suited to the times ; that there exists among mankind, in medicine as in politics and religion, a certain

thirsty "go-ahead" or "go the whole hog" principle which is absolutely insatiable. I do not say that this character is the peculiar attribute of the present age, for the history of nations proves it to have existed at all periods of the world. There is no philosopher's stone of health any more than for commutating the grosser into the precious metals. But every one who desires it has the elements of an equally valuable "arcanum" in conforming to a correct practice of diet, clothing, exercise, and ablution.

123. The simplest mode of applying water to the skin, and that by which the smallest extent of surface is exposed, conditions of much importance to the weakly and delicate, is by means of the *wetted sponge*. In this mode, the water may have any temperature that is agreeable to the sensations, a part only of the body is exposed at a time, and as soon as that part has been *briskly* sponged, and as *briskly* wiped dry, it may be again covered by the dress. The whole body may in this way be speedily subjected to the influence of water, and to the no less useful friction which succeeds it in the operation of drying. An invalid rising from a bed of sickness would adopt this remedy by degrees, beginning first with the arms, then proceeding to the chest, and then,

gradually, to the whole body. He would use warm water in the first instance, but if the season were summer, would be speedily able to proceed to cold. A person of weakly habit beginning a system of daily ablution for the first time should commence in the summer, and by the winter his powers of endurance will have become so well trained, that he will bear cold water without inconvenience. It must be admitted, that the plan here laid down is very simple ; it requires no apparatus, a sponge and a basin being the sole furniture for its use ; but it is no less a valuable appliance to health. The cold chill of the sponge, which was at first disagreeable, becomes pleasant, the quick friction which ensues is agreeable, and while it stimulates the skin, gives action to the whole muscular system ; and the warm glow, the thrill of health which follows, is positively delicious. I must, however, call attention more strongly to the " glow of warmth " over the surface, as it is the test by which the benefit of the remedy is to be estimated in this and in all other forms of ablution and bathing. I can hardly conceive a case in which the application of water, according to this method, could leave a chill behind it ; but if such an occurrence take place, the individual has need of medical aid, and that should be promptly supplied. I may mention that

it was the present form of ablution which was used by Sir Astley Cooper, and to which he attributed much of his unusually robust and excellent health.

124. The second form of ablution by the sponge requires the aid of a large shallow tub, or sponging-bath, in which the bather stands or sits, while he receives the water from a sponge squeezed over the shoulders and against his body. The same precautions, with regard to temperature, may be taken in this as in the preceding case, but the bather is necessarily more exposed, and the form of bathing is suitable only to persons in moderate health; excepting in the summer season, when it may be borne by invalids. In the early use of the sponging-bath, the bather should content himself with a single affusion from the sponge, and should then dry the body quickly. As there is more freedom for the limbs, there is more muscular action in this than the former method, and the glow is proportionally increased. Indeed, in the sponging-bath, exercise and ablution are combined, and its employment by persons of sedentary habits is highly advantageous. I know but one circumstance that could render the sponging-bath objectionable, and that is, the occurrence of palpitations. This, however, may be obviated, by relinquishing the drying of the body to an attendant,

or adopting the "wet sponge," and after a short time, if there be no tendency in the system to disease of the heart, the palpitations will cease.

125. A third kind of ablution is that with the shower-bath, which provides a greater amount of affusion than the former, combined with a greater shock to the nervous system. But that which more particularly distinguishes this from the previous modes is the concussion of the skin by the fall of the water, the degree of concussion having reference to the height of the reservoir and the size of the openings through which the little columns issue. The usefulness and convenience of the shower-bath and its facilities of application render it a necessary article of furniture in every house, the only question of importance with regard to it being the kind of apartment assigned to its use. I have known instances of the shower-bath being transferred to an area, an outhouse, or a cellar, so that the bather had to make his way from a warm bed, if the bath were taken at rising, only partly dressed, through cold passages, to his bathing-place, and was generally chilled on his way. The bath, in such a case, becomes an instrument of punishment and disease, rather than of health. The shower-bath must be located in a dry room, a room in which a fire can be

lighted in the winter season—in an airy dressing-room, for instance—and every regard paid to comfort and convenience. It is in this that the public bath is generally so much superior to that of home; in it, every suggestion that comfort and even luxury can invent is realized, and over such a bath only does Hygeia preside. The shower-bath admits of modification, to render it suitable to the most delicate as well as to the most robust. The extent of fall may be increased or diminished, the apertures may be regulated, so as to produce the lightest shower or the heaviest rain; the temperature of the water may be adjusted to any degree of warmth; and moreover, the quantity delivered also determined. I cannot too often repeat that the sensations of the bather must be tenderly regarded, if good is to follow the practice of ablution; and this is in no case more necessary than in delicate or convalescent health. By judicious training, the nervous system, which would shudder under the application of a tepid sponge to the skin, could be made to bear, without uneasiness, a smart charge of cold water from the shower-bath. It is evident that in this case a victory is gained over the sensations of the utmost importance, and one which cannot be too highly valued; for by a parallel reasoning, the skin, which in this

way is made to bear the shock of a shower-bath, could better, and for a longer period, resist the influence of atmospheric cold and its consequent morbid effects on the economy. In making use of the word "shock," as expressive of the effect of a discharge of water by the shower-bath on the surface of the body, it must not be supposed that I refer to any unpleasant or painful effect; this is far from being the fact; the shock with warm water, with which the bather should always begin, is really agreeable, and the feeling will be one of regret when the shower is at an end. A person unaccustomed to the shower-bath entering one with a strong charge of water at a low temperature, and pulling the valve-string, would certainly be shocked by the sudden and unusual sensation caused by the rush which immediately follows; but this is abusing, not using the shower-bath. In the like manner, a feeble stream of electricity may be passed through the body without producing a disagreeable sensation, and with benefit to the part, while half the quantity from a Leyden jar would occasion a severe and painful shock. In using the cold shower-bath, it will be found that the first impression made upon the skin is much colder than that which follows; and after being prolonged for a few minutes, the sensation

is really one of warmth. This is an effect of the concussion of the skin by the water, which I shall hereafter have more particularly to allude to. The old "tumbling bath" is the parent of the present shower-bath, and much inferior in its value, for in it the whole body of water contained in the reservoir is thrown at once upon the bather.

126. Before quitting the subject of the shower-bath, I must refer to an objection that has been made to its use, namely, that it is liable to cause a determination to the head, and is therefore improper for persons of full habit. This is an error originating in the abuse of the bath, and is only so far related to truth as the assertion, than an excessive meal will produce apoplexy. If a person whose vessels are oppressed with excess of blood subject himself without training to the sudden shock of a shower-bath, a shock whose first effect is to impel the blood inwards upon the vital organs, it is impossible to answer for the result; the result, in fact, must be ruled by the physical strength of the tissues of those organs to resist the impulse. But the whole tenour of the observations on food, raiment, exercise, and ablution contained in this book is to guard against violent extremes, which are, in reality, a wilful risk of life. If, in the case above supposed, the individual

be young, and the tissues elastic and strong, the vital organs will not only resist the strain, but will not in any wise be injured. If, however, the person have reached that time of life when the tissues are brittle rather than yielding, something must give way. But I repeat that I cannot look upon this otherwise than in the light of an exceptional case, and such an one as could not occur if the rules of bathing, here laid down, were strictly followed. Indeed, the *training* necessary to arrive at the comfortable use of such a bath as has been supposed, would itself prevent the fulness, which in this case was the cause of mischief. To prevent the dangerous consequences attributed to the shower-bath, it has been suggested that the feet should be immersed in hot water during the operation. I can only say, that if this harmless expedient will in any way conduce to the confidence of the bather, let it be practised, by all means ; but philosophically, it is useless ; *the secret of safety lies in the training* ; not only in this, but also in all other matters in which the vital organs are concerned. I should not deserve the pardon of my lady readers if I were to neglect another matter connected with this subject, namely, the suggestion of some covering for the protection of the hair. The best contrivance for this purpose that I have seen is a high, conical, extin-

guisher-shaped cap, made of some light material, and covered with oiled silk. A cap of this shape has the advantage of not interfering with the descending shower, while, by the breadth of its base, it effectually protects the head, and offers the means of tying a border of the same silk beneath the hair.

127. The douse, or douche-bath, is a contrivance for applying water locally, and combining, with affusion, more or less concussion of the skin. As the remedy for local disease, this form of bath has been in use from time immemorial; a jug of water poured from a height on a part of the body is a douche-bath; and a more complete one is the stream from a pump, the popular treatment of a sprain. The douche-bath to the head is also applicable to some kinds of insanity. From these remarks, it will be apparent that the douche-bath is less manageable than the forms previously described, and that recourse must be had to some bathing establishment when its use is required. In establishments of this nature, the douche may be obtained of any size or temperature, and may be received in any direction, some being horizontal and some also ascending. The concussion of the skin, caused by the blow of the water against the surface, is a feature of importance in this form of bath; and when a sufficient height of

column cannot be obtained, the blow may be supplied artificially by a little wooden hammer, with which the skin is beaten as the water falls.

128. The cold bath is of three kinds, fresh, saline, and mineral, and the properties of each may be modified by being at rest or in motion. The still, fresh water, or plunging-bath, offers few advantages over the shower-bath, and combines the same principles. The affusion is, perhaps, somewhat more complete; the shock is dependent on the temperature of the water, and the concussion on the activity and energy of the bather, who, by his active movements in the bath, supplies the want of motion in the fluid. The cold-water bath on the banks of a stream is infinitely preferable to that taken in an apartment; the temperature of the atmosphere is probably agreeable, the sun may be warm, the fresh air breathes upon the limbs, and the immersion is active, and accompanied by diving, or the exercise of swimming. The saline bath, at rest, differs from the fresh-water bath in the more stimulating properties of the saline matters which it contains, and in the greater weight of the water; while the same bath in motion, that is, in the open sea, produces a greater degree of concussion than the river stream, particularly when accompanied by active motion or

swimming. The mineral baths, in like manner, owe their special properties to the mineral salts which they hold in solution.

129. When the cold bath is disagreeable to the sensations or to the constitution of the bather, it may be raised in temperature to suit his purposes. It then changes its designation, and, according to its heat, is termed, temperate, tepid, warm, or hot. A temperate bath ranges from 75° to 85° ; a tepid bath, from 85° to 95° ; a warm bath, from 95° to 98° ; and a hot bath, from 98° to 105° . In other words, the warm bath comes up to the elevation of the warmest parts of the exterior of the body, the hot bath to that of the interior, and a little beyond; the temperature of the blood on the left side of the heart being 101° .

130. The vapour-bath offers some points of difference from the preceding, in the circumstance of extending its influence to the interior as well as to the exterior of the body. The bather is seated upon a chair, in a position agreeable to himself, and the vapour is gradually turned on around him, until the requisite temperature (from 90° to 110°) is attained. The vapour is consequently breathed, and thus brought into contact with every part of the interior of the lungs. The vapour-bath has undergone much improvement within the last few years, and its

powers as an agent for the cure of disease have been increased by the discovery of various vegetable substances, whose volatile elements are susceptible of being diffused through the vapour, and, thus introduced into the blood, are made to act upon the system.*

131. Bathing and exercise are very closely allied to each other—they both stimulate the actions of the skin, and both, if carried too far, are productive of fatigue. Bathing, again, is indebted to exercise for some of its useful properties. In like manner, the rules of bathing and those of exercise are very similar. Bathing, to be efficient in preserving health, should be regular, should be commenced by degrees, and increased by a process of training, and should not be permitted to intrude upon hours devoted to some important function, such as digestion. It must not approach too near a meal, that is to say, if it be attended by the least fatigue; nor must it follow a meal too closely, three or four hours being permitted to elapse. The time occupied in bathing in cold water by invalids should not exceed a few minutes,

* I have lately had the opportunity of examining and testing the merits of some admirably-conducted baths of this kind, kept by Mr. Sturgeon, of No. 3, New Basinghall-street, and my opinion is strongly in their favour.

ranging, perhaps, from two to ten; but persons in health may carry it to the point of satiety, provided always that they combine with it active exercise. The period for the tepid, warm, or vapour-bath, is from a quarter to half an hour, unless special indications require to be fulfilled.

132. I come now to the immediate physiological effects of bathing on the system. When the body is moistened with a sponge wetted in cold water, or when affusion by the sponge or shower-bath is effected, the skin immediately shrinks, and the whole of its tissues contract. As a result of this contraction, the capacity of the cutaneous system of vessels for blood is diminished, and a portion of the blood circulating through them is suddenly thrown upon the deeper parts and internal organs (see diagram, page 26). The nervous system, among others, participates in, and is stimulated by the afflux, and communicating its impression of stimulus to the whole system, causes a more energetic action of the heart and bloodvessels, and a consequent rush back to the surface. This is the state termed "reaction," the first object and purpose of every form of bathing whatsoever, the test of its utility and security. Reaction is known by the redness of surface, the glow, the thrill of comfort and warmth,

which follow the bath, and the bather should direct all his care to ensuring this effect. By it, the internal organs are relieved, respiration is lightened, the heart is made to beat calm and free, the mind feels clear and strong, the tone of the muscular system is increased, the appetite is sharpened, and the whole organism feels invigorated. This is the end and aim of the bather, and to this all his training tends. The error is, to expect the result without the preparation. After a proper training, the most plethoric and apoplectic individual may derive health and safety from systematic bathing; but it will be seen, at a glance, by the above explanation, that without the training the attempt would be madness. But the reader must not imagine, that because there is danger in bathing in a particular case, that the practice is dangerous: that would be an erroneous inference. I have endeavoured to show that food, raiment, and exercise, when judiciously used, are the source of many enjoyments, and the means of our existence; and I think it will be granted me without difficulty, that excess in either is replete with danger. Are we to give up the use of food because an incautious person eats himself into an apoplexy? Bathing is as little dangerous as food, the difference between the two being, that we prefer the one, and

therefore take it under the mantle of our protection, while we repudiate the other, because it is less agreeable to our appetites, or perhaps a little troublesome.

133. In order to increase and promote the reaction of the skin, various measures and manipulations are resorted to, some of them being practised in the bath, others after quitting it. Of the former kind is the operation of shampooing, which consists in pressing and kneading the flesh, stretching and relaxing the joints, and brushing and scrubbing the skin. In the East, the practice "is most singular. You are laid out at full length, rubbed with a hair brush, scrubbed, buffeted, and kicked; but it is all very refreshing."* The ancients were in the habit of scraping the skin with an ivory knife. But practices so agreeable to the bather have been little followed in temperate and cold climates, partly from the prevailing neglect of the bath, and partly from the necessity of having the operation performed by a person skilled in the manœuvre. Our common means of stimulating the skin are confined to the rough towel, the horse-hair glove or rubber, and the flesh-brush, which are used after quitting the

* Sir Alexander Burnes's Travels in Bokhara.

bath.* Indeed, this short catalogue embraces all the appliances requisite for the purpose. For tender and delicate skins, the rough towel answers every purpose, and should be used by the bather himself, unless the exertion be found too great, or cause palpitation of the heart. In the latter case, it must be resigned to an attendant, and the process completed by the bather, in order that the reaction may be increased by some degree of muscular exercise. Some skins bear the horse-hair and bristle brushes equally well with the rough towel, in which case these may be used after the drying is effected. When there is any delicacy of the respiratory organs,

* Since the above was written, I have had the opportunity of examining a flesh-glove that comes recommended to us by the experience of ages, and certainly offers advantages superior to any other kind of rubber for the skin in existence. This is the Indian flesh-glove or kheesah, a glove, or rather mitten, which has been used, from time immemorial, in Hindoostan, Persia, and throughout the East, and by a race of people, both from necessity and luxury, more attentive to the skin than any other upon the face of the globe. The glove was introduced into England by Mr. J. Ranald Martin, of Grosvenor-street, and much labour and expense have been employed by Messrs. Savory and Moore in having a similar glove manufactured in London. Their imitation, however, is perfect, both in appearance and properties; and it is a subject of much satisfaction to me to be enabled to recommend so admirable a contrivance for promoting the health of the body, through the agency of the skin. The glove is made of goat-hair, the material used in the manufacture of the Burruck or Persian glove-cloth, of which the original kheesah is composed.

the horse-hair and bristle brushes, by producing an increased degree of stimulation over the chest and trunk of the body, are important additions to our means of cure. It is not intended, however, that the remedy should be more unbearable than the disease, which is likely to be the case if the common horse-hair gloves* are employed: a better kind are those which have a brush surface; they are much softer, and more efficacious. The electrical qualities which are spoken of in connexion with horse-hair gloves are an innocent fraud on the imagination of the purchaser. The best form of flesh-brush is one in which the bristles are set on a leather back.

134. The influence which the bath exerts over the nervous and circulating system of the bather is not the least remarkable of its effects. The temperate and the tepid bath, for example, produce a gradual diminution in the number of the heart's pulsations, a calm in the nervous system, and a tendency to sleep; in other words, they are *sedative* in their action on the system. The hot-bath, on the contrary, causes an excitation of the nervous and vascular system, and increased heat of the interior of the

* In Hindoostan, the horse-hair glove is employed for rubbing down horses, a purpose for which they are certainly better fitted than for using to the human skin.

body, a quickened pulse, and profuse perspiration. It is a *stimulant* to the system. The warm-bath, occupying a mid-position between the tepid and the hot-bath, is also intermediate in its effects; but as the power of maintaining and bearing heat is very different in different persons, it is impossible to fix upon the exact point of neutrality for all. It appears to extend over a range of about ten degrees from 90° to 100°, so that if we wish designedly to produce a sedative or a stimulant effect on the economy, we should, having always regard to the feelings of the bather, select a temperature above or below the neutral range.

135. Another curious and important law is associated with the influence exerted by the bath over the state of the pulse, which is, a power of absorption by the skin below the neutral range, and an augmented transpiration above it. The absorbing power is modified by various circumstances, such as the quantity of fluids already contained within the tissues of the bather, the state of the body in relation to food, activity of nutrition, &c. In this sense, medicated baths have the power of acting upon the system. The process is, however, slow, and requires long immersion when the water-bath is used, but more active with the vapour-bath.

136. The opposite effect is produced when the temperature of the bath rises above the neutral range ; in other words, above the temperature of the blood. In this case, transpiration is so active, that the bather loses weight. If the bath be prolonged, there is danger of its proving fatal, by the over-excitation of the system ; the pulse, as before mentioned, becomes rapid, the beating of the heart tumultuous, the respiration quickened ; the bather experiences a sensation of oppression amounting almost to suffocation ; he is faint and giddy, and falls into the insensibility of apoplexy.

CHAPTER X.

ON THE MERITS OF HYDROPATHY, OR THE TREATMENT OF DISEASE BY WATER.

137. THE advantages to health of a judicious and sound system of diet, clothing, exercise, and ablution, cannot be better illustrated than by reference to what has been termed the "water-cure." The water practice has effected important results in the treatment of disease, and will, I trust, be instrumental in restoring to Medicine one of her most valuable and important auxiliaries. Medical men may be jealous that these benefits have been "conjured from the vasty deep" by other hands than those of the high priests of Therapeia, but they have no just reason of complaint; the treatment of disease by water had been improperly neglected; now, however, its merits may be tested, and the test aided by public encouragement; moreover, the remedy will revert to those who are

alone qualified to employ it, and we may fairly hope that a correct system for its use will be established by their labours. Priessnitz, the peasant of Silesia, has done much, but he would have done infinitely more had he received a medical education; he would then have avoided many errors, and have entitled himself to the rank of a discoverer. At present, though armed with the experience of twenty years, he is little more than an experimentalist, and, in some instances, a rash and incautious one. A warm supporter* and eulogist of Priessnitz remarks: "The knowledge acquired by anatomy, physiology, and pathology, is indispensable to the full understanding of the 'water-cure,' and to its practice, without frequent error. It is true it has been discovered and brought to extraordinary perfection without this knowledge, but Priessnitz did not bring it to its present state without twenty long and patient years of practical study of the powers of water, of the vital phenomena, and of those of disease, however imperfect his knowledge may be. But Priessnitz is a genius; an extraordinary case; one of those isolated instances which occur so seldom in the history of man; let not, therefore, other uneducated persons attempt to practise the 'water-cure,' because Priess-

* Dr. James Wilson.

nitz has practised it : the power of genius is no rule for ordinary mortals."

138. This I believe to be a plain statement of the amount of merit due to Priessnitz, and such, as I think, we cannot refuse to accord him. To weigh truly the advantages of the system, we must, as the same author advises, "allay the force of habit, and the passion of prepossession." "One of Priessnitz's great peculiarities," he observes, "is his tact; this is a valuable attribute, and indispensable to a great practitioner, though, when unaided by a knowledge of every mechanical and rational means of ascertaining the precise state of all the organs, it must frequently be followed by error." His patients, strange to say, look at this blundering upon the right at the risk of hitting the wrong, as a special *clairvoyance*, as a mode of "peeping into the internal recesses of the bosom, and into all the windings of the abdominal cavity." The truth is, that being incomprehensible to themselves, they regard it as supernatural and wonderful, while the same persons would consider the cautious process of induction and mature judgment, founded on carefully observed data and the collective experience of ages of the medical man, as nothing at all out of the common. This is the natural consequence of training a people to believe that drugs are

their cure ; they at last value the filthy stuff alone, and despise the judgment which directs it. Truly, indeed, do we deserve Napoleon's contemptuous sneer, that " England is a nation of shopkeepers," so long as we tolerate the mental attributes of the medical man only for the sake of enjoying his drugs, and pay gladly for the drugs, while we repudiate any reward as the harvest of a scientific education.

139. But to return to Priessnitz. When a patient is brought to him to be submitted to the " water-cure," " he looks at and feels the skin, examines the make of, and marks on a man, with the greatest attention and accuracy, and makes them valuable guides as to what he ought to do, and what opinion to form as to the state of the constitution and nature of the disease. He goes no further, for the best of all possible reasons, because he does not know or understand the means. He does not feel the pulse or look at the tongue, both valuable, and almost indispensable, when understood, and joined with all other means ; had he done this, he would have acted somewhat differently in many cases which I have noted." I think some of my invalid readers will shudder before such a picture of a medical examination. Priessnitz is evidently incompetent to investigate disease, and his examination embraces less than half of the inquiry of

every medical man. To visit his want of knowledge charitably, we must admit that *he sees with half an eye*, a kind of inspection that I should think ill supplied by all the "tact" which the uneducated peasant can bring to bear on his treatment. But this does not invalidate the benefits of water and hydropathy ; it only leads us to the conclusion that we should not prefer to seek them at the hands of the redoubtable Priessnitz, if we could obtain them at home, administered by those in whom we feel confidence, and whom we know to have deserved that confidence by the nature of their education and qualifications. The secret of Priessnitz's success seems to be explained in the following passage: "He evidently tries to stick as close to nature as he can, and by this he has done wonders." But this remark immediately precedes a proof of his failure, and shows him, with all his disposition to try, a blundering expounder of Nature's laws. For example, pursuing his perquisitions into himself, a Silesian peasant, as the *book of nature*, he arrives at the conclusion, that whatever is suitable to him, must be good for his patients. Now, listen, ye dyspeptics, to a few "first lines" of this Silesian-peasant-book. "Priessnitz is himself so strong and hearty by his mode of life, that *he does not know he has a stomach*, the truest sign of the healthy state ;

and, not feeling with his patients, he forgets, or, from some mystification of reasoning, overlooks the fact, that others are not in this enviable position, or takes an unphysiological view of the influence of an overloaded stomach on the whole body, on each of its organs, and on any disease with which it may be affected."

140. The consequences of self-inspection, ignorance, and obstinacy,* on the part of Priessnitz, are attended with the most mischievous and injurious results to his patients. Dr. Wilson continues: "With all Priessnitz's sagacity, it is a matter of surprise that he has fallen into an abuse which interferes greatly with his excellent cure; this is, allowing vegetable and animal matters at his table, which are of an indigestible and pernicious nature, such as pork baked to a cinder, sausages, 'sauer kraut,' salted cucumbers, and bad pastry, articles of diet which, even in health, should be avoided, when any food of a more salutary nature can be obtained. What, then, must be the effect when the majority of his patients have, complicated with other complaints, some disease or derangement of the digestive organs. But a more flagrant error still is the quantity which each person consumes. There is a

* "The expression of his countenance is intelligent and inquiring; he has a general appearance of firmness, which he possesses, in fact, to the degree of obstinacy."

kind of *furor* who shall devour most. It is true that with the 'water-cure' every person can eat infinitely more than he could under any other circumstances. But this is not enough; indigestion may take place, and excess be committed in the 'water-cure,' as well as elsewhere. Water only counteracts the evil effects. But the point I am convinced of is, that it interferes with, and retards the final cure of, the majority of the patients of Graefenberg." The following is a vivid picture of the effects of this abuse. The author is detailing a case of dyspeptic hypochondriasis; speaking of the patient, he observes: "One day he came to my room, and I examined him. The lungs and heart were perfectly sound. On pressing deeply on different parts of the stomach and bowels, great pain was caused, particularly about the region and pyloric orifice of the stomach; in the latter there appeared to be some hardness. I found that the process of pressing, though made with great gentleness, made his hands and feet quite cold. The case was a clear one: he was ordered to go through the sweating process twice a day; a hip-bath and douche; to *eat as much as he could, and without distinction*. At the end of seven months of this active treatment, he left Graefenberg very little better. The error in this treatment was the douche,

sweating, and diet." Dr. Wilson goes on to say, that the misapplication of treatment arose from the perversity of Priessnitz's theory, which enforced the necessity of ejecting the Morrison's pills, which were the cause of the disease, and other morbid "stuff," out of the system. The proper treatment being, "the general fomentation by 'the wet sheet,' and an additional hip-bath, and the warm compress to the bowels, foot-bath, &c. Another fatal error was in the diet, for he stuffed enormously the most indigestible matters, in the hope of gaining strength. After a dinner of pork and 'sauerkraut,' salted cucumbers, and pastry for a ploughman, I always, the next morning, made a point of conversing with him. I generally found him sitting on a bench by himself, looking on the ground, and avoiding all intercourse." While in this state, he had an objection to answer any questions; but after a little solicitation, would acknowledge that he had passed a horrible night, sleepless and sick. The tenour of the human mind, in such a case as this, and the intolerance of good advice under such circumstances, is well displayed in the next remark of the author. "If I had said a word about the pork, 'sauerkraut,' and other indigestible 'combustibles,' he would never have spoken to me again." Dr. Wilson "made it a rule to inquire, the

morning after one of the indigestible dinners, how the dyspeptics and hypochondriacs found themselves. They were invariably in a suffering state."

141. Another of the peasant's vagaries is an objection to warm clothing. "Priessnitz recommends people to clothe lightly, and to avoid flannel next the skin." "His prejudice against flannel is so great, that he will not allow its use under any circumstances." "What makes Priessnitz so obstinate on this point, I cannot exactly determine; but he has, with all his genius and sagacity, two or three decided mystifications." So, besides being poisoned with improper food, taken in improper quantities, the invalid is to be deprived of his warm coverings, and their future use prohibited. These are startling propositions; and we can only come to the conclusion, that such a plan may be suitable for Graefenberg and Priessnitz, but most unsuitable for any place possessing inferior advantages of air and means of taking exercise. Priessnitz's tact and sagacity are then purely local, his plans applicable to Graefenberg alone; he is, in every sense of the word, a "genius loci;" remove him from his native "berg," and the fruits of his twenty years' experience will be well nigh lost, he will have all to learn over again. It must be recollected, that in drawing these inferences of

the true character of Priessnitz as a minister of disease, I have taken the statements of a warm admirer as a groundwork; and though in my own mind they do not detract from a certain kind of merit due to the man, it is necessary that he should be brought down from the pinnacle of nonsensical flattery upon which his eulogists have raised him, in order that he may be rightly comprehended. The British nation are hearty detesters of "humbug;" and it is to be regretted that so much of that material should have been interwoven, by indiscreet adulators, among the laurels of Priessnitz, both for his own sake and that of his system. The artificial throne upon which he has been chaired, itself explains the remark of Dr. Wilson, that at Graefenberg, "nothing can exceed the prejudice against medical men." To which may be added another little reason, which savours of negligence, but which is diluted, obviously with *water*, into the expression "reserve." This reserve, then, "has its inconvenience, when carried to excess, for he frequently omits to give the necessary instructions when the patient forgets, or does not know how to ask for them."

142. Dr. Wilson deserves the warmest praise for his candid analysis of Priessnitz and the "water cure," and still more, for putting its principles into

practice in Britain. But his long residence at Graefenberg, and his extreme anxiety to establish the "universality of water," render him a partial advocate of the merits of his remedy. Thus, after the narration of a case, which I shall presently quote, he observes, "here there was not air and exercise, and no particular diet. No doubt it will stagger a little those who think that diet, air, and exercise constitute the principal parts of the water cure." Now I think I may answer for my readers as well as for myself, that we are quite willing to give a fair share of honour to well directed ablution; and that, although we could wish to see an equally well directed diet added, we are disposed to be satisfied in this case with abstinence from alcoholic and other stimulants. But we cannot agree with him that air and exercise were omitted in the case referred to. The patient was unable to walk out, but she breathed the fresh air of Graefenberg, *to her a change of air*, in her apartment; and exercise does not imply walking many miles, but simply action of the muscles, to an extent commensurate with the powers of the individual. Such motion was enjoyed by the patient in question, firstly, through the friction used by the attendants, and subsequently, movement in obedience to her own will. The patient was a lady nearly

seventy years old ; she was completely crippled with rheumatic gout, and had not been out of her bed for nearly twenty years. For sixteen years, she was unable to lie horizontally ; and for seventeen had not used a pen. Priessnitz at first refused to receive her, but yielding to solicitation, she was treated as follows :—“ Every morning the upper part of her person was gently rubbed all over for a few minutes with a towel moistened in cold water. She was then well dried, and her dress replaced ; the legs and feet were then well rubbed in the same way, and the same thing was repeated in the evening. A bandage, well wrung out of cold water, was placed round the waist, covered with a thick dry one, and the same dressing occasionally to the legs. A few tumblers of water were drunk during the day, more or less, as she felt inclined.” Under this treatment, she got well. But this is no case in disproof of the value of air and exercise. A walk across the room to a feeble invalid is equal to a mile of brisk walking to a person in health.

143. The following remarks by Dr. Wilson give a proper view of the treatment of disease by water. “ It is next to impossible to do more than lay down general rules in the treatment of any given complaint. The treatment must be changed from day

to day, according to the state of the patient, the nature of his disease, and the powers of his constitution. One day, using cold water, sweating, and douche ; at another time, substituting the wet sheet, chilled or tepid water ; and even, sometimes, warm or hot water, which Priessnitz has recourse to in rare cases ; at other times, doing nothing, or next to it. In fact, it resolves itself to this : all depends upon the knowledge and tact of the practitioner ; and it requires the same study and same knowledge of all diseased states, the powers, properties, and combinations of the remedy, as in the practice of medicine."

144. In admitting that disease has been cured, and that much benefit to health has resulted from the treatment adopted at Graefenberg, there are one or two considerations which must be taken into the argument. One of these relates to the arbitrary medical rule which reigns there, a rule of absolute necessity in the "water cure," and the very basis of success in all medical treatment. The place recognises but one king, and dereliction is immediately followed by banishment. This, therefore, is a condition of importance, if we wish to transfer the benefits of the "water cure" from Silesia to Britain. We must have Graefenbergs in the form of institutions, under strict laws and rigid discipline. The advantages of

institutions of this nature are thus referred to by Dr. Wilson :—“ Among the foremost, are the removal of the patient from all business, care, and temptation that can interfere with the cure, and his return to a healthy state. The patient goes to bed early, and gets up early, and goes through the different parts of the cure with more ease and pleasure from the stimulus of association and example ; he has the advantage of seeing similar cases to his own cured, of comparing notes, and receiving consolation.” At Graefenberg, therefore, existence and mind are dedicated to health ; the pursuit of health is the sole occupation of the day ; the votaries of water WILL follow out the rules of their director ; they WILL be cured, and they ARE cured. Now, it is only in an institution that we could hope to combine these advantages in Britain ; and I trust that the day is not far distant when we shall see such institutions, *hygienic sanatoriums* in fact, in the neighbourhood of all our large cities and at our watering-places. My readers will perceive an additional necessity for institutions in the following glance at the instructions to a patient, who inquires how far he may venture to practise the “ water cure ” alone :—“ You can apply cold water every morning, either by the wet sheet, wet sheet-bath, cold bath, or shower-bath, or simple

ablution ; take a quiet walk, and drink three, four, or five tumblers of water before breakfast ; take a foot-bath at eleven or twelve o'clock, a tumbler or two of water, and a good long walk. The fomentation may be applied during the day to the stomach, as described. For a cold, you can lie in the wet sheet, and be afterwards well rubbed in the shallow, chilled bath for five minutes ; or when heavy and indisposed, a good sweating and a bath ; but not much more would I recommend to ordinary people to try themselves." I think few persons would be so bold as to venture upon these instructions, however simple they may appear to the suggester, without the supervision of a medical director. It has been said of a person who conducts his own case in a court of law, that he has a fool for his client ; politeness forbids me to say what kind of patient a man has who physics himself.

145. Those who have not read any authentic detail of the "water cure" will be astonished to hear of a writer saying of himself, that in eight months he has taken 500 cold baths, 400 hip-baths, has reposed in a wet sheet for 480 hours, and drunk 3500 tumblers of cold water. "I once," he writes, "by way of experiment, swallowed thirty tumblers of water from the spring before breakfast, each a large

half pint, two of which I sometimes took at once. I was nearly three hours about it. At nine o'clock I was so hungry that I could hold out no longer, otherwise I would have tried another dozen. When I went out at six, I had a wet bandage on the stomach, tightly applied, and covered by a thick dry one. When I went to breakfast, the abdomen was diminished in size, for my bandage no longer stuck so close. I never enjoyed a morning's walking more, and during the day felt perfectly well. My usual quantity was from five to ten tumblers before breakfast, two before dinner, one or two at dinner, and two or three during the evening. This is about the general rule that ought not to be exceeded during the cure."

146. With our present knowledge of the importance of the application of the principles of hygiene to health, it will not be without interest and instruction to pass in review the various modes of using water practised by Priessnitz. His manner of producing and keeping up profuse perspiration is excellent; it is thus described by Dr. Wilson: "The bedding is removed, and a blanket of the largest size is spread out on the mattress; the patient, lying down at full length, is enveloped in it as closely as possible, and so as to fit well about the neck and

feet. The best covering over this is a small feather-bed, which must be tucked in about the head and shoulders, and all the way down to the feet; it is as well to elevate the head as high as the patient finds it convenient or comfortable. In this state he is left until perspiration comes on; it is then allowed to continue for a longer or a shorter time. It generally takes two or three hours before perspiration begins; but it is a good plan, when it is slow, after the first hour, to begin rubbing the hands gently against each other, and up and down the sides, doing the same with the feet, but not so as to fatigue or affect the breathing. As the packing up takes place at four in the morning, not to lose any part of the day, the patient has generally a good sleep for an hour or two. When perspiration has fairly set in, the window is thrown open, and from time to time a wine-glassful of cold water is given to drink. When it is considered that sufficient perspiration has taken place, the bed and blanket are thrown off, and the patient steps into a bath (if it be in his room) containing about a foot of cold water, where he is well washed and rubbed, assisting himself as much as possible. Before sitting down in the bath, it is well, as a general rule, to have a basin of cold water at the side, in which he just gives his hands, face, and

breast a rub. When the large bath is used, the patient walks to it, still enveloped in the blanket, a cloak thrown over, if necessary; here he plunges in at once, if it is large enough. Sometimes it is necessary to have two baths, one with cold, the other having water with the chill taken off. In this case, he enters first into the warmer bath, and after a good rubbing, transfers himself quickly into the colder one, where the same thing takes place for a minute or two, returning again to the warmer one. Where the douche is in the house, it is sometimes made use of instead of the bath; I doubt its great utility. After all these processes, he dresses quickly, and goes out to walk for an hour or longer, drinking, from time to time, a tumbler of water." It is not to be wondered at that Priessnitz should have considered this as a process which no disease could elude, a thorough purgation of the humours through the skin. But he found, in practice, that it was not generally applicable, that it was liable to produce emaciation and irritability, and that it was injurious in persons having a determination of blood to the brain or mucous membrane, or suffering from nervous debility; that, in fact, he merely separated the diluent water from the system by this means, and left the blood loaded with salts, and highly irritative, behind.

147. There is one part of this process, however, that calls for special remark, and that is, the sudden immersion of the body in cold water while bathed with perspiration. This is easily explained; the skin is stimulated to excess, and were not some means taken to check the action, it would be prolonged indefinitely, and would be a cause of chill to the surface of the body, and give rise to cold and fever. The cold water, applied in the manner described, is a stimulant; it produces a momentary shock to the nervous system, causes the arrest of the perspiration, and is followed by a general re-action.* In describing the manner in which cold was produced by draughts of cold air, I had occasion to remark, that the checked perspiration was the effect, and not the cause, of the injury done to the system, and that the real cause of mischief was the chilling of the cutaneous nerves and the consequent depression of the nervous powers. Cold never injures the body when acting as a stimulant; it is only when it acts long upon the surface, and robs the latter of its heat. The youth of Rome, to avoid cold, were wont, after

* It is but fair to mention, that at all hydropathic establishments, the temperature of the water is regulated by the state and power of the invalid. This rule is particularly enforced in the excellent establishment with which I am most familiar, namely, that of Miss Price, at Harrow, Middlesex.

their contests on the plain of Mars, to leap into the Tiber. By this practice, they checked and removed the perspiration from the skin, prevented its slow evaporation and the cold engendered by that process, and caused a healthful re-action. If we hear of disease following this practice, it is in cases where the object is unknown or overlooked. The individual is labouring under nervous exhaustion from fatigue, or his nervous powers are lowered by the long continuance of the ablution; or he is passive in the bath; there is always some such depressing cause. As a stimulant, I repeat, immersion cannot be injurious. If the patient were to get up from the bed and dress, the probability is, that he would take cold; he would then necessarily chill; but the old action is stopped, and a new one induced, by the cold affusion. I may refer also to the practice of Russia, as an illustration of the harmlessness of exposure to a *stimulant cold* while the skin is perspiring. The Russian quits his hot vapour-bath to be rubbed with snow; he then returns to the bath, and again to the snow, repeating the process several times, but always finishing with snow. The cold in his case has another effect; it subdues the excitement of the circulation caused by his clumsy bath. But in the Priessnitzian mode there is no such excitement. A method of treatment

introduced into medicine many years ago, but rarely adopted at the present day, consisted in pouring several pailfuls of cold water upon the patient, then drying him well, and returning him to bed. This remedy never gave cold.

148. The *cold bath* of Priessnitz differs in nothing from the ordinary bath, excepting in its application, being rarely taken but as an appendage to the sweating process, or wet sheet. The *shallow bath* is a large tub, containing from six to twelve inches of water. The patient remains in it from three to ten minutes, rubbing his skin and dashing water over the surface. It is also coupled with the affusion, once or twice, of a basinful over the whole body; this bath is a derivative in its action, and is employed by Priessnitz in fevers and inflammations, in which the period of ablution is prolonged according to the judgment of the prescriber. The hip-bath (*sitzbad*),* like the preceding, is derivative in its action, and is used for chronic diseases, more especially in those of the upper and lower stomach. It also relieves determinations to the brain and chest, "flatulence, colic, spasms, and vomiting." The period of prolong-

* I am enabled to give strong testimony in favour of the sitting-bath from my knowledge of its successful use in chronic disorders of the head, chest, and stomach, at the Harrow establishment.

ing it is from fifteen minutes to an hour, and during its continuance, the surface of the stomach is to be quickly, but gently rubbed with the hand. In commencing either of the above baths, the temperature of the water is to be slightly raised, and in succeeding days gradually reduced to its natural standard. The skin, under the stimulation of the water, becomes warm and vividly red.

149. The *damp sheet* (leintuch) is the chef-d'œuvre of Priessnitz ; it is simply a linen sheet wrung out of plain water until no more drops fall. It is then placed on a blanket over a mattress, and the sides of the sheet are brought over the patient and tucked in, so that he is well packed up from neck to foot. The blanket is then arranged in the same manner as the sheet, and a light down bed placed over all. The head may be raised to any elevation that may be agreeable to the patient, and, when there is headache, a fold of linen dipped in water may be laid upon the forehead. The process lasts for half or three-quarters of an hour or an hour ; the patient then rises, takes the cold or chilled bath, walks for an hour, drinks some tumblers of water, and then is in high condition for breakfast. In different cases, the process may be modified by reducing the size of the sheet, leaving out the legs or arms, or both, and enveloping the

trunk only; but in the most delicate invalid, the shallow bath, at an agreeable temperature, after the removal of the damp sheet, is indispensable. "Where there is great heat of the skin from fever or internal inflammation, the damp sheet is changed as often as it becomes warm; sometimes as often as fifteen or twenty times before the patient is put into the bath; but all this of course depends upon the symptoms. It is a powerful prophylactic remedy, and, as I have said, possesses, at the same time, a sedative, soothing, and soporific property, calming the pulse, removing feverish heat from the surface, and allaying pain and irritation." As regards domestic qualities, Dr. Wilson observes, "after a long journey, or travelling day and night, a damp sheet and cold bath remove every symptom of fatigue and any disposition to cold." "After a feverish night, awaking with headache, malaise, or what is called a state highly bilious, let this process be gone through, using, at first, a shallow bath with ten inches of water at 80° of Fahrenheit, and a good rubbing for five or ten minutes." Such is the "damp sheet," and such are stated to be its effects. It is certainly calculated to equalize the circulation, taking heat here, producing contraction of vessels there, checking the vital chemistry of malnutrition in this place, promoting perspiration in

that, determining to the surface, and occasioning a general and soothing calm to the nervous system. And it is equally certain that, administered properly, it is not likely to produce cold. If employed improperly, the cold bath which succeeds is the antidote to its bad effects. The test, however, of this, as of all other modes of application of water, is the subsequent re-action; where this occurs, the remedy, however monstrous to the eyes of prejudice in its shape, is perfectly harmless.

150. The *wet sheet bath* (*abreibung*) is a sheet less completely emptied of its water by wringing than the damp sheet, and thrown over the patient, who draws it about him, and rubs the upper parts of his body, while an attendant does the same by the back and lower limbs. This is continued for two or three minutes, and then replaced by a dry sheet, with which the skin is thoroughly dried. The author observes, "this is an excellent portable bath," and very convenient for daily ablution and travelling. It is tonic in its medical effect.

151. The *wet bandage*, or *compress* (*umschlag*), is a damp sheet in miniature for application to a part of the body. When used for superficial inflammation, it acts by evaporation, and the thinner the material employed the better. When the inflammation is deep

or chronic, it is made to perform the purpose of a fomentation in the following way: a thin fold of linen is wrung out of water until no moisture runs from it, and is then spread smoothly on the skin; a second and thicker fold, but dry, and of larger dimensions, is placed over the preceding, and both are retained in their place by a broad bandage which completely envelops them. The wet compress is derivative and sedative in its action, and keeps up a gentle excitation of the skin and free perspiration. Whenever it dries, which does not take place for several hours, it is again wrung out of water and applied; and its action is increased by water, drunk during the period, and exercise. In this manner the wet compress may be worn for days together, or only during the night or day. Whenever it is laid aside, even for a few hours, it must be recollected that the surface is warm and perspiring, and the perspiration must be stopped by rubbing the skin briskly with cold water, and then drying it well. In the latter case, water is used as a stimulant. The above remedy is very useful in dyspeptic disorders. It is undoubtedly based on the soundest physiological principles, and enjoys the advantage over some of the other modes of application of water of being perfectly safe, and so manageable that the experiment can be easily

made. It is by no means disagreeable; after a few minutes, the wet is no longer felt, and the compress is then warm and not unpleasant. And this is the test of its utility; if it be disagreeable to the sensations, and remain so, it will do harm rather than good, and should be abandoned. I have been familiar with the wet compress in a different shape for many years, and have seen the most beneficial and surprising results follow its use; it answers every purpose for which a poultice is generally used, and is infinitely more agreeable as a remedy.

152. The *douche*, as used by Priessnitz, is a column of water of from "one to six inches, or more," in diameter, and descending from ten to twenty feet.* His *foot bath*, *head bath*, and *partial baths* offer no peculiarities worthy of notice. The cold foot-bath is used by him as a derivative in determination to the head and vital organs of the trunk. "It is," says the author so frequently quoted, "the best local remedy for habitual cold feet, keeping them in a glow for the rest of the day, and with repetition,

* The *douche* baths employed at the Harrow establishment are, 1, a waterfall *douche* of twenty feet descent; 2, a vertical column *douche*, varying in diameter from half an inch to two inches; 3, a horizontal column *douche*; 4, a vertical shower *douche*; and 5, a horizontal shower *douche*. The *douches* are sparingly used, and never at the beginning of treatment, except in particular cases.

permanently restoring the warmth and circulation in them. To ensure a speedy re-action, the feet must be warmed by rubbing or exercise before putting them in the cold water, and immediately after the bath, exercise must be taken. A certain way of warming the feet and keeping them so is by drawing on a pair of cotton socks well wrung out of cold water, over them another pair of thick dry ones, and a pair of large boots. A walk in this state warms the feet immediately, and they remain in a glow the whole day."

CHAPTER XI.

ON THE "RASHES" OF THE SKIN; NAMELY, ST. ANTHONY'S FIRE, RED RASH, ROSE RASH, AND NETTLE RASH.

153. WHEN the reader is informed that between ninety and one hundred varieties of disorder affecting the skin are known, he will not be surprised to learn that attempts should have been made, at a very early period, to subject them to some kind of classification. Hippocrates, the father of medicine, for example, divided them, according to the supposed nature of their *cause*, into two classes, *local* and *constitutional*; the former he believed to originate in a morbid action of the skin alone, and the latter in an attempt, on the part of nature, to eject from the system some morbid humour. But the classification, if it might be so called, of Hippocrates, afforded no means of distinguishing the various forms of disease

from each other. Galen, perceiving this deficiency, endeavoured to supply it by classifying diseases of the skin according to their *situation*. He, also, established two groups, namely, *those affecting the head* and *those affecting the other parts of the body*. An obvious objection raises itself to Galen's classification, in the fact, that the same disease may at one time attack the head; at another, the body; and often, both at the same time. Nevertheless, Galen had followers; and within the present century an eminent French writer divided the whole of the diseases of the skin into *ringworms* and *tettors*. In these primitive forms of classification, the observer will perceive the reigning popular theories of the present day. The people have still their ringworms and their tettori, according to difference of situation of the eruption; and they have still their local remedies to "kill" the ringworm, or their inward medicines to "purify the blood." But the Hippocrates and Galens of the present day take no note of the rapid march of science; their theories remain unchanged, and their remedies the same. Barbarous remedies of an early age are the panacea of the uninformed at the present day, just as the language which they employ may be referred at once to the Celtic or Saxon roots from which it sprang. Thus, if we

would indulge an antiquarian taste in tracing the roots of our language by existing words, we must pursue our inquiry after obsolete expressions among the lower classes, particularly in the provinces. And in like manner, if we aim to discover ancient and forgotten medical remedies, we must seek them in the same quarter. The "toad's heart" and the "viper's fat" have still an existence as popular remedies ; and at a recent execution in a provincial town, there were persons ignorant enough to request permission to avail themselves of the touch of the dead man's hand to dispel their wens and warts. It is the persistence of these popular superstitions that is the great source of sad encouragement given to empirical medicines. What ideas of witches culling simples on the murderer's grave at the third hour of the morn, and before the dew of the morrow sets, does not the term "vegetable pills" conjure up ! What balmy influences are imagined in a pill formed of juice of primrose-petals, and roses'-breath ! while the poor bolus, shorn of its name, is a vile compound of filthy and poisonous juices ; aloes, for example, gamboge, ipecacuanha, croton, castor, colocynth, scammony, all vegetable remedies, Flora's and Pomona's gifts. While, on the other hand, the

maligned mineral kingdom supplies us with such useful and harmless remedies as magnesia, soda, sulphur, and steel.

154. But to return. A more appropriate classification than either of the preceding took its origin in the early part of the seventeenth century, in the labours of Riolanus; and this system, improved by modern investigations, is the famous artificial classification of Willan, a classification now very generally followed both in this country and on the continent. But Willan's system is incomplete; he allowed himself to be diverted into unnecessary sub-divisions by the terms class, order, genus, and species, which he borrowed from Linnæus, and made the subject intricate and complex. Alibert attempted to rival Willan by founding a natural system in emulation of Jussieu, but succeeded only in plunging the subject into still further perplexity, and the system of Alibert scarcely outlived the man. While cutaneous pathology was in this state, a new era was in the act of dawning; one in which anatomy has received a new impulse from the use of the microscope, and physiology has been improved to a remarkable degree by that instrument and by organic chemistry. A new basis was thus afforded for classifying cutaneous diseases, and

of this I availed myself in a classification published in 1842.* To this system I gave the name "Natural Classification," not from any likeness which it bore to the natural system of Jussieu, or that suggested to Alibert's mind by a contemplation of the principles of the great botanist, but from its being actually founded on the structure of the skin. Now, as I suppose my reader to have formed some idea of the structure of the skin by the perusal of the first four chapters of this work, he is perfectly competent to form a judgment upon the natural system, and to obtain an insight into the laws of disease illustrated by this classification. In proceeding to a demonstration of this system, I may remark, in the first place, that the agents of diseased action are the nerves and the vessels. The scarf-skin, it will be remembered, possesses neither of those organs, and therefore cannot be the seat of intrinsic disease. It may be, and is, altered occasionally by the state of its producing organ, the true skin, but cannot be considered as itself susceptible of the abnormal vital action termed "disease."

155. The constituents of the skin, exclusive of the scarf-skin, are the true skin, the perspiratory ap-

* A Practical and Theoretical Treatise on the Diagnosis, Pathology, and Treatment of Diseases of the Skin. Churchill, London.

paratus, the oil-producing apparatus, and the hairs and hair-tubes. These four parts form the groundwork of a *primary* classification into as many divisions of diseases of the skin. Of the diseases of the true skin, a *secondary* division comprises inflammation, under which a large majority of the diseases of the skin may be ranged: enlarged growth of the papillæ of the sensitive layer; disorders depending specially on the state of the vessels; disorders depending specially upon the state of the nerves; and disorders depending specially upon the state of the colouring principle. The diseases of the perspiratory apparatus are such as have reference to excess, diminution, or alteration of the perspiratory fluid; the diseases of the oil-producing apparatus, to excess, diminution and alteration of the oily product, detention of the product within the tubes and glands, and inflammation of the glands; and the diseases of the hair and hair-tubes; to augmented and diminished quantity of hair, alteration in colour, disease of the hair-pulps, disease of the hair-tubes, and altered direction of hair. A glance at the following table will render this arrangement more clear:—

<i>Diseases of the true skin.</i>	{	Inflammation.
		Enlarged papillæ.
		Disordered state of vessels.
		Disordered state of nerves.
		Disordered colour of the skin.

<i>Diseases of the perspiratory apparatus.</i>	{	Excessive perspiration. Diminished perspiration. Altered perspiration.
<i>Diseases of the oil-producing apparatus.</i>	{	Excess of product. Diminished product. Altered product. Detention of product. Inflammation of glands.
<i>Diseases of the hair and hair-tubes.</i>	{	Increase of hair. Diminution of hair. Alteration of hair. Disease of hair-pulps. Disease of hair-tubes. Altered direction of hair.

INFLAMMATION OF THE TRUE SKIN.

RASHES.

156. We call that state of any part of the body where there exists redness, heat, pain, and swelling, "inflammation." Inflammation, therefore, may be trifling or severe; it may be limited in extent or diffused over a large surface, or the signs by which it is known may be present in unequal proportion; in other words, it may be of little consequence or serious; and this nothing but a knowledge of the state of the system, the cause, the nature of the part attacked, and that kind of knowledge which the special study of medicine confers, can decide. When the redness is vivid, the heat great, and the tumefaction considerable, we call the state *St. Anthony's fire*, or *erysipelas*. *St. Anthony's fire*, moreover, is accom-

panied by more or less constitutional fever, namely, thirst, white tongue, quick pulse, pains in the head, &c.

When the redness is less vivid, the heat less, and the tumefaction but little perceptible, particularly if it be of long duration, vary in its tints, and appear settled on the spot, the case is one of *fiery spot, blotch, or red rash*. The red rash is generally slow in its progress, variable in point of extent, and not necessarily accompanied by constitutional fever, as is the case with St. Anthony's fire.

Sometimes, in place of one or several moderate-sized or large spots, the latter are numerous and distributed over the greater part of the body; they are small and irregular in form, and have a crimson tint. This is the eruption known as the *rose rash*, so common in summer after over-exertion.

In another case, the redness may not at first be perceptible, but there is itching and uneasiness in the part; and if it be scratched, the redness becomes vivid, and is marked by white wheals and small white, rounded, eminences; in fact, the affected part has the appearance of the skin when stung with nettles, and is thence called *nettle rash*, technically, *urticaria*, from the Latin word "urtica," signifying a nettle. These four inflammations of the skin are the the so-called "rashes."

157. To fully understand the nature of the family of the "rashes," it is further necessary to have some acquaintance with their cause. The cause of St. Anthony's fire lies in the constitution, and many persons have an hereditary or acquired disposition to the production of a rash of this sort, upon the existence of any disturbance of the digestive or nervous system, or upon some wound of the skin, even of a trifling nature ; or they take it by infection from another labouring under that disease. In disordered and weakened constitutions, it is liable to attack the eyelids, and thence extend to the head. It sometimes follows leech-bites or the scratch of a pin, and is always an indication of some action or change in the system that requires watching. A peculiarity of St. Anthony's fire is its disposition to run from one part to another, from the hand, for example, running up the arm to the body in the course of a few hours ; at another time, it suddenly quits the part first affected without leaving a vestige of its existence behind, and flies to a distant one. These eccentricities, and the serious constitutional disturbance always conjoined with it, render it an obnoxious companion. Very frequently, when the redness and swelling are at their height, the scarf-skin is lifted up all over the surface in blisters ; and, occasionally the swelling is dropsical and alarming.

158. The unprofessional person who has ever reflected on the cause of a given disease will have felt the perplexity of the subject, and the obscurity that environs the term "cause." And yet no progress towards cure can be effected until the cause is guessed or known, and the treatment directed in accordance with some proper principle. I have alluded above to the cause of erysipelas being present in the constitution, and I may now observe, that the causes of disease in general may be arranged into three classes, namely, moral, constitutional, and local. The *moral causes* are not the least powerful and energetic in the production of disease, and as they are more under the control of the patient or his friends than of the medical man, they should be most closely watched and carefully obviated. The *constitutional causes*, depending upon some error in the phenomena of life, can be comprehended only by the medical man, and to him they should be left. There are, however, constitutional remedies of great power, but not sufficiently valued, in the hands of every one, namely, diet, clothing, exercise, and ablu-tion. The reduction of inflammation may be effected entirely, or much facilitated, by a diluent diet, that is, such an one as shall dilute and cool the blood; by a moist covering to the part; by modified exercise or rest; and by local or general bathing, according

to the nature of the case. But such appliances require judgment; the cause may be one which demands other means, or the treatment may be carried too far. The *local causes* are either internal or external: when the former, they are out of the reach of domestic aid; but they may be known causes, such as improper articles, or excess, or even want of food; in which case, they contribute to the knowledge of oneself, and may be avoided at another time. When external, they are within the reach of every one; and if they cannot be removed at once, may perhaps be mitigated, and the remedy applied with greater certainty. The treatment of disease is therefore naturally entwined with its causes, and the consideration of one is scarcely complete without that of the other. Treatment is suggested by the cause, it is dependent on the cause, and it admits of the same threefold division into moral, constitutional, and local. Shakespeare has shown himself fully aware of the necessity of a moral treatment of disease, and expresses his conviction in the well-known appeal of Macbeth to his physician:—

“ Canst thou not minister to a mind diseased;
Pluck from the memory a rooted sorrow;
Raze out the written troubles of the brain;
And with some sweet, oblivious antidote,
Cleanse the full bosom of that perilous stuff
Which weighs upon the heart?”

159. In the domestic management of St. Anthony's fire, every disturbing cause, such as noise, conversation, bad news, heated temperature, cramming with nice broths and jellies, should be avoided, and the injunctions of the medical man should be carefully followed. The disease is always serious, and its consequences doubtful; it is often dangerous, often attended with delirium, and by no means a case to try Mrs. A.'s or good Mrs. B.'s advice upon; in other words, it must not be tampered with. Officious kindness in the sick room is highly dangerous; deeds are wanted there, not words; the real wants of the patient should be anticipated, but no imaginary wants created. The inflamed part should always be raised into an easy position, and one which will facilitate the current of the blood to the heart, and the prescription of the medical man carefully followed. Sometimes he may prescribe a cold lotion, in which case a layer of thinnest linen wetted in the lotion, but not so much as to drip and make the bed wet and uncomfortable, should be gently laid upon the part, and replaced by a second, as soon as the first loses its moisture. Three of these pieces of linen should be in use at the same time—one on, one in the basin containing the lotion, and the third hanging on a string to cool, previously to taking the place of the

second. No other covering should be placed upon this, as the object is to encourage evaporation as much as possible.

160. It may be said to be a law in medicine, that WHATEVER IS DISAGREEABLE TO THE SENSATIONS OF A PATIENT IS INJUDICIOUS; there are undoubtedly many exceptions to this law in disease; but even as a guide to those exceptions it is deserving of being borne in mind. I have endeavoured to show that this is *the law of life* in every particular affecting health, and I shall have to make constant reference to this law in the management of the sick; therefore I wish it remembered. I would make it the password to the sick chamber; and I would make every one repeat it before he or she entered the chamber. Nay, it should be written on the chamber-door, in large characters. How melancholy is the death scene of the noblest of our poets, Byron, from neglect of this law. "There was also in the scene," writes his biographer, Moore, "now passing around the dying Byron such a degree of confusion and uncom- fort as renders it doubly dreary to contemplate. There having been no person invested since his illness with authority over the household, neither order nor quiet was maintained in his apartment. Most of the comforts necessary in such an illness

were wanting; and those around him, either unprepared for the danger, were, like Bruno, when he came, bewildered by it, or, like the kind-hearted Fletcher and Count Gamba, were by their feelings rendered no less helpless.

“ ‘ In all his attendants,’ says Parry, ‘ there was the officiousness of zeal, but owing to their ignorance of each other’s language, their zeal only added to the confusion. This circumstance, and the want of common necessaries, made Lord Byron’s apartment such a picture of distress, and even anguish during the two or three last days of his life, as I never before beheld, and wish never again to witness.’ ”

161. But to return: in fulfilment of this law, the medical man will more frequently prescribe a warm fomentation than a cold lotion, in St. Anthony’s fire; and this is a remedy which the friends and attendants of a patient may have recourse to, in such a case, without danger, whenever the advice of a medical man cannot immediately be procured. In the warm fomentation, the linen should be thicker than in the former case; it should be folded once or twice, dipped in warm water, or a decoction of chamomile flowers and poppyheads, and applied in the same manner upon the inflamed part. The thickness and folding of the linen must be regulated by the sensations of

the patient, for a light covering will often give the sensation of a ponderous weight to a part in a state of inflammation. The same precautions must be taken with regard to the dribbling of water, and the wet compress must be covered by a dry fold of cotton or flannel, to prevent evaporation as much as possible. Sometimes, everything in the shape of moisture is disagreeable to the patient, and flour or cotton, wool or lard, are used instead. These are considerations for the medical man to determine, but in his absence either might be advantageously employed, *the sensations of the patient always respected*. When there are blisters, they should be gently snipped with a pair of scissors (the scarf-skin being insensible), and the fluid which they contain carefully absorbed by a clean sponge, squeezed dry out of warm water, or by a piece of soft and dry linen. When flour is employed as a covering for the surface, it generally soaks up this fluid. In snipping the blisters, the only care required is to avoid tearing off the scarf-skin. When this is preserved, it falls down upon the excoriated surface after the escape of the fluid, and forms its most natural and appropriate dressing.

162. As regards internal remedies of a domestic kind, the appetite of the patient should again be consulted; he will reject everything in the shape of solid

food, but will take with pleasure cooling and unstimulating drinks, such as lemonade, orangeade, sherbet, acidulated barley water, &c. These, therefore, are the most appropriate to his case. At a later period, arrowroot, sago, and tea, come in for their share of approval; and still later, light broths and soups, the yolk of an egg beaten up with sugar in white wine, omelette, &c., form a transition to a stronger diet. There is no greater mistake, no greater unkindness, than pressing niceties in the shape of food upon sick persons when their inclination is opposed to them. Nature prohibits food in illness; and to make her prohibition indisputable, she removes the appetite and all disposition for eating. Shall we disobey her mandates? Shall we again partake of the forbidden apple, that we may be made wise to cruel consequences? Alas! so man was from the beginning, and is. These maxims are universal in medicine, and I cannot too strongly impress them upon the reader; in so serious a disorder as St. Anthony's fire they require additional attention. In this disease, the medical practitioner may think it right to depart from the usual practice of keeping the patient low, and administer stimulants and wine. When he does this, the attendant should obey his instructions to the letter in the limitation of

the quantity. Wine and stimulants should on no account whatever be given to sick persons, excepting under the direction of a medical man.

In convalescence, precaution must be had to the quantity and regularity of the food administered, for in returning health after disease, a person is in a similar state to one who has been starved. He requires to have small quantities given at a time, and repeated at intervals of three or four hours. A moderate meal in health would be an excessive one to a convalescent, and would probably be followed by injury to the stomach, and relapse into the disease from which he was just escaping. If a walk across the room to the invalid is a mile to the same person in health, his diet must be regulated on the same principle as his exercise.

163. The RED RASH, or *blotch*, presents great variety in form, situation, and severity, and not less in duration. Very frequently it is referrible to a constitutional cause, and is associated with disordered action of some of the vital organs. Of this kind are the *fiery spots*, or blotches, that fix on the faces of women, the consequence of disordered health, dyspepsia, or tight lacing. Another kind of red rash is that which affects one or both of the legs, and is accompanied by so much swelling as to resemble

St. Anthony's fire. This is a rash of elderly people, or younger persons of weakly health who have over-walked or over-exerted themselves. Sometimes the red patches are circular or oval in form, and come out suddenly, to disappear again in the course of a few hours; or like St. Anthony's fire, they vanish in one place to appear in another. At other times, they commence in a small blotch, and spread by the circumference, while they fade at the centre, forming very distinct rings — the *ringworm blotch*. I have seen the whole body covered with rings, partly entire and partly broken, in cases of rheumatic fever. When they are thus acute and numerous in their eruption, the rash soon fades away; but when they appear singly, and are slow, they are tedious in their cure. It would, however, occupy too much space, and be ill-suited to a popular work, to follow out all the varieties of the red rash; I shall therefore conclude with two of a more familiar kind, namely, gall and chap. Whenever two surfaces, moistened by perspiration or other fluid, are in such contact with each other that they rub together during the motions of the body, the part becomes red and inflamed, and is said to be galled, or chafed. These circumstances are most frequent in young children, and are almost confined to persons having a tender and delicate

skin. They occur between the large rolls of fat which exist in young children and fat persons, in the groins, behind the ears, &c., are exceedingly painful, and if not remedied, give rise to troublesome excoriations. The *chop*, as it attacks the wrists in cold weather and during the prevalence of piercing winds, is still more familiarly known. It is obviously an effect of cold. But there are chops which depend on the contact of moisture associated with chafing, and which attack the covered as well as the uncovered parts of the body, and these are sometimes very troublesome. A painful illustration of the latter affection is *chapped nipples*; another is *chapped lips*. Red rash is neither infectious nor contagious.

164. The treatment of red rash, when the functions of health are disturbed, requires such hygienic and medical measures as will restore the disordered functions to their proper equilibrium. The domestic treatment is chiefly of a local nature. For example: evaporating lotions to relieve the heat of the inflamed surface, and a nicely-adjusted cotton web elastic bandage, when the lower limbs are affected, to give support to the vessels, and aid in the movement of the blood towards the heart. The following is an excellent evaporating lotion for such a purpose:—

EVAPORATING LOTION.

Spirit of wine, two ounces,

Rose water, two ounces,

Water, twelve ounces.

Mix, and keep well corked, except when in use.

This kind of evaporating lotion is used for all purposes in which such a remedy is required; it is the one, for example, referred to in the treatment of St. Anthony's fire, and the one I mean to imply whenever the term "evaporating lotion" is used in the course of this work. When a greater degree of calming effect is required, the surface being unbroken, camphor water may be used in place of common water, or a drachm of sugar of lead, or Goulard's extract, added. In this latter case, it must be remembered, that the lotion is *poisonous*, and should be kept out of the reach of children. Opium is also added to the lotion, to produce calm; but this addition had better be left to the medical practitioner. The mode of using an evaporating lotion is always that already described (§ 159); and the chill may be taken off in cold weather, by placing the bottle in warm water. When the case is of long standing, and the redness does not disappear, a stimulating application is then desirable, and there is no better than warm vinegar dabbed on the sur-

face with a sponge, or used as a fomentation (§ 161). For blotches on the face, the best remedy is camphor spirit dabbed on the spot after washing, or twice or thrice in the day; or the following lotion used every morning after washing:—

SUBLIMATE LOTION.

Sublimate of mercury, two grains,
Almond mixture, half a pint.
Mix.

For chaps and galls, the treatment consists in keeping the surface as dry as possible, and dusting it frequently with starch-powder. If these means fail, wash the part with the following styptic lotion, and after drying it off, dust the surface with the white flowers of zinc:—

STYPTIC LOTION.

Infusion of petals of roses,* one pint,
Burnt alum, from ten to sixty grains.†

When the excoriation does not yield to the styptic lotion, a weak infusion of nut-galls might be tried,

* This infusion is made by pouring a pint of boiling water upon two tablespoonfuls of the petals of the red rose, letting it stand till it cools, then straining through linen. If the petals are home collected, they should be taken from the bud just before it opens, and dried quickly in the air, so as to preserve as much of their colour as possible. They should be kept in a dry place.

† As the strength of this lotion must be regulated by the delicacy of the skin, it may be increased or diminished accordingly; the weakest formula is best suited for infants.

or the tincture of catechu, or benjamin, gently dabbed upon the part. The two latter tinctures are the best possible domestic remedies for chapped lips, or nipples, or chapped hands, when the latter are severe. A good application for chapped hands or face is the following; and during its use, the skin should be protected as much as possible from cold water and cold winds by gloves and cuffs, and also from the parching heat of the fire.

CERATE FOR CHAPS.

Pure olive-oil, one ounce,

Yellow beeswax, half a drachm.

Melt the beeswax in the oil, with a gentle heat, in a sand or water-bath, and when melted, stir in,

New honey, one drachm,

White flowers of zinc, half a drachm ;

and keep stirring till cold.

After well washing and drying the skin, a little of this cerate should be gently but briskly rubbed into the part with the palm of the opposite hand, so as to reach the bottom of the cracks, and then wiped off with a dry towel, leaving no trace of grease on the skin. This process should be repeated at bedtime, before sitting near the fire, and after each washing, and the rubbing should be continued each time, provided it does not cause bleeding, until the chapped skin is quite warm.

165. ROSE RASH.—The rose rash, or the “rose,” is an eruption of small irregular patches of a rose-red tint, which spreads over the surface of the body, and is ushered in by a slight attack of febrile symptoms. I have had occasion before, in connexion with erysipelas and red rash, to speak of “febrile symptoms,” and as they are common in all eruptive complaints, and indeed in every disease affecting the constitution, from common cold upwards to small-pox, and only differ in severity, I shall now proceed to particularize them in the order in which they occur. They are, chills, varying from a downright shiver to a sensation of water trickling down the back; heat, which may be a mere flush, or succession of flushes, or a burning glow; languor, often evinced by yawning; lassitude; pains in the head, back, loins, knees, and limbs; restlessness; quickened circulation and respiration; white or red, and frequently dry tongue; thirst; dry, shrunk, or parched skin; absence of appetite, nausea, and checked natural secretions. The whole of these symptoms, collectively, with reasonable allowance for variety, depending on constitution, severity of attack, &c., constitute fever; and these symptoms, in a slight form, are present in rose rash. Rose rash, however, is only a slight complaint; it attacks young children under the name of *infantile rose*, and adults

of weakly constitution, in the summer and autumn season, under the appellation of *summer* and *autumn* *rose*, and is sometimes associated with certain constitutional disorders, such as that of inoculated small-pox, cow-pox, rheumatism, and gout.

166. Rose rash bears a close resemblance to measles in the form of its little patches of red, and is therefore styled "false measles." It is, doubtless, frequently mistaken for measles; like them, the efflorescence appears first upon the head and breast, and then passes downwards to the feet; there is also redness of the throat, but an absence of the watery eyes and symptoms of cold in the head which accompany measles; there is also much less constitutional disturbance; it lasts a shorter time, not more than three or four days, and is neither contagious nor infectious. Another difference between them is the minor degree of intensity in the redness of the eruption. It is accompanied by itching and tingling of the skin, and on this account is often very irritating to infants. Adults bear the annoyance better, and in them the disorder is of so little importance as scarcely to confine them to the house. The most common cause of rose rash in infants is the irritation occasioned by teething, and disorders of the mucous membrane of the intestinal canal. In adults, the

more frequent causes are, heat of weather, fatigue, draughts, drinking cold water when heated with exercise, and indigestible substances.

167. The domestic treatment of rose rash is purely constitutional. The patient should remain at rest in a cool atmosphere, and if in bed, lightly covered with clothes, until the attack be passed away, abstaining from solid food, and taking cool and unstimulating drinks. Drinks of this kind are technically termed *diluents*, from the influence they exert in diluting and cooling the blood. Effervescing drinks are also useful; they, however, require the direction of the medical practitioner, as do cooling medicines and baths.

168. NETTLE RASH.—The nettle rash is so characteristically marked by its tingling and pricking pain, its white elevations and wheals on a red ground, and the production of fresh elevations and wheals wherever any part of the skin is rubbed or scratched, or even touched, as to be familiar to most persons; it is, for the most part, attended with febrile symptoms of moderate severity, and generally with nausea and sense of fulness of the stomach, only relieved by sickness. When the febrile symptoms are severe, it constitutes the *febrile nettle rash* of medical authorities. When the elevations are very numerous and closely grouped together, the variety

is termed, *clustered nettle rash*. One of the characters of the rash is a sudden appearance and disappearance ; occasionally, the latter is so conspicuous as to form the basis of a variety, the *evanescent nettle rash* ; while at another time it is as remarkable for its permanent character, *persistent nettle rash*. The common cause of nettle rash is some error of digestion, either from the nature of the food, or some state of disorder of the nervous or other systems of the body. That which can best be appreciated by the non-medical reader, and at the same time the most frequent cause, is food in an unwholesome state. In other cases, the food, without being itself unwholesome, acts like a poison on the individual ; and in a third class of cases, the peculiarity appears to reside in the individual, rather than in the food. Among the list of alimentary substances which have been known to cause this troublesome affection are mussels, lobsters, crabs, shrimps, oysters, dried fish, pork, goose, almonds, strawberries, raspberries, cucumbers, melons, mushrooms, rice-milk, and porter. Now, it is evident that the greater part of these substances are harmless to most persons ; those which are most commonly the cause of nettle rash, however, are shellfish, and particularly mussels. A frequent cause in children is teething.

169. Whenever food is the cause of the disorder, the attack comes on suddenly, a few hours after the meal ; for example, in the middle of the night, after a hearty supper. The person suffers at first from a sensation of weight and fulness in the chest, accompanied with nausea, giddiness, and, soon after, vomiting and violent action of the bowels ; he feels a pricking and tightness in his throat, which produce cough and difficulty of breathing, amounting almost to a sense of suffocation. These symptoms arise from swelling of the membrane of the mouth and throat. Swelling of the tongue succeeds, and shortly after, the swelling extends to the face and head. The nose, lips, and ears, are burning hot, and itch violently, and by degrees the rash spreads over the whole body, affecting chiefly the skin of the joints. Nettle rash, from irritation caused by obnoxious alimentary substances, sometimes subsides in a few hours ; more frequently, it continues for a couple of days, and in rare instances is so severe as to prove fatal.

170. Nettle rash calls for medical aid to set the digestive system in order, and if the cause be indigestible food, this must first be removed from the stomach by the aid of an emetic, followed by a gentle aperient. As regards domestic treatment, vomiting,

where it occurs, is to be encouraged by drinking warm water; and after this symptom has passed away, acidulated diluent drinks will be found of service. A hot foot-bath will assist in determining from the head and upper parts of the body, and a compress wrung out of cold water until it ceases to drip, and kept in contact with the stomach by means of a dry bandage, will relieve the irritation of the stomach and bowels. When the subject is a child, and the cause teething, the whole body should be immersed in a bath as warm as the child will bear, and wrapped in flannel on being transferred to bed.

All the rashes, on their disappearance, leave behind them a rough and peeling state of the scarf-skin, which rubs off in powdery or branny scales, and makes way for a new scarf-skin that is formed beneath. The speedy removal of the old scarf-skin, and the restoration of pliability of the new, may be promoted by gentle frictions with cold cream.

171. It would be wrong to quit the subject of the rashes without adverting briefly to the characters of those three great scourges of childhood, measles, scarlet fever, and small-pox. These are not diseases of the skin, although they are generally manifested by a cutaneous rash or eruption; they may, however, and do exist, without external indications, and

in essential nature are fevers of the blood. These fevers commence, like all others, with chills, followed by the usual train of febrile symptoms described in a preceding paragraph (§ 165), and particularly by drowsiness and languor. In measles, the precursory symptoms constituting the period of sickening last for three days before the appearance of the rash; in scarlet fever, for two; and in small-pox, for two, three, or four. The rash, in all the three diseases, follows the same course of development, appearing first on the face and neck, next on the trunk and arms, and then on the lower limbs; declining in the same order. The appearance which it presents, at this early period, is so similar, that it would be difficult, even for the experienced eye, to distinguish between them. It is necessary, therefore, that some specific rule should be laid down, by which the precise disease may be discovered. This is not difficult, for measles are always preceded by symptoms usually indicative of a severe cold in the head; such as red and watery eyes, running from the nose, sneezing, sore throat, and more or less cough, followed by expectoration. Scarlet fever is known by the absence of symptoms of cold in the head, but the eyes are frequently red, and there is sore throat and a peculiarly red tongue, spotted all over with

little scarlet points. Small-pox is distinguished by the negative of these signs, by sickness at stomach, severe pain in the loins, and especially by the known-prevailing epidemic. When the rashes are fully developed, measles and scarlet fever offer a striking difference in colour, the former being compared to the hue of a raspberry, and the latter to that of a boiled lobster-shell; in the former, also, the patches are small and clustered; in the latter, large and irregular. The rash of small-pox is more decidedly punctated than that of the two preceding, and the minute red points very speedily become prominent pimples. And the whole of these rashes are distinguished from those of St. Anthony's fire, red-rash, rose-rash, and nettle-rash, by the redness of the former being dotted, an appearance which is due to the assemblage of numberless minute red points or dots (the papillæ of the sensitive skin distended with blood), and that of the latter being blended and suffused. Small-pox, besides its common type, presents a number of modified and aborted varieties, which I cannot do more than enumerate in this place; they are termed varicella, hives, swine-pox, chicken-pox, horn-pox.

172. The period of time which intervenes between exposure of the body to the contagion of these

essentially contagious and infectious diseases, and the premonitory symptoms of the fever, the period of "incubation," as it is technically called, is from two to ten days for scarlet fever; from seven to fourteen for measles; and from ten to sixteen for small-pox. Another estimate of time of equal importance in the history of these diseases is the period of seclusion of a person who has suffered from the fever. This should not be less than a month in either, and the utmost care should be used in purifying and ventilating the clothes, the furniture, and the apartment which has been inhabited by the sick person. The floor of the chamber should be washed every day with the solution of chloride of lime, and the walls, also, if practicable; the windows should be kept open, the furniture transferred to an airy meadow before it is again used, and it would be no excess of precaution to re-paper the apartment. Clothes, linen, and bed-furniture, must be aired and washed, and aired again; indeed, it is scarcely possible to carry caution too far after these diseases.

CHAPTER XII.

ON THE ERUPTIONS OF THE SKIN ; NAMELY, PIMPLY ERUPTIONS, SCALY ERUPTIONS, AND THE ANIMALCULAR ERUPTION.

173. THE term "rashes" may be properly limited to that state of inflammation of the skin in which the inflammatory action does not proceed beyond its more simple and primary signs, namely, redness, heat, swelling and pain. Indeed, it must be apparent, from the outline of them which precedes, that the rashes are merely parts of a disturbance of health seated more deeply in the constitution. There are other affections, however, in which the cutaneous disorder is the most conspicuous, and sometimes the only sign of disease in the economy, and in which the inflammatory action seems to expend itself in the skin, and consequently gives rise in that tissue to a more positive state of local

disease. It is to affections of this kind that the term *eruptions* is properly applicable, and to these I shall restrict it in the pages of this work. We have seen that, in the rashes which accompany measles and scarlatina, the papillæ of the sensitive skin are distended with blood, and assume the appearance of minute red points, and that in small-pox these red points are subsequently developed into pimples, and constitute a real eruption. The same effect is seen in the less violent, but more prolonged inflammation of the skin which accompanies the first or *pimply* group of eruptions; the papillæ of the sensitive layer are raised into little elevations, or pimples, which are sometimes distinctly apparent on the surface, and at others are only appreciable by the touch. In another group, the little elevations are obviously filled with a small drop of a transparent and colourless fluid; these form the group of *watery pimples*. In another series, the little elevations contain an opaque yellow fluid, or "matter;" these constitute the *mattery pimples*. In a fourth group, the effect of the inflammation of the skin is the production of a well-marked scale of various dimensions, and generally of a circular form, upon a red ground; these are the *scaly eruptions*. And in a fifth, the inflammation is due to an outward and living cause,

namely, a minute animalcule which burrows in the scarf-skin, and is a cause of much irritation. This animalcular eruption is the disease termed "itch."

DRY PIMPLES.

174. The *papular** *group* of eruptions or *dry pimples* are remarkable for the high degree of cutaneous irritation which they create, and hence are very annoying companions, and likely to be torn into disagreeable and painful sores by attempts made to relieve the itching. They are common in infants and young children, and in them are known by the popular terms *red gum*, *red gown*, and *tooth-rash*. In adults, they are technically termed *lichen*; and another and less distinct form, in which the eruption is only appreciable to the touch, though always distinguishable by the marks of the nails, is denominated *prurigo*, on account of its excessive itching.

In the red-gown and tooth-rash of infants, the pimples are sometimes paler than the surrounding skin, and in one variety are almost white. They are always accompanied by more or less of feverishness, and indicate irritation in the gums from the growth of the teeth, or in the alimentary canal. In a

* Papula, a pimple.

few instances, they are caused by flannel worn next the skin, or deficient ablution.

175. LICHEN exhibits great variety in its outward characters in different individuals; in one, the pimples are brightly red; in another, of debilitated constitution, they are bluish and livid; in a third, they are developed around the base of hairs; in a fourth, they appear as circular groups, and increase by their circumference, while they fade in the centre, forming so many rings of various size; in a fifth, a modification of the preceding, they have the appearance of flexuous bands; while, in a sixth, they are remarkable for producing intensity of suffering, or unusual disorganization of the skin. They are all occasioned by constitutional disturbance, sometimes referrible to the digestive, and sometimes to the nervous system. In some instances, however, they depend upon a local cause. I have had a crop of lichenous pimples on the backs of my hands from rowing in hot weather; and in hot climates, that annoying disorder called *prickly heat* is a lichen. Wearing woollen garments next the skin in the summer-time is also an occasional cause of this eruption.

176. PRURIGO presents two degrees of severity, but even in its mildest form is a cruel and relentless dis-

order ; all rest and repose are out of the question, and sleep impossible, until exhaustion conquers suffering. But there is yet a severer degree of this distressing malady, termed *ant-bite* prurigo, from the sensations being compared to having the flesh devoured by myriads of ants, or the skin pierced with red-hot needles. And this occurs without any obvious reason in elderly persons, rendering their existence almost unbearable. It is this disease which is referred to in a preceding paragraph (§ 29) as the scourge of several distinguished persons, among whom were Plato, and Charles the Fifth and Charles the Ninth of France.

177. The domestic treatment of infants and children is comprised in the application of the laws of health to the mother as well as to the child. The position of parent is one of serious responsibility, both morally and physically, and the edict has gone forth, that "the sins of the parent shall be visited on the children." As the parents bestow their physical likeness on the child, so also do they their moral similitude, and in those whose moral attributes are essentially bad, it is sin to marry. Many diseases are known to be hereditary, and the sin committed by the parents in marriage under such circumstances is fearfully avenged, when in old age their comfort and their prop, and often their support, is taken from

them, as the natural consequence of their own want of reflection in due season. If we could ensure good mothers, we could improve vastly the race of men. These observations may be thought out of place in a work of this kind, but they bear strongly upon the injunctions I am now about to lay upon the nursing mother of a sick infant. She must, by following faithfully the rules of health in respect of the four great hygienic principles of food, clothing, exercise, and ablution, give health with her milk to her offspring; she must also pay close attention to her mind, avoid all sources of irritation and anxiety, and remember that an angry mother sours her milk, and produces a fractious, and often a diseased infant. I am quite of opinion, that if mothers were sound in constitution, and bestowed the requisite care upon the maintenance of their health, we should hear little of diseases of children. In children, as well as in the parent, the rules of health must be carried out, and the judicious use of the bath will often sweep away any little ailment under which they may be suffering. For itching of the skin, both in the infant and the adult, there is no better remedy than the juice of a lemon squeezed into a pint or half-pint of pure water, and used as a lotion. Distilled vinegar and vinegar and water, may be used in the same

manner, but the remedy for an infant must always be more diluted than that for an adult. When other means have failed, I have frequently found the following lotion allay the most troublesome itching:—

ANTI-PRURITIC LOTION.

Dilute pyroligneous acid, half an ounce.

Camphor in powder, half a drachm.

Infusion of rose petals, one pint.

Mix.

Another useful anti-pruritic lotion is the following:—

Chlorate of soda, one drachm.

Rose-water, two ounces.

Common water, six ounces.

Mix.

For prurigo, when the preceding formulæ fail, a solution of two drachms of sulphuret of potash or lime to a pint of water might be tried; or the following, which I have found of great service:—

Sublimate of mercury, three grains.

Dilute hydrocyanic acid, two drachms.

Almond mixture, half a pint.

Mix.

The latter must not be used to children, and, being poisonous, requires to be kept out of their way. Besides these remedies, which are directed to the relief of a troublesome symptom, the diet must be

reduced and regulated, stimulants of all kinds, both food and drinks, must be avoided, and the tepid or temperate bath frequently taken.

WATERY PIMPLES.

178. The watery pimples or vesicles are the result of the same action as that which gives rise to an ordinary blister; inflammation is excited in the sensitive skin by an inward or an outward cause, and the inflamed vessels pour out the watery part of their blood, and so raise the scarf-skin from off the sensitive layer in the form of a small dome, which, in some situations, is conical, in others, a segment of a sphere. As an example of the manner in which these watery pimples may be produced artificially, I may mention, that in a case of this kind, of unusual obstinacy, occurring in a young woman in one of the French hospitals, a suspicion arose that the patient herself had some hand in the continuance of the disease, and upon watching her closely, it was found that she was in the habit, every day, after the medical visit, of dusting a blistering powder over her limbs. The watery pimples, as may be supposed, present great variety in point of number and size; some are so minute as scarcely to be discernible without close inspection, while others increase to the

magnitude of a hen's egg. They are numerous in the inverse ratio of their size, the smaller ones being very abundant, and the larger ones scanty and few. These primary distinctions in the size of the pimple form the basis of their division into four genera. The smallest vesicles, which are about the size of a pin's head, and are often clustered together in vast numbers, are known by the term *eczema*; when they are of larger dimensions, being equal in bulk to a small pea, they are termed *herpes*; when of somewhat larger size, they are designated *rupia*; and when they assume the bulk of blisters, they are termed *pemphigus*.

179. ECZEMA may be developed upon any single part of the body, or may be scattered over various parts at the same time. In the former instance, it assumes the characters of a local disease, and is not unfrequently met with on the scalp, the face, or the ears. It exhibits, also, three degrees of severity; one of these is the simple type; another is remarkable for the vivid ground of red on which the vesicles are developed; while in a third, the fluid of the vesicles changes from its original limpid and watery character to a more or less opaque and yellow matter. There is a fourth state, which most frequently follows the decline of the active forms, namely, chronic

eczema, and is characterised by a subdued degree of inflammation, and long continuance. There is a peculiarity about eczema which at once distinguishes it from all other eruptions, and renders it an unusually disagreeable companion, and that is the copious watery discharge which it emits, and which, spreading upon the sound skin, causes irritation, and an extension of the disease. The discharge, left to itself, dries up by evaporation, and forms a crust, which gets progressively thicker. Around the lips and on the face of children this crust forms a kind of mask, and on the scalp, it mats the hair together, and is peculiarly unpleasant. The discharge, however, still continues oozing out from the cracks in the crust, or from its edges, and distilling in small drops from the crimson surface of the exposed skin when the crusts are torn off; and even after the fall of the crust, when the inflamed surface is covered by a thin scarf-skin, there is still some weeping from the oil and hair-tubes.

The presence of a copious watery discharge in this eruption, conjoined with the formation of a thick crust, has gained for it the appellation of *humid tetter*, a name which is properly applied. When it affects the scalp, and continues for a long time, the deep tissues of the skin become implicated, and the

pulp of the hairs may become injured, and the hair fall. In the latter case, the disease becomes a cause of partial baldness, and is entitled to the designation *humid scall*, or *scalled head*. A variety of humid scalled head, in which the humour from the excoriated surface runs down upon the hairs, and encloses them in little silvery pellicles or sheaths, has received the name of the *asbestos scall*. But the term "scall" is very objectionable, and a fertile source of error and mistake. Infants and young children are subject to attacks of this eruption on the face, and the association derived from the nature of their food, at this period of their lives, has gained for the disease the name of *milk crust*. There is, however, another milk crust, to which I shall have occasion to refer when treating of the next group of diseases, the mattery pimples.

180. HERPES, like eczema, may be scattered over divers parts of the body at the same time, thus assuming a "general" form, or it may be limited to a spot, and be "local" in its nature. The latter is its more common character. It is easily distinguishable from other eruptions by its little dome-shaped, transparent, and pearly bubbles, distended with fluid, and surmounting a base of crimson red. It is also known, practically, to most persons, as a familiar foe, in the shape of an eruption, which breaks out

upon and around the lips on the dispersion of a cold, or any slight ailment accompanied by feverishness. I need not call to mind the little bladders of water which form in that case, nor the hard brown crust which succeeds, but it may be satisfactory to know that this little scourge passes under the dignified title of *herpes labialis*. Sometimes these little patches are seen around the apertures of the nose, or upon the eyelids and ears, but their family likeness to that of the lips at once distinguishes them. I have had occasion before (§ 163) to remark upon a peculiarity of disease affecting the skin, namely, its frequent habit of beginning with a small circular spot, which spreads by the circumference, while it fades gradually at the centre. This character is perceptible in the patches of herpes, when they attain any size, and the eruption is then designated *vesicular ringworm*. In one very remarkable variety, the vesicles are arranged in concentric circles, which acquire by age a difference of tint, and constitute the *rainbow ringworm*. While another, besides being made up of a number of patches, which assume more or less of the annular character, has a tendency to follow a circular direction in its course: this latter is the eruption so well known under the name of *zone, or shingles*. The shingles usually embrace one-half of the trunk of

the body in the situation of the waist, and very rarely the whole trunk. The rarity of the latter occurrence has given rise to an unfounded notion, that if the circle were completed, the patient would die. Instances are occasionally met with in which shingles form a demi-zone upon the neck, face, or head, and they have been seen running, for a short distance, and in a straight line, along the arm or thigh. Shingles are generally regarded as a slight and trivial affection; this is the case in young persons, and adults of good constitution. In these, the little bladders shrink in five or six days, and are followed by a thin crust, which, in due time, is rubbed off by the clothes, and no trace of the eruption remains, other than some degree of redness of the skin. In old or weakly persons, however, the disease is not so easily disposed of; small sores are left behind when the crusts are removed, and the sores are painful, and long in getting well. This latter character establishes a transition between herpes and rupia.

181. RUPIA.—The term rupia is derived from a Greek word, which signifies “dirt,” and it must be confessed that the disease in question is open to the imputation conveyed by its name, from the unsightly appearance of the dirt-coloured crusts which succeed the rupture of its vesicles. As far as the

latter are concerned, there is nothing to distinguish them from those of the two diseases between which rupia is placed; they are generally larger than the vesicles of herpes, and generally, but by no means always, smaller than those of pemphigus. But the main character of distinction between rupia and all other diseases of the skin is the formation of unhealthy, foul, burrowing sores, which pour out a reddish and ill-conditioned matter in such quantity, that it collects and dries upon the sore, and forms a crust of remarkable thickness. In one variety, called *simple rupia*, the crust is comparable in appearance and apparent construction, and sometimes, also, in size, to an oyster-shell. In another, namely, *prominent rupia*, the crust is conical in shape, and resembles a limpet shell. These are the two chief varieties of rupia; the third, observed generally in starved and neglected children, is distinguished by its corroding, ill-looking sores, and an absence, or thin and imperfectly formed condition of the crusts. Rupia owes its origin to a weakly and debilitated constitution, and the local disease cannot be removed without renovation of the entire system; hence it is always tedious, and often fatal.

182. PEMPHIGUS.—The term pemphigus, derived from the Greek, and signifying “a bubble,” is pecu-

liarily applicable to this disease, which consists of an eruption of bubbles of scarf-skin, enclosing a thin and watery fluid. Another term by which the disease is known is *pompholyx*, which means, literally, "a water bubble." The French call it the "bubble fever," and the Germans, "water bladders." This is the kind of eruption which I have before referred to as having been imitated by a girl in one of the French hospitals, and it will be seen, from its nature, that this can easily be done by any sufficiently stimulating application. The bubbles raised under a common blister are a local pemphigus, only differing from the disease in question in being produced by a known and local cause. The bubbles, in this disease, are raised upon a base of inflamed skin scarcely larger than the bladder which they support; they occur singly or in patches, and they vary in size from the dimensions of a split pea to the half of a walnut-shell, and from that to a hen's egg or orange. They rise up very rapidly, frequently in the course of a few hours, and break in two or three days, when they are followed by an excoriated surface, which becomes covered by a thin crust, and speedily heals. The varieties of pemphigus are acute and chronic, the former being active and brief in its course, and accompanied by a smart attack of

feverishness; the latter slow, without fever, but with more intrinsic constitutional disturbance. This disease has been known to spread as an epidemic, as was the case in Switzerland in 1752.

183. The treatment of the class of watery pimples offers to our judgment the two indications which meet us in the treatment of most other surgical diseases, namely, constitutional and local attention. Mr. Abernethy, many years ago, pointed out the importance of constitutional remedies in local disease; and, indeed, without the force of so high an opinion, we must feel its necessity. The blood, the nerves and their functions, are more or less implicated in every local affection; and a shock, however trifling, cannot be given to any part of an instrument so well attuned as the animal organism, without producing a simultaneous vibration through all its strings; therefore it is that so few local disorders exist in which constitutional treatment is not required. The main question is, what do we mean by the term constitutional treatment? Are we to bleed, and purge, and nauseate, and sweat? Nay, rather than that, it were better to discard physic altogether. Are we, then, to take the opposite course of idealizing physic, and make a fool of our judgment by gulping at infinitesimals? Here the error would be, it may be ad-

mitted, on the safe side, but it is, nevertheless, error. Are we such infants that we cannot trust ourselves to shape the middle course? Must we ever be repeating the rash experiment of Phaeton, or the wilful *felo-de-se* of the recognised monomaniac, who plunges into destruction in order to escape it. The answer, I fear, is, Such is the perversity of human nature. The four great principles of health, food, raiment, exercise, and ablution, are all-powerful constitutional remedies, and, by regulation and modification, may be made to answer many purposes where health is deranged. Then there are certain substances in nature, known as medicinal, that are also useful assistants.

In the constitutional treatment of the watery pimples, the system sometimes requires to be lowered, sometimes to be toned, sometimes to be altered, but *the which* is a question, though simple, requiring the highest qualifications of the medical art. In domestic management, we must be content to reduce the diet in quantity and stimulating quality where there is any tendency to fulness; to employ diluents where there is feverishness; and to be cautious where there is doubt. The principle of local treatment is more obvious; the evaporating lotion (§ 164), the fomentation (§ 161), the tepid or

warm bath, these are our remedies. When crusts collect so as to be unsightly, or a source of irritation, they may be softened by a moderate quantity of the following cerate at night, washing it off in the morning with tepid water and soap. If the crust is not so much softened as to come away with the first washing, a second or third application of the cerate will succeed, but no violence should be used in the removal.

ALKALINE CERATE.

Sweet olive oil, one ounce.

White wax, one drachm.

Melt the wax in the oil, at a low heat, in a sand or water-bath, and then add—

Sub-carbonate of potash, one drachm.

Mix.

When the crust is removed, the inflamed surfaces should be dressed with cold cream, or fomented if there be much heat or inflammation; but if the latter has subsided, or the eruption is slow and chronic in its nature, the following astringent lotion will be found of service. This lotion is very useful in milk crust and scalled heads :—

ASTRINGENT LOTION.

Distilled rose water, one pint.

Sulphate of zinc, twenty to sixty grains.

Mix.

The mode of using it on raw surfaces is to dab them

gently with a piece of fine linen wetted in the lotion. For scalled head, the proper mode of application is to rub it gently on the surface with the ball of the finger, after the removal of the crusts, for five or ten minutes, and repeat the process twice or three times a day. In cases of scalled head, where the lotion appears unsuitable to the skin, or circumstances do not admit of its proper application, the following cerate will be found to be equally beneficial:—

SCALLED-HEAD CERATE.

Olive oil, one ounce.

Subcarbonate of soda, one drachm.

Shake well together, and then add—

Sulphate of zinc, reduced to very fine powder, one drachm.

Mix well.

Whenever the bladders are large, the fluid may be soaked up by a sponge, or piece of dry linen, in order to prevent the dispersion of an irritating fluid on the skin; and when of smaller size, they may be dusted with starch-powder with the same object; for herpes on the lips, the styptic lotion (§ 164), of medium strength, used every hour, and for several minutes at a time, is best suited; for shingles, a cloth wrung out of the evaporating lotion (§ 164), and applied in the manner described (§ 159). When the shingles leave small sores behind them, the

styptic lotion (§ 164) should be used, and the surface then dusted with starch-powder ; the same lotion, or the astringent lotion, are the most suitable for the unhealthy sores of the rupia. For the latter, in particular, the following lotion is specific :—

CHLORIDE OF LIME LOTION.

Solution of chloride of lime, one drachm to half an ounce.

Rose water, two ounces.

Pure river water, fourteen ounces.

Mix.

MATTERY PIMPLES.

184. The mattery pimples form a natural group distinguishable from other diseases of the skin by the nature of the fluid which they contain. This latter is no longer watery and transparent, or whitish and partially opaque, like that of the watery pimples, but opaque and yellow from the first. It is poured out upon the sensitive skin, and raises the scarf-skin in the same way with the watery pimples, and the resemblance is increased by the formation of crusts, on the drying up of the matter. But the little bubbles of the mattery pimples rarely exceed the dimensions of a split pea in size, and are never so minute as those of eczema (§ 178). They are developed on a ground of inflamed skin, and the degree of inflammation of the skin is the basis of

their division into two groups, termed, technically, impetigo and ecthyma.* The former presents the slighter degree of inflammation, and sometimes there is scarcely any redness of the skin; the latter is always accompanied by considerable inflammation and redness. The little bubbles attain their full size in the course of two or three days, and either dry up without breaking, or more frequently burst and then dry, forming a hard crust, which offers considerable variety of colour, being sometimes yellowish, sometimes brownish, and sometimes almost black. The production of a crust, as one of the characters of the mattery pimples, brings them within the meaning of the term "tetter;" and the nature of the crust, as compared with the simple tetter, herpes, and the humid tetter, eczema, cannot be better expressed than by the common popular name for this eruption, namely, *crusted tetter*. When crusted tetter attacks the head, it will probably destroy the hair, and become a scall, the *crusted scall*.

185. Among the causes of obscurity which attend the study of complaints of the skin, there is hardly a greater than the multitude of terms which are applied to them; and if the various diseases had been re-

* These terms signify a *breaking out with impetuosity*, and simply *breaking out*, the former referring to impetigo, the latter to ecthyma.

presented by a chess-board, and the names, well shaken together in a bag, had then been emptied upon the board, so that several names should fall indiscriminately on each square, there could not be a greater confusion than reigns over the nomenclature of these disorders. Impetigo, for example, is one of the crusted tetter, the *yellow crusted tetter*; its crusts, in some instances, having the aspect of a dab of honey dried upon the skin; and this latter resemblance has been deemed sufficient to gain for it the surname of the "honey disease." This honied expression is peculiarly applicable to those incrustations which not unfrequently form on the lips and ears of children. Sometimes, they constitute a mask for nearly the entire face, and the disease becomes one of the varieties of the "milk crust" (§ 179). Pretty cognomens, it must be admitted, for unsightly disorders, but conveying, in their appearance, anything rather than agreeable reveries of milk and honey, or pleasant associations of honied lips. Impetigo, in one respect, resembles the humid tetter, namely, in the oozing of fluid from the excoriated skin. It is this fluid, or humour, which causes the great thickness of the crusts, and their reproduction when once removed. A resemblance may be traced, also, in the manner of evolution of the eruption, for some-

times the mattery pimples break out in clusters of regular form and various size upon a single part of the body, and at other times they are scattered irregularly over the entire surface of the skin; the former is termed *figured*, the latter, *scattered*; the former presents occasionally another peculiarity, namely, growth by the circumference and evanescence in the centre, forming a *crusted ringworm*. Crusted tetter sometimes excites St. Anthony's fire, and at other times is remarkable for tardiness, and obstinacy of course and duration. When the latter character prevails, the eruption extends over an entire limb, or deposits an uniform incrustation around it, so that the limb has the appearance of a branch of a tree with a cracked and rugged bark. This kind of case necessarily interferes with the motions of the limb, and wherever it cracks, the humour rises up in the crevice, and spreads for a little distance around the opening. Generally, these oozing streams are tinged with blood, and the crusts which form are of a deep brown colour, or black.

186. I have remarked, that the crusted tetter may invade the scalp, and when it does so, and remains on the head for any time, it causes fall of the hair, and becomes, in consequence, a "scall." The varieties of character which it presents on the scalp

have given rise to some of the idle names assigned to these eruptions. For example, when the crust is brittle and greyish in colour, and breaks up into little pieces, which are fixed on the hairs like beads upon a string, or scattered loosely among them, the disease is called the *granulated scall*; and when the crust is harder, and, guided by the hair, forms rigid prominences like stalactites in their shape, the disease becomes a *stalactitic scall*. The scalls caused by the humid tetter have been already described (§ 179).

187. ECTHYMA.—The mattery pimple called ecthyma is that which is developed on a highly-inflamed skin; the bladders are generally of the size of a split pea, and surrounded at their base by a broad halo of redness. They are usually separate, not clustered like impetigo, scattered over various parts of the body, and followed either by a hard black crust, or by a sore. Ecthyma occurs either as an acute or chronic eruption; and in the latter shape attacks weakly children, and persons much reduced by sickness and famine. In individuals of the latter class, the inflamed surface is more or less blue and livid, and the matter frequently coloured by admixture with blood.

188. As respects the treatment of the mattery pimples, the principle of management of all inflam-

mations of the skin will be correct in this. The redness, swelling, and pain, which precede and accompany the evolution of the pimples, call for the use of the evaporating lotion, either cold or tepid, as the sensations may prefer, or if more grateful, the warm fomentation. These remedies will curb the inflammatory excitement without interfering with the separation of any morbid humour from the system, and will facilitate the indications of nature. When the crusts have formed, the astringent lotion (§ 183) used as a fomentation is the proper remedy. Hard crusts generally act as causes of irritation; the fomentation will keep them soft, and, making its way under the edges and through the chinks of the crust, will excite the excoriated surface to healthy action. It is often desirable to get rid of the crusts altogether, for which purpose the alkaline cerate (§ 183) comes into use. On the head, this is peculiarly necessary, for nothing can be done in the treatment of these eruptions on the head so long as the crusts remain. When the crusts are gone, the astringent lotion (§ 183) applied in the manner already directed, will effectually cure them, not only on the scalp, but also on other parts of the body. In the "milk crusts" of children, it is also a valuable remedy; but in these latter, as they are necessarily much exposed to the air, a

cerate, by affording a protective covering and checking evaporation, must be the selected vehicle for the remedial application. The scalled-head cerate (§ 183) is most suitable for domestic use ; or in very young infants, the zinc ointment of the shops diluted with oil.

189. When the mattery bladders of ecthyma leave angry sores behind them, the latter must be treated with the astringent lotion (§ 183), used as a fomentation, and should they continue, with the chloride of lime lotion (§ 183). Indeed, ecthyma and rupia are somewhat allied in their nature. But while the minister of cure is busily engaged on the local treatment of these diseases, the moral and the constitutional must not be forgotten. There is no medicine for moral causes of disease so important as gaiety of spirits, change of thought, change of occupation, and change of scene. Herein lies, in fact, the secret of sea-bathing, the bath being the excuse for the moral physic. But there are persons who would be better suited by swinging on the branch of a certain oak, in a certain forest, in a certain county, and for a certain time. The patient may imagine that it is the concatenation of swinging, tree, and county that is to do the good, if he please, but the prescriber knows full well that the secret lies in the change of thought, occupation, and scene. Mr. Aber-

nethy's story of his treatment of a patient is a never-to-be-forgotten illustration of the importance of moral medicine in physical disease. A gentleman engaged in duties involving much responsibility and anxiety consulted Mr. Abernethy for the cure of a string of ailments that rendered him incapable of performing the obligations of his office; he assured the surgeon, that to leave town for the sake of health was utterly out of the question, and that he could not be spared for a day from his engagements. Mr. Abernethy pondered; he knew the doctor who would certainly cure the gentleman; but then he lived in one of the most remote towns of Scotland. The gentleman reflected; and upon such strong assurances of cure from Mr. Abernethy, determined on the sacrifice of quitting his business, and seeking the Scottish Æsculapius. He started by mail, full of expectation and hope; business was forgotten; anticipations of cure filled his mind, not unmingled with gratitude towards his adviser. The town was reached, but no physician found; no such house, no such street, no such person known. Enraged at being made the dupe of an eccentric surgeon, he immediately returned to London, thoughts of a very different nature to those which previously engaged him occupying his mind—thoughts so tempestuous, that the loss of a week in

travelling and expectation were drowned, and with them, every consideration of his usual occupation. Arrived in town, he drove with all speed to a well-known door in Bedford-row, and was ushered into the presence of Mr. Abernethy, whom he at once overwhelmed with a storm of indignant expostulation. Mr. Abernethy smiled when a calm was at last restored, and asked after the gout; but the gout and all the other ailments had been forgotten in the excitement of the journey; and the gentleman was bound to acknowledge the wisdom of his adviser. Railroads, unfortunately, put this kind of practice out of the range of possibility at the present day; but they offer, in return, advantages which if properly used are in reality superior. An hour takes the invalid to a classic and delicious ramble, thirty miles from London, and the same conveyance brings him back to lunch or dinner. We do not lack the opportunities, but the judgment to use them. But to return from this long episode, the moral and constitutional symptoms must be regarded in conjunction with local disease. The constitution may be full and inflammatory, or low and debilitated; it is sometimes difficult to decide which. In impetigo, it is generally the former; in ecthyma, the latter. The doctor must be consulted to solve the doubt.

SCALY ERUPTIONS.

190. The scaly eruption, or dry tetter, is a form of inflammation of the true skin, distinguished from the rashes and pimples by the alteration of the scarf-skin, which immediately covers the inflamed part. In the onset, the eruption makes its appearance as a small, dull-red spot, slightly raised above the level of the surrounding skin, constituting, in point of fact, a broad and flat pimple, almost as large at its summit as at its base, and of about the diameter of a split pea. Upon the surface of this pimple the scarf-skin becomes slightly roughened, and after a little while, a very distinct but thin circular scale is produced. The little scale increases in thickness by the addition of fresh layers to its under surface, and has a bright, silvery lustre, which is due to the extreme thinness of the layers of scarf-skin. The persistence of the eruption in the form I am now describing, namely, as small pimples scattered over the skin, each pimple being surmounted by a white, silvery, laminated scale, constitutes one variety of scaly disease termed *lepra guttata*,* from the Latin, *gutta*, "a drop," the

* The professional reader will perceive in the description of the next group my reasons for considering this form of eruption as a lepra.

appearance of the eruption giving the idea of a number of drops of water hanging on the skin. The eruption does not, however, constantly retain its early pimply character ; more frequently, the pimples increase in dimensions, and spread out into the form of circular patches, having the size of a shilling, or half-a-crown, or crown piece. This enlarged growth naturally requires time ; and in proportion to the period occupied in growth is the thickness of the laminated scale ; the latter, however, never exceeds in thickness a piece of moderately thick paper, and always preserves its beautiful silvery aspect. There are no humours, no irregular, unsightly crusts, no excoriated surfaces in this eruption ; in fact, there is nothing repulsive ; but, on the contrary, if it were the general instead of being the exceptional, it would be thought very beautiful and highly fashionable. I have already more than once announced a principle of cutaneous pathology in the changes which accompany the circular growth of all the eruptions of the skin, namely, the decline of the disease in the centre, while the onward march takes place by the circumference, until a distinct ring of greater or less dimensions is produced. Another illustration of this principle occurs in the scaly eruptions ; for as soon as the pimple attains the dimensions of a fourpenny or

sixpenny piece, and still more as it becomes larger, a distinct depression is apparent in the centre of the little patch, with a consequent rising towards the outward edge. These are the characters which distinguish the common dry tetter, technically, *lepra vulgaris*. By the time the circular patches reach the size of a shilling or half-a-crown, the scales usually fall off, the last part to give way being the central point, which, as it is the oldest, is also the most dense and generally the thickest. When the scale falls, portions of scale continue to be formed on the prominent parts of the patch, but no new scale similar to the first; and very frequently the surface looks red and angry, and remains bare until the eruption declines altogether. Sometimes the circles continue to enlarge until they give way at one or two points, and then previous observation and experience can alone determine what the ugly red patches which remain, in reality, are. Two other designations have been given to the scaly eruption termed *lepra*, as characteristic of varieties of appearance, namely, *alphoides* and *nigricans*. The former of these, which simply means "white," is applied to the eruption when the patches cease to enlarge, after attaining the size of a fourpenny or sixpenny piece, the scales at this time being whiter than at any other. The

other term relates to a lividity in the hue of the patches when they occur in persons of weakly and debilitated constitution, the livor being of the same nature with the blueness of the lips and fingers of a boy or girl whose energies are not sufficient to keep them warm on a winter's day.

191. The unprofessional person will perhaps, long ere this, have indulged a smile at the gravity with which, in magniloquent phrase, I have propounded the laws of cutaneous disease. And I am quite ready to admit, that the subjects for whom I am making such equitable laws are, in many instances, very refractory personages, and very apt to take the law into their own hands; and so it is with the scaly eruptions, for instead of obediently breaking out *secundum artem*, and according to the laws stated in the preceding paragraph, the pimples sometimes come out in thick clusters, and so blend and interfere with each other, that the disease can scarcely be distinguished as the same. Instead of distinct circular forms, we have now irregular patches of every size; instead of one well-formed and thick scale, there are numerous small and thin ones; and instead of a depressed centre and rising edge, the surface is uniform; but the disease is essentially the same, though unruly in its rise and obstinate in its pro-

gress, and though, moreover, it has received from medical authorities a different appellation, namely, *psoriasis*, which may be Anglicised into *irregular dry tetter*. The circular dry tetter, or lepra, exhibits a partiality in its eruption for the vicinity of joints, particularly the knees and elbows; and this is remarkably the case in the irregular variety; so much so, that it is common to find the latter about the joints, and the former upon the limbs of the same person. The scaly eruptions have a taste also for symmetry, for not only do they attack both elbows and both knees at the same time, but very frequently the form of the patch is of similar shape on corresponding parts. Another frequent seat of the irregular scaly tetter is the scalp, limiting itself rigidly to the boundary allotted to the hair, but nevertheless, a very troublesome companion. Happily, the scaly eruptions have no ambition to appear upon the face, their more common situation, with the exception of the scalp, being the limbs. The variety of scaly eruptions described in the preceding paragraph as "*lepra guttata*" is usually ranked among the present family from the thinness and imperfection of its scales, and the absence of a size sufficient to give it the decided character of the circular dry tetter, but its true signification is that which I have assigned to

it. By a French author, it is called the *isolated* dry tetter, the common form being the *diffused* dry tetter; to these are added a third, but rare variety, characterised by a disposition to creep along the skin in a curved and serpentine course; this is the *gyrating* dry tetter; while a fourth is an aggravated state of the diffused kind, which spreads over an entire limb, and maintains its ground with the obstinacy pictured in its name, *inveterate* dry tetter. Of these dry tetter, there are some annoying and obstinate varieties which occur on separate parts of the body without affecting others; one, for example, locates itself upon the eyelids; another on the lips; a third beneath the finger-nails; and though last, by no means least, on the palms of the hands. In these situations, the disease is a cause of great discomfort, from the unsightliness which it occasions, and from the "bad name" which attaches to all eruptions upon the hands. Sometimes, curiously enough, it pitches on the tongue.

The preceding forms of dry tetter are sufficiently distinguished from other cutaneous diseases by the swelling, or rather thickening and hardening of the skin which accompany them; by a disposition, when extensive, to crack and chap, the chaps being without humour and dry; and by the formation of scales,

sometimes of remarkable construction and of large size, but at all times of considerable dimensions.

192. I have now to describe a scaly eruption, in which there is more or less of a dry and reddened state of the skin occurring in patches of every variety of size, and accompanied by a copious production of minute bran-like scales. This disease has received a name derived from a Greek word, meaning "chaff," or "bran," namely, *pityriasis*, or the *branny tetter*. It may occur on any part of the body, but like its predecessors, exhibits a predilection for certain situations, and those, strange to say, generally the opposite to the ones selected by the other dry tetter, from which one might infer that, as all the scaly eruptions are essentially of the same nature, the difference in the characters of the branny tetter is probably referrible to a difference in the nature of the skin, or of the part on which it is developed. The more common seats of the branny tetter are the face, the scalp, the breast, the hands and feet, and the bendings of the different joints. These parts, with the exception of the palms and soles, are usually those in which the scarf-skin is thin and the skin delicate, and the same qualities render persons who have naturally a thin and susceptible skin, most subject to this disease. Hence we find it more commonly in children, women,

and elderly persons, than in robust men. All the dry tetter excite some degree of itching, particularly at the period of the fall of the scale, but none so much as the branny tetter, and the latter is particularly annoying when it affects the hairy scalp. In this latter situation, the itching is sometimes unendurable, and the efforts to relieve it bring down a shower of little shining scales. The most careful brushing only clears the hair for a time; they speedily collect in large quantities, and if not carefully and frequently removed, become a source of still further discomfort, and one also of much unsightliness. The annoyances which originate in this vexatious complaint have given birth to the popular expression by which the disease is known, namely, *dandruff*, an appellation derived from two Saxon words meaning "itch" and "dirt." Children and elderly persons are more liable to dandruff than others. Those circular red patches of about the size of a shilling or half-crown which appear on the face, and look as though they were dusted over with little scales, are instances of the branny tetter. Sometimes they surround the mouth to the edge of the lips, and sometimes also they affect the eyelids.

193. There is no class of diseases more intractable than the scaly eruptions, and none that more

obstinately defy the best-directed medical treatment. The dandruff is, however, an exception to this general accusation. Domestic treatment should be principally directed to the regulation of the health by strict attention to its rules. The scales may be easily removed by the alkaline cerate (§ 183), and after these have fallen, the common sulphur ointment used, with long-continued friction. Under the influence of sulphur, used as a stimulant, this and other chronic affections of the skin will sometimes get well. On the same principle, vapour baths, medicated with sulphur or iodine, are often of great service. But the best of all external remedies for lepra, and that which is almost wholly confided in at the French hospitals, is the tar ointment, of which creosote ointment is a refinement. When dandruff occurs in young children, it is necessary to modify our remedies to suit their peculiar susceptibility of skin. The alkaline cerate, diluted one-half, will remove any crust or scales which may have collected on the skin, and the weakest formula of the astringent lotion (§183), rubbed on the part with the ball of the finger, will remove any disposition in the skin to the production of more. In the adult, the white precipitate ointment is an useful remedy both in dandruff and lepra, particularly when the latter affects the hands ;

but it requires to be used with precaution. Dry friction of the eruption, exercise of the body to perspiration, and the shower-bath, conjoined with an abstemious diet, will often cure lepra after all other means have failed. Brushing the patches with a flesh-brush, until they become tender, is also an useful remedy.

ANIMALCULAR ERUPTION.

194. The presence of animals in the skin of man, of such minute size as scarcely to be perceptible without the aid of microscopic power, is a phenomenon calculated to excite the lively interest of every zoologist, and it is one to which I very early turned my attention when pursuing the investigations traced out in this book. I soon had proof that there existed a parasite within the scarf-skin peculiar to man; and more extended observation led me to believe that the genus was of universal distribution among animals. I have found it in the horse, and figured it in the Transactions of the Veterinary Medical Association. I have seen it, also, in the mouse, and more recently in the pheasant. From these observations, I am inclined to think that man forms no exception to the general rule, and that in a state of

nature, the little creature may be found abundantly in his peculiar habitat, the human scarf-skin; but that artificial habits and manners have almost driven him out of the pale of polite society. Occasionally, however, he makes incursions upon his ancient haunts, but is driven back with wrath whenever he is discovered. It would seem that there are no protective game-laws for the unfortunate "curmudgeon," yet "battues" are by no means infrequent under the sunny skies of Italy, and with ourselves he is much indebted to the perpetuation of the tax on soap. The little parasite has a peculiar objection to soap, and cheap soap would go far towards exterminating him. The baths for the lower orders which will give them clean skins and fresh linen are also angry threatenings against a persecuted race, and should be as much as possible discountenanced by a humane and discerning public. The ladies, again, pursue him with their anger; he is known to possess an acute sense of smell, and is sickened by the cruel compounds of the perfumer. To him the "eau de millefleurs" is a thousand daggers, the "eau de Cologne" a perfidious enemy, and the little bundles of lavender spikes which the country maiden hoards in her drawers, absolute poison. I trust that none of

my readers will take advantage of my candour in pointing out the weak points of the little "brigand"* to torment him any further.

195. The parasite of the human scarf-skin is a species of *mite*, the "acarus scabiei" (plate 5); the largest I have examined measured the seventy-seventh part of an inch in length; that is, about the seventh part of a line, and was scarcely distinguishable by the naked eye. It is sub-globular in form; has a brightly shining coat, which reflects the light, and gives the animal the appearance of a very minute bladder of water, a comparison suggested by its early observers; eight legs, four in front near the head, and four imperfect ones underneath its body, and a strong, tortoise-shaped head; indeed, altogether, it offers much the character of a tortoise, with its arched and convex back, a flat under-surface, and two large legs, each almost the size of the head; on either side of the latter, the resemblance, moreover, is increased by the manner in which the legs appear to project from the front border of the body. But here the likeness ceases, for the hinder legs scarcely show themselves beyond the outline of the body, and the creature runs with considerable rapidity, raising its body above the level of its head. The skin or shell

* The name by which he is popularly known in Gascony.

of the animal is white and beautifully ribbed, and the head and fore-legs are covered by a layer of reddish skin, like the horny case of the insect tribe. The back presents a number of projecting spines and long porcupine hairs, set on round tubercles, and similar hairs stand out in all directions from the different segments of the legs. On the hinder legs, the hairs are very long, and trail behind in walking. If we could divest our minds of a certain prejudice, we should, I think, accord to an animal such as I am now describing the epithet "beautiful," and perhaps "elegant." The zoologist cannot do otherwise, and there are parts of its organization that evince a marvellous beauty of structure; the parts to which I now allude are the fore-feet, which are composed of a delicately thin membrane, divided into three lobes, and furnished with three little tendons, which raise the surface applied to the ground, and producing a vacuum, secure the footing of the little creature, and make it difficult and almost impossible to displace him against his will. It is this circumstance which renders him a steadfast foe when he is permitted to set foot on the skin; but his tenacity of hold acts against himself when we seek to bring him out from his burrow for examination. For upon inserting the point of a needle into his hiding-place,

he foolishly lays hold upon it with his tenacious feet, and so is easily drawn out. When placed upon the skin, the acarus sets himself to work, with his head and fore-feet, to make a hole in the scarf-skin; into this he introduces the front half of his body, and the rest speedily follows. The work of burrowing is now easy, and he soon makes a channel or burrow many times his own length, and at the end of this, excavates a small chamber, in which he rests from his labours, bores for his food, and turns himself round when occasion needs. When his supplies are exhausted in his little cave, he works onwards, and makes another, and retraces his steps from time to time, to enjoy the fresh air, perchance, or to select a more agreeable and commodious site for his exertions. It is probable, also, that he is actuated in seeking for change by a necessity of giving up his old domicile to a young brood, which require a convenient situation to wax in strength before they can assume the mining habits of their progenitors.

196. It will occur to every one, that these evolutions, these marches and counter-marches, these sappings and minings, cannot take place in close proximity with so sensitive an organ as the true skin without exciting some tickling, some itching, in fact; and this circumstance has given the popular name to

the annoyance, namely, the *itch*. But the itching is not the painful symptom I have had occasion to describe in connexion with the dry pimples (§ 174); on the contrary, it is so far bearable, that a royal authority, James the First, is said to have remarked, that the itch was fitted only for kings, the scratching being so exquisite an enjoyment. Indeed, nomenclature is so eccentric in its gambols, that we as often hear the thing, for I can hardly call it disease after such evidence, spoken of as the "scratch" as by any other name. But the effects caused by our little engineer are not limited to the production of an uneasy sensation, the skin in his vicinity looks more or less red, little conical, watery pimples rise here and there upon the surface, and where the skin is peculiarly sensitive, or the little animals are unusually active or numerous, mattery pimples even are developed. To which, in very bad cases, when the pimples are scratched and torn, may be added open sores. It must not be supposed, however, that all these signs are necessarily present in itch; I have seen cases in which there was no other indication of the presence of the marauder than his little burrows and the ragged state of the scarf-skin which he invariably occasions. Indeed, this latter character I look upon as the only essential mark of itch, the

only proof of an animalcular disorder, and in its absence the suspected disorder is certainly not itch. I make this remark, because the itch is usually regarded as a revolting and unpronounceable disorder, but I have no hesitation in declaring that nineteen out of every twenty cases of so-called itch are not the affection I am now describing; consequently, are not itch, and consequently are not communicable.

197. The cure of itch is founded on the distastes of the little animals; I have found camphor and musk, rubbed together with olive oil, constantly destroy them in young children in whom delicacy of skin forbade more stimulating remedies. In like manner, the following lotion, used five or six times a-day, will destroy them in children:—

Sulphuret of potash, half-an-ounce.

Water, a pint.

But the most efficient of all the poisons of the *acarus scabiei* is sulphur, in almost any form, provided that it be well rubbed into the skin. This latter consideration is highly important, for the little creature is safely ensconced at the end of a long gallery, and unless the remedy be so applied as to enter the gallery, he is comparatively safe. To obviate this possibility, the instructions in using sulphur ointment are, to rub it in for half an hour together before the fire, warmth rendering it soft and diffuent like oil,

and then the patient is to betake himself to bed with a charge of ointment remaining on the skin. Four applications of this kind, namely, one night and morning for two days, are sufficient to exterminate an entire colony, and destroy the eggs; and a thorough wash afterwards, with plenty of soap, in a warm bath, completes the cure. For domestic purposes, the simple sulphur ointment of the shops should be the remedy employed, half an ounce of sub-carbonate of soda being added to each pound of the ointment, and half-a-pound of the latter being used at each application. For children, half this quantity will be sufficient. Another excellent remedy, to be used in a similar manner, is the following:—

Sublimed sulphur, quarter of a pound.

Parings of white curd soap, half-a-pound.

Add boiling water to the mixture, and stir the whole together until it acquires the consistence of cream. A fourth part of this will be enough to rub in at one time; but the question of quantity must always be determined by the extent of the colonized skin. It is frequently limited to a small extent, in which case that alone would require treatment. The principle should therefore be, to saturate the part completely.

198. Sulphur has obtained the credit of being a specific for itch, and so it undoubtedly is, when properly applied. What its precise mode of action

may be, I am not quite sure ; but I believe it to depend upon the formation of sulphuretted hydrogen within the skin, this gas being highly destructive of animal life. It must not, however, be inferred that because sulphur cures the itch, everything which sulphur cures is therefore the itch. I have heard such an argument, or rather abuse of argument, used. Nevertheless, as a stimulant is useful in all diseases of the skin that need stimulation, if the latter condition exist, it will cure them. But sulphur, besides being a stimulant, is also an irritant to delicate skins, or if its use be prolonged, and may be the occasion of an eruption similar to the eruption of itch. Now, if the eruption, instead of the animalcule, should be looked upon as the disease, why, sulphur ointment will perpetuate the supposed disease, until either the skin gets accustomed to the irritation, or the treatment is changed. This is the explanation of cases of itch being months under cure, when three days is the proper average. To apply the remedy effectually, it is important to know the common seat of the colony ; this is the thin skin and protected parts between the fingers, the bends of the wrists and elbows, the same parts on the legs, and the front of the trunk of the body, and here the ointment should be most vigorously used, although it must not be

spared on other parts. Another necessary and important precaution is the destruction or fumigation of all the clothes worn by the affected person, for one of these minute creatures remaining in the meshes of the cloth will be sufficient to reproduce an entire colony. The sulphur fumigation is of course the best for the purpose, and chlorine will be found a good auxiliary. The clothes should then be kept scented for some time.

CHAPTER XIII.

ON WARTS AND CORNS.

199. THE next group of disorders of the skin carries us away from the general affection of the true skin, termed inflammation, to an unnatural state of one of the constituents of the skin, namely, the papillæ (§ 20); the proper designation for the state of skin which exists in these disorders being, *enlarged papillæ*. . We have therefore to consider the causes which are capable of giving rise to enlarged papillæ; and secondly, the effects which result from their enlargement. With regard to the first inquiry, it may be stated that the papillæ obey the law of increase observable in all other structures of the body when subjected to excitation, whether that excitation be natural, that is, dependent on actions taking place within the system; or artificial, that is,

resulting from irritation which reaches them from without. The papillæ of the sensitive skin have been described in a former chapter as being uniform in length, and their length so inconsiderable as to be undistinguishable to the eye, excepting in certain situations. Now, it occasionally happens that a small cluster of these papillæ, amounting to from five to twenty or more, in number, take upon themselves to grow in length and bulk until they attain a gigantic stature in comparison with their fellow-papillæ (plate 6, fig. 2). They may, for example, reach a line in length. Again, it will be remembered that the papillæ of the sensitive skin are covered and protected by the scarf-skin, and that the thickness of the scarf-skin bears an exact relation to the size of the papillæ. It may therefore be inferred, that if the papillæ grow to this prodigious size, they, in their turn, will occasion the production of a proportionate quantity of scarf-skin, which will form a rounded prominence on the surface of the body. Such is the reality, and the little prominence so produced is termed a *wart* (plate 6, fig. 1). The size of the wart in height has reference to the length to which the papillæ have grown; its breadth depends on the number of the enlarged papillæ; and it is quite possible that the growth of a single papilla

might be the cause of a wart which would necessarily be of slender proportions. But the separate papillæ in an enlarged cluster are always more or less isolated, and each papilla acting for its own protection, throws out the material for its own separate sheath of scarf-skin, so that, in reality, the wart of moderate size is a bundle of smaller warts, the number of the latter being the number of the papillæ, and the whole being kept together by the ring of natural scarf-skin which surrounds them. This will serve to explain the well-known fact, that an old and worn wart always looks ragged at the end, as though it were composed of fibres, the fibres being the above-described sheaths; and moreover, the wart has a tendency to split in a longitudinal direction. Again, if we cut off the top of a wart, the section gives the idea of the division of a bundle of fibres; if we cut a little further, we probably divide a point from which the blood oozes; this is the extremity of the longest of the papillæ, and a little nearer the base of the wart we should cut across several. The common situation of warts is the hands; sometimes they are produced on the face, and less frequently on the other parts of the body. Their cause is unknown; but from their frequent occurrence in schoolboys, dirt may be supposed to have some share in occasion-

ing them. It is a popular belief, that the blood which flows from warts, when wounded, will cause them to grow on whatever parts of the skin the blood touches ; and schoolboys, who love experiments, occasionally adopt this method of transplanting them, but without success. Indeed, there is no truth in the supposition, and if a fresh crop should be produced around a wart that has been teased by a schoolboy, the fact, when it happens, admits of a more philosophical explanation.

200. The wart may be regarded as the effect of an excitation acting generally from within ; but instances are not wanting, in medicine, to prove that they may also be dependent on an obvious external cause of irritation.

I now turn to a growth of the skin analogous to the wart, but occasioned by an evident external cause, the cause in this particular case being either pressure or friction, or both combined. Whenever a portion of the skin is subjected to long-continued and unequal pressure, the papillæ of the sensitive skin are stimulated, and grow to an unusual size. Associated with this increase of growth of the papillæ, is the increased thickness of the scarf-skin, and this latter being the outward and perceptible effect, is denominated, according to its size, either "callo-

sity" or "corn." When the pressure, and consequently the thickening of the scarf-skin is distributed over an extensive surface, the state is properly a *callosity*. Where it is limited, occupying, for example, the prominence of a joint, and where, in consequence of this limitation, the effects produced are more severe, the case is one of *corn* (plate 6, fig. 4). Callosities may occur on any part of the body where much pressure exists; on the shoulder, for instance, in persons who are in the habit of carrying burdens; on the hands in certain crafts; on the elbows and knees, and on different parts of the feet. Corns are usually limited to the feet, and are, in fact, a more severe degree of callosity. The papillæ of the central part of the corn are enlarged to such an extent as to be equal in magnitude to those of a wart. In this state, the papillæ take on the action of producing separate sheaths of scarf-skin in the same manner as warts, and these sheaths, seen on the cut surface of a corn, give the idea of fibres, which popular ignorance magnifies into roots. A corn extracted by its roots is therefore expected never to grow again, because trees, which have roots, when torn up from the ground, never re-appear. But the fact is, that these so-called roots are, in reality, branches, and they may be cut off, and torn off, and twisted off, as long as the

possessor lives, without curing the corn, unless the CAUSE, namely, the *pressure* and *friction*, be removed. When the cause is taken away, the papillæ return by degrees to their pristine bulk, and the corn disappears.

201. It will be apparent to every one, that if a shoe of a certain size be worn, and if this shoe, by its too small dimensions, and consequent pressure, occasion a corn, the corn, by increasing the size of the injured part of the foot, will necessarily increase the pressure on the already irritated skin. Pain and inflammation follow this injury, and the least mischief that can happen is the enlarged growth of the papillæ, more blood than natural being now habitually sent to them. But, on a particular day, when vanity triumphs over comfort, and the "light fantastic toe" has been more than usually wronged, blood bursts from the pores of the sensitive skin, and the next morning, when the corn is inspected, it has the character of a bruise. The doctor is sent for, a poultice is put on, rest enjoined, and in a few days all is again well; too well, in fact, to allow experience even a whisper. A gay party again does slaughter on the unfortunate corn, but similar means restore it, as before. Now, I have had the opportunity of examining a corn which has been thus maltreated, and its

section is precisely that of the geological section of a stratified mountain, stratum following stratum, of various hues, from a delicate yellow, to the deep black of dried blood, each black line being the chronological memorial of a white day in the possessor's existence (fig. 4).

202. I must not dismiss the subject of corns without adverting to another torment, and one less easily guarded against than the preceding, namely, the *soft corn*. The soft corn occurs between the toes, and is produced in the same manner as the common corn; but in consequence of the moisture existing in this situation, the thickened scarf-skin becomes saturated, and remains permanently soft. The soft corn, again, rarely becomes convex outwardly, but presses severely on the deep textures, and gives little indication, as regards size, of the torment which it occasions. It is no uncommon thing to find a blister formed under the soft corn, and its fluid oozing through a small, round aperture in the centre of the latter. Sometimes, also, the soft corn is followed by a deep and painful sore, and inflammation of the foot; and on one occasion I examined a soft corn which had eaten into the bones, and produced inflammation of a joint. Diseased bone originating in soft corns is no infrequent occurrence.

203. The treatment of warts is to pare the hard and dry skin from their tops, and then touch them with the smallest drop of strong acetic acid, taking care that the acid does not run off the wart upon the neighbouring skin, for if it do, it will occasion inflammation and much pain. If this practice be continued once or twice daily, *with regularity*, paring the surface of the wart occasionally, when it gets hard and dry, the wart may be soon effectually cured.

The same treatment will keep corns under, in spite of pressure; but there is a knack in paring them which I will now explain. The end to be gained in cutting a corn is to take off the pressure of the shoe from the tender papillæ of the sensitive skin; and to effect this object, the summit of the corn must be cut in such a manner as to excavate it, the edges being left to act as a bolster and still further protect the central part, where the longest, and consequently the most sensitive papillæ are found. The professional chiropodist effects this object very adroitly; he generally works around the centre, and takes out the fibrous portion in a single piece. He digs, as he says, for the root. There is another way of disposing of a corn which I have been in the habit of recommending to my friends; it is effectual, and obviates the necessity for the use of the knife. Have some

common sticking-plaster spread on buff-leather; cut a piece sufficiently large to cover the corn and skin around, and have a hole punched in the middle of exactly the size of the summit of the corn. Now take some common soda of the oil-shops, and make it into a paste, with about half its bulk of soap; fill the hole in the plaster with this paste, and cover it up with a piece of sticking-plaster. Let this be done at bedtime, and in the morning remove the plaster, and wash the corn with warm water. If this operation be repeated every second, third, or fourth day for a short time, the corn will be removed. The only precaution requiring to be used is to avoid causing pain; and so long as any tenderness occasioned by the remedy lasts, it must not be repeated. When the corn is reduced within reasonable bounds by either of the above modes, or when it is only threatening, and has not yet risen to the height of being a sore annoyance, the best of all remedies is a piece of soft buff leather, spread with soap-plaster, and pierced in the centre with a hole of exactly the size of the summit of the corn. If it can be procured, a better substance still for spreading the plaster upon is "amadou," or "German tinder," commonly used for lighting cigars, and kept by the tobacconists. This substance is softer than leather, and does not

become hard and ruck up, as the latter does, after it has been on for a short time. The soft corn is best relieved by cutting away the thick skin with a pair of scissors, avoiding to wound the flesh; then touching it with a drop of Friar's balsam, and wearing habitually a piece of cotton wool between the toes, changing the cotton daily. Caustic, as an application for the cure of corns, is a remedy which should be used with great caution, and would be better left altogether in the hands of the medical man.

CHAPTER XIV.

ON DISORDERS OF THE BLOOD-VESSELS AND NERVES
OF THE SKIN.

MOTHERS' MARKS.

204. UNDER the title of abnormal state of the cutaneous vessels are to be described certain marks and patches on the skin, known under the popular name of *mothers' marks*; technically, *nævi*. To explain the precise nature of these marks, I must refer my reader to paragraph 20, in which the capillary vessels and the rich network which they form in the tissue of the true skin, are described. The so-called mothers' marks are nothing more than an excessive dilatation of these capillary vessels on a spot of skin varying in size from a mere point to a patch of several inches square. The simplest form of *nævus* is that which is called the "spider-mark;" it is a small red point, from which a number of little straggling vessels

radiate on all sides. This mark is usually developed on the face, and not unfrequently on the cheek; sometimes the mark resembles in size and colour a red currant; sometimes a cluster of currants; sometimes a strawberry or raspberry; and sometimes is uniform and of considerable extent, and is compared to a lobster. These marks are generally slightly raised above the level of the surrounding skin, and are subject to much variety in tint of colour, in accordance with the quantity of blood flowing through them. Thus, when the circulation is naturally active, or the individual is excited by moral causes or exercise, the marks are bright red in colour; while, on the other hand, in cold weather, or under a depressed state of the mental powers, they become claret-coloured, or bluish, or livid. Again, there are some which are permanently livid and dark-coloured, and they are styled black-currants, blackberries, sloes, unboiled lobsters, and other fantastic names. These blue marks are such as have a more dilated state of the vessels, and a slower current of blood, than the red kind, and consequently afford time for the transition of the blood from its scarlet arterial tint, to its venous and dark-coloured hue.

205. The notion of these marks having any connexion with the imagination of the mother is per-

fectly fabulous ; so that husbands need be under no apprehension of seeing a red dab on their child's forehead, if their ladies choose to have an ungratified longing for a feast of peaches in mid-winter. Neither need mothers wrong themselves by idle reproaches, from supposing that any unchecked desires on their part became a cause of deformity to their offspring. They have merely to attend to the four great cardinal rules of health so often spoken of in this book, and cultivate a calm mind ; Nature will do the rest. The subject of treatment I may dismiss summarily ; cases of this kind should be early submitted to the judgment of the medical man, for the marks are apt to enlarge, and if they increase to any magnitude, they get beyond medical relief, and are sometimes fatal. They should on no account be meddled with or teased by frequent examination. They will sometimes subside by the use of a gentle degree of pressure made with a piece of soap-plaster, spread on leather, which has the additional advantage of keeping them out of sight and observation. When hot and painful, and attended with throbbing, the evaporating lotion (§ 164), or the styptic lotion, will confer temporary relief.

DISORDERED STATE OF THE NERVES.

206. The nervous system, as respects its natural and ordinary functions, is enveloped in mystery. We are acquainted with its laws of action, with the results of that action, and latterly have acquired some new information with regard to its structure. But all the knowledge that has hitherto been obtained tends only to prove to us how utterly insignificant are our powers of investigation, and how futile our attempts to comprehend the secret workings of the handicraft of an Almighty Creator. It has been conceived that anatomy and physiology have a tendency to bias the mind of the student of this branch of science in favour of materialism. This is a reflection on the works of the Creator, on the part of those who make the accusation, for to suppose them capable of giving birth to such a thought is to imagine a grossness of composition which the real student knows to be incorrect. How opposite is the truth! The material composition of the nervous system may be said to be thoroughly well known; its actions are also known. The brain, for example, is the material abode of the soul, of thought, sensation, and will; then there are nerves of sensation, nerves of motion, and nerves of special perception. The judge of his fellow-man

who has the hardihood to stigmatize him in the eyes of the ignorant, by applying to him the appellation "materialist," will probably infer, that science distinguishes a particular apparatus for thought, another for sensation, another for will, and another for motion. How different is the fact! One simple, colourless fluid, hardly dissimilar to the colourless element of the blood, is the agent in the hands of the Almighty for the development of these extraordinary powers. The same material element develops the most opposite results. Can an anatomist and physiologist, then, knowing this fact, be a materialist?

207. Everything which relates to sensation is dependent on the nervous system, or more properly, on the nervous fluid; and in obedience to the laws of life, the nervous fluid must have a standard of health to render it capable of executing its proper functions. If from neglect of the rules of health the humours be foul, can we expect healthful sensation? If the nervous fluid be poisoned by alcohol, can we expect the sensations to be undisturbed? If the nervous fluid enclosed in its protective tubes is surrounded by tissues in an active state of inflammation, can we expect other sensations than those of pain? The answer is evident. Now, we know from observation, that if a part of the body containing nerves, and con-

sequently nervous fluid, be charged with caloric before the fire, the sensation is one of heat; and that if ice be substituted, the sensation is said to be cold. But we have reason to believe that the nervous fluid takes on a similar state to that caused by heat and cold, without the presence of either of those agents; for in sickness we have sensations of chill, while the body is unnaturally hot, or the person is in a high temperature, and *vice versâ*. From this we learn, that what we call sensation is a state of the nerves, or rather of the nervous fluid. But all our investigation fails in discovering what that state is. There can be no doubt that it is a disordered state, when the sensation is painful; and the probability is, that the state is healthful when the sensations are agreeable. Now, from some unexplained cause, it too frequently happens that a very distressing state of itching takes possession of the skin, either on part, or on the whole surface. This is obviously a morbid sensation, depending on a present morbid state of the nervous fluid. But what is the cause? and how can we remedy it? The former question can only be answered by generalities having reference to the health of the organization, such as deranged digestion, disordered functions of other kinds, &c. As respects the latter, we examine all the functions

through, and if any be out of order, we endeavour, by general means, to set them right. And with regard to the local inconvenience, experience aids us by recording certain substances which have a decided effect in calming such irritation. Such are, for example, vinegar, diluted lemon-juice, the anti-pruritic lotions (§ 177), the evaporating lotion (§ 164), the styptic lotion, &c. It is unnecessary to picture the torments to which persons labouring under this disorder are subject; those who suffer, know them too well; those who have never felt them, cannot imagine their intensity.

CHAPTER XV.

ON DISORDERS AFFECTING THE COLOUR OF
THE SKIN.

208. THE human family exhibits two remarkable extremes in the degree of colour of the skin, these extremes, in their natural state, having reference to opposite conditions of solar light and climate. Between the physical extremes on the surface of the globe, every degree of variety of tint is observed, and similar states are reproduced under the influence of differences of constitution and health. In the chapter on the scarf-skin, I have already pointed out the principal physiological changes which result from augmentation and diminution of pigment; I may therefore confine myself in this place to those excessive alterations which, from their unsightliness, are regarded in the light of disease. Under the

head of augmentation of pigment, we have the formation of patches of a dark colour and irregular shape on any part of the surface of the body, whether exposed to the stimulus of the sun, or covered by the dress. When these spots are more or less raised above the surface of the surrounding skin, they are called *moles*, and they constitute in the popular mind one of the kinds of "mothers' marks." Moles exhibit every variety of size, form, and tint of colour, and they are generally covered by a pretty thick crop of dark-coloured, bristly hairs. The reverse of this state, namely, diminution of pigment, gives origin to the state of skin which is met with in the Albino, and which also occurs on parts of the body in patches of various dimensions. In Europeans, these white patches differ so little from the tint of the surrounding skin as to excite little remark; but in tropical countries they are more striking, and for that reason, probably, more frequently observed. In Hindostan, where these patches are not uncommon, and where they are liable to spread over the entire body, they commence with some degree of itching and pain, and when fully formed, are attended with an insensible state of the skin, showing that the cause lies deeply; very probably in the nervous system. In a young lady whom I saw lately, these white

patches were the sequel of scarlet fever, and were so extensive as to be mistaken by her friends for the sound skin, the deeper tinted skin around being regarded as discoloured spots.

209. The colouring principle of the skin occasionally offers varieties in its tint, dependent, probably, on a difference of chemical composition, such difference being referrible to states of constitution of the individual. Thus, when persons of a light complexion are exposed to the influence of the sun and heat during the summer season, numerous round or oval-shaped yellow spots, similar in appearance to stains, are developed in the skin; these spots are popularly termed "freckles," or *summer freckles*, and generally disappear during the darker and colder months of the year. There are, however, other freckles which have no dependence on light or heat, which are equally vivid in the winter as in the summer season, and are, in point of fact, of constitutional origin. These are the *cold freckles*; they offer some variety in colour, being sometimes brightly yellow, and sometimes green, and are not confined, like the summer freckles, to persons of a light complexion. Another discoloration, occurring in the form of patches of various tints of hue, are "saffron spots," "sulphur spots," and "liver spots." In

essential nature, these are the same as freckles, but they are not always permanent. They often appear suddenly under the influence of some general disturbance of the system; they are attended with some degree of itching, and they fade away gradually when the cause which excited them is removed.

210. The treatment of the family of discolorations involves surgical as well as domestic means. The only safe and certain mode of getting rid of moles is a surgical operation. For the other forms of stain, the best local application is the following cerate, which should be well rubbed into the affected skin at night:—

Elder-flower ointment, one ounce.

Sulphate of zinc, twenty grains.

Mix well.

In the morning, this is to be washed away with abundance of soap, so as to secure the entire removal of the grease, and the following lotion is then to be applied:—

Infusion of rose petals, half-a-pint.

Citric acid, thirty grains.

Mix.

The yellow spots and liver spots will quickly disappear under this treatment, and in most instances the freckles will be ameliorated, if not removed. Should the remedies give rise to any unpleasant irri-

tation or roughness of the skin, the following lotion will counteract such effects :—

Almond mixture, half-a-pint.

Goulard's extract, half-a-drachm.

Mix.

If, associated with the discoloration of the skin, there is any constitutional disturbance, that will call for the direction of the medical man.

CHAPTER XVI.

ON THE DISORDERS OF THE PERSPIRATORY SYSTEM.

211. THE disorders of the perspiratory system, though involving important results with regard to health, and, in some instances, fatal diseases, offer so little to interest the general reader, that I may dismiss them with a few passing remarks. The perspiratory apparatus is one of the organs of the body by which unnecessary and noxious materials are separated from the blood; therefore, any interference with its action is necessarily accompanied by disturbance of the circulating fluid, and also of the organs which co-operate with the skin in its functions. The influence of checked perspiration is instantaneously perceived in the alteration of the product of the kidneys, while excess of action of the skin is no less injurious to the system, by causing

exhaustion of the nervous powers. Health lies in the equilibrium, and the duty of the individual to himself is to pursue that state as nearly as possible. Excess of perspiration is undoubtedly a state of disease; defect of perspiration is equally so; while intermediate states may be indicative of intermediate conditions of health. The habitually dry skin is not less a state which occasions excessive action of other organs of the body than the habitually moist skin is a cause of other ailments affecting the nervous system, and both call for observation and a strict attention to the laws of health. Partial perspirations are sometimes a cause of great inconvenience and annoyance, and may affect any part of the skin; for example, a case is related by a German author, in which the disorder was limited to one half the body; and I am myself acquainted with one of a similar kind. Alterations of a remarkable kind in the chemical nature and physical qualities of the perspiration are also occasionally met with; such as changes in colour to green, blue, black, and yellow; changes in odour, &c. One or two cases are on record in which the odour of the perspiration resembled musk, and one in which it was like the fumes of sulphur.

CHAPTER XVII.

ON THE DISORDERS OF THE OIL-GLANDS AND TUBES.

212. THE nature and purposes of the oily product of the skin have been so fully pointed out in a preceding chapter, that I may at once proceed to discuss the disorders which affect this system in particular. These relate, in the first place, to *quantity* of the product ; secondly, to *quality* ; thirdly, to its *export* ; and fourthly, to *inflammation* attacking the substance of the glands.

We sometimes find the oily product of the skin so much increased in quantity as to become a source of great discomfort, particularly when the disorder is manifested on the face. In this case, the skin is always more or less bedewed with a greasy fluid, which fills the hollows around the nose, attracts dirt from the atmosphere, and gives an unseemly polish

to the features. But this is not all; the action which gives rise to this increased quantity of product is one of excitation in the skin itself, and unless it be checked, will produce thickening and coarseness of the skin. On the other hand, we occasionally meet with instances wherein the function of the oil-glands is abrogated, where the oily product is deficient in quantity or entirely absent, and where, in consequence, the skin is dry, harsh, and rough. The skin, under these circumstances, requires to be stimulated to perform its natural office, but the stimulant must be gentle, otherwise inflammation will be occasioned, and a more serious disease established than that which the remedy was intended to remove. The remedy must also be of such a nature as to take the place of the arrested fluid.

213. When, in addition to increase in quantity, the oily product of the skin is so altered in its nature as no longer to spread upon the surface in the form of oil, but acquires a disposition to adhere firmly to the skin, and dry up almost as fast as it is expelled from the glands, we have then a curious, but, at the same time, an obvious result. The tendency on the part of the substance, so altered from its natural state, is to collect upon the scarf-skin, and form a crust of equal thickness over the whole surface; but

this tendency is interrupted by the continual movement of the skin. If we look at any part of the skin with attention, we see at once in what manner this interruption is occasioned. From the nature of its connexion with the parts beneath, the skin is thrown into numberless folds, which, falling always in the same line, give a permanent marking to its surface. These markings are most conspicuous in the situation of joints, and offer some differences in character upon its different sides, being always larger and coarser on the convex side, and smaller on the concave; in both, they are more or less elliptical and diamond-shaped in their outline. These little diamond-shaped islets represent the passive part of the skin when the body is thrown into motion, while the movements that occur take place at the little grooves which surround the islets. Having now examined the bed on which the crust forms, we at once perceive, that in consequence of the mobility of that bed, the crust, while in a soft state, will be cleft into little divisions resembling the diamond-shaped bases on which they are formed, and that any increase in the oily product will contribute to the thickness of these little divisions without altering their diamond-shaped form. We have therefore a number of little hard, and, from discoloration by

the atmosphere, dark-coloured scales upon the surface of the skin, suggesting the idea of the scaly skin of a serpent or fish, and in compliance with this idea, termed the *fish-skin disease*. This state of things sometimes occurs in the arm-pits, sometimes on the breast or other parts of the body, and sometimes on the face. It is generally limited to a small extent of surface, but by no means always. I have seen instances where nearly the entire skin was in a similar condition. Again, instead of remaining in the state of scales, the little plates become occasionally so much increased in thickness as to assume the character of hard, polyhedral, and rounded spines (plate 6, fig. 5), which have been popularly magnified into a resemblance with porcupine's quills. This comparison has suggested the name of the *porcupine disease*, by which it is popularly known. Instances of porcupine men and porcupine boys are not uncommon at country fairs.

214. Detention of the oily product of the skin within the oil-tubes and glands takes place under two circumstances; in one of these, the aperture of the oil-tube remaining all the while open; in the other, the aperture is closed, and is consequently the cause of the detention. When the aperture of the tube remains widely open, we may infer the existence

of some torpidity in the gland, whether such torpor depend on the state of the skin, or of the system of the individual in whom the disorder occurs. Or, if not torpidity of the gland, there is an unusual degree of dryness of the oily product. Both of these states are, in reality, met with, and they give rise to some difference in the morbid appearance of the skin. When the oily product of the skin collects in the oil-tubes, it assumes the elongated form of those passages, and causes expansion of the aperture of the tube to an extent commensurate with the bulk of the little cylinder (plate 3, fig. 3). Through this expanded aperture, the dirt and smoke constantly existing in the atmosphere enter, and the end of the little pile of oily matter becomes more or less blackened. In large towns, we can scarcely examine a face without observing some of these round black spots, generally upon the nose and forehead; and when they exist in any number, they are a cause of much unsightliness. It is well known that these ugly spots may be removed by pressing the skin immediately adjacent to them with the finger-nails, and then that there arises from the aperture a little white cylinder, of moderate length, and having the appearance of a small white maggot with a black head, the black head being the part of the collected matter which

was discoloured by its approximation to the aperture of the oil-tube. From the resemblance referred to, these little black points are popularly termed *grubs*. They are, as I have shown, merely the oily product of the skin impacted in the oil-tubes, instead of being expelled as quickly as formed. The longer these little piles are permitted to remain in the skin, the more firmly they become fixed; and after a time, when they lose their moisture, they are converted into little horny spines, as dense as bristles, and having much that character. Sometimes they are a cause of inflammation of the gland, and of the adjacent skin, and then they constitute the eruption known under the name of spotted acne.

TUMOURS OCCASIONED BY THE DETENTION OF THE
OILY SUBSTANCE WITHIN THE OIL-TUBES, THE
APERTURE OF THE TUBE BEING OPEN.

215. When the detention of the oily product is of long continuance, and when, in consequence, the obstacle to the expulsion of the newly-formed matter is progressively increasing, it is no uncommon thing to find the oil-tube distended to such an extent as to form a small pouch within the substance of the skin. When this process is once established, it may go on to produce a cavity of remarkable size, the original aper-

ture of outlet undergoing very little change, or being only slightly dilated in proportion to the dimensions of the internal cavity. I have a specimen in my collection, in which such a cavity as I am now describing is as large as the hollow of a filbert-shell, and I have seen others as broad as a crown-piece. Now, these cavities, when they occur, are filled with oily product which is more or less altered in its characters by detention, and by the changes which the walls of the tube undergo in being so unnaturally distended. Indeed, as the walls of the cavity become progressively thinner, the cells of the newly-formed matter contain less oil than formerly, and assume a perfect resemblance to the cells and scales of the scarf-skin, having the beautiful silvery polish, and also the laminated arrangement of the latter, the laminae corresponding with the plane of the surface which produces them. It sometimes happens that the aperture of these cavities is so large as to admit the head of a large pin, and then some of the matter which they contain may be drawn out, and sometimes a portion is pushed out by the formative force within, and forms a prominence on the surface similar in its nature to the horny, bristle-like spines mentioned in the preceding paragraph. Such collections as I am now describing may be distinguished from other cutaneous disorders

by the name of *accumulations* of the oily product of the skin.

216. Accumulations of the oily product of the skin naturally give rise to an enlargement or tumour of greater or less magnitude, and these tumours are distinguished from others by the presence of an aperture through which the contents of the swelling can be ascertained. But they do not always retain a passive character; in an instance before me, the substance collected to such an extent as to render the skin covering it as thin as tissue paper; the skin then gave way, and the substance protruded through the opening. I need hardly say that this was not accomplished without much pain and suffering to the poor woman in whom it occurred. The change which next ensued was, however, the most remarkable. As the matter was forced further and further through the artificial aperture formed in the skin, it dried by exposure to the air, and became as hard and dense as the finger-nail, or horn. It was in this state when I first saw it; a decided horn, two inches and three-quarters in length, by one inch and a quarter in thickness, growing from the front of the thigh, and firmly implanted in the skin. I had never before seen so complete a human horn as this; and misled by the imperfect accounts of the nature of horns con-

tained in medical works, I proposed its removal by the knife, to which she very willingly assented; for the thing was an excessive annoyance to her, catching against her clothes, very frequently meeting with blows, and then giving her much pain. The operation was speedily over, and she soon got well; but had I known as much of the nature and origin of the growth as I learnt from its examination after removal, the pain of an operation might have been spared her. I trust, however, that my experience will serve others as well as myself at a future time, and with that view I communicated the case to the Royal Medical and Chirurgical Society, by whom it has been published in the twenty-seventh volume of the Society's Transactions. In this paper, I have shown the analogy which subsists between the oily product of the skin, scarf-skin, and horn, and have proved that the growth in question was not merely horn-like, but was actually horn, both in intimate and in coarser structure.

217. Having in the above case had my attention so forcibly drawn to the occurrence of horn in the human being, I prosecuted a search into the literature of the subject, and succeeded in collecting no less than ninety recorded instances of horny growths. They appear to have been more prevalent in the

earlier than the present times, probably from scarcity of soap, and some curious speculations were excited in the minds of the older physicians by observation of them. Rhodius, for example, met with a Benedictine monk who had a pair of horns, and was addicted to rumination; and Fabricius having seen a man with a horn growing from his forehead, whose son ruminated, is willing to give the father the credit of transmitting this disposition to the son by virtue of the ruminant character which he bore so obviously on the head. The most remarkable case of human horn on record is that of a Mexican porter named Paul Rodriguez. The horn was situated upon the upper and lateral part of the head; it was fourteen inches in circumference around its shaft, and it divided above this point into three branches. Voigtel cites the case of an old woman who had a horn with three branches growing from her forehead, and M. Dubois had a woman under his care, in the Hospice de Perfectionnement, with a horn that measured seven or eight inches in diameter at its base, and was six inches in length. The length of the horn in some recorded instances is also remarkable. Sir Everard Home saw two cases, in both of which the growth measured five inches by one inch in diameter. They were curled, and had the appearance of isinglass.

In one case, the horn was fourteen years growing. Dr. Gregory mentions a horn which was removed from the temple of a woman in Edinburgh which measured seven inches. Dr. Charriere, of Barnstaple, saw one growing from the nape of a woman's neck which measured seven inches. A horn in the British Museum is said to measure eleven inches in length by two-and-a-half in circumference; and Bartholin, Faget, and several other writers, have spoken of horns twelve inches long. A singular instance of horn is mentioned by Cruveilhier in his "Anatomie Pathologique," as falling under the notice of Dr. Faget of Bordeaux. The subject was a Mexican Indian, and the horn was situated in the lumbar region on the left side. After growing for three years, it had attained a length of four inches by seven or eight inches in circumference, and was sawn off by the patient's son; after another three years, it was submitted to a similar operation, and at the end of nine or ten years from its first appearance, was extirpated by M. Faget. The portion removed by M. Faget, with the two portions previously cut off, amounted in length to about twelve inches.

In a scarce tract in small quarto, published in 1676, there is "a brief narrative of a strange and wonderful old woman that had a pair of horns grow-

ing upon her head." "This strange and stupendous effect," continues the pamphlet, "began first from a soreness" of the back part of the head where the horns grew. "This soreness continued twenty years, in which time it miserably afflicted this good woman, and ripened gradually into a wen near the bigness of a large hen egg, which continued for the space of five years, more sadly tormenting her than before, after which time it was, by a strange operation of nature, changed into horns, which are in show and substance much like ram's horn, solid and wrinkled, but sadly grieving the old woman, especially upon the change of weather." The horns were shed four times, the first "grew long, but as slender as an oaten straw;" the second was thicker, and on the fall of the latter, two were produced, which were broken off by accident. One of these was presented to the King of France; the other is stated to have been nine inches long, and two inches in circumference. The periods of shedding were three, four, and four years and a-half. There is an engraving of this woman in Dr. Charles Leigh's *Natural History of Lancashire, Cheshire, and the Peak of Derbyshire*. Her portrait and one of the horns is in the Ashmolean Museum, and another of the horns in the British Museum.

218. Grubs and accumulations are both of them due to the collection of the oily product of the skin within the oil-tubes, attended, in the latter case, with a remarkable state of expansion of the tube. There is, however, another disorder belonging to this group, in which, as in the preceding, the oil-tube is filled; but in addition, the tubes of the little gland at its base are also distended, and the swollen gland rises up to the surface of the skin, and forms a small tumour, generally about the size of a currant (plate 6, fig. 6). The resemblance to a currant is not confined to size alone, it is very like one in shape; there is the flattened and indented summit, resembling the point of attachment of the corolla of the currant, lines down its sides marking its division into segments or lobes (fig. 7), and the smooth polish of the distended skin. Its colour is usually lighter than the surrounding skin, from the whiteness of the contained substance, which may be sometimes seen through its thinned walls, and its base is more or less narrowed, so as to give it the character of being independent of the skin. The contents of these little tumours, as may be inferred from their impaction in the tubes, is denser than natural, the cells are more distinct (fig. 8), and apparently filled with a dry granular substance, and retain their oval shape, instead of being,

as in the natural state of the oily substance, collapsed and broken. If the little tumour be pressed between the fingers, it frequently happens that a small quantity of milky fluid oozes out from its summit; but this is by no means a constant character, for in some the oily product is so dry as not to permit the filtration of this fluid through its mass. These *small sebaceous tumours* are generally met with on the neck or face, particularly in the vicinity of the eyelids, and they are sometimes found dispersed on other parts of the body. They have been described by most authors as being contagious, under the name of *molluscum contagiosum*; but this is not the fact, as I have been enabled, very satisfactorily to my own mind, after careful observation, to determine.

TUMOURS OCCASIONED BY THE DETENTION OF THE
OILY SUBSTANCE WITHIN THE OIL-TUBES, THE
APERTURE OF THE TUBE BEING CLOSED.

219. I now come to a disorder of the oil-tubes of frequent occurrence, depending upon closure of the aperture of the tube, and consequent imprisonment of the product of the gland. In this case, Nature seems to accommodate herself to the emergency, for the collected substance loses the bulky character which it ordinarily possesses, and rarely collects in

any quantity ; indeed, the size of the little tumours occasioned by its accumulation is not greater than that of a mustard or millet-seed ; and from this latter circumstance they are denominated *sebaceous miliary tubercles*. These little tumours, or rather tubercles, are perfectly white and pearl-like in their appearance, and of a round form. They are frequently seen scattered about the eyelids, and sometimes on other parts of the face ; they give rise to little or no inconvenience, other than that which arises from their unsightly appearance. I have met with but one exception to this statement, namely, in the case of a gentleman who had one of these tubercles, of larger size than usual, at the inner angle of the eye, which interfered with his comfort in the closure of the lid, and threatened to continue growing. I removed the contents in that case, and the tubercle has not returned.

220. In the chapter which treats of the natural structure and functions of the oil-glands, I have stated the chemical composition of the oily product, and in general terms I have remarked that it contains saline matters, namely, salts of soda, potass, and lime. Now, one of the commonest changes occurring in glands is the alteration of the constituents of their peculiar product, and that this event is not infre-

quent in the oil-glands I have had occasion to show in preceding paragraphs, and shall have again to make known as I proceed. For example, we occasionally meet with small, whitish tubercles, of the millet-seed kind, which, upon examination of their contents, turn out to be composed of an excess of the salts of lime, and are consequently hard and stony in their nature, or like a piece of mortar. When tested with the microscope, the hard mass is seen to be made up of numberless small scales, like those previously described, and within these scales are the minute particles of calcareous salt, which, by their accumulation, give hardness and density to the mass. Two such tubercles as these have lately been removed from the eyelid by Mr. Dalrymple. They have also been seen in other situations. From their obvious relationship to those described in the preceding paragraph, I have designated them *calcareous miliary tubercles*.

221. Occasionally, I have seen the place of the oily matter of these small tumours occupied by a clear, watery fluid, which collects to such an extent as to render the skin thin and transparent, the tumour, under such circumstances, having the shape, and often the size and appearance, of a grape. I have seen two such grapes hanging to the margin of

the upper eyelid, and interfering with the motions of the lids, and even with the sight, besides being a cause of deformity to the person who bore them. These are *watery cysts* of the oil-tubes.

222. There remains to be described, among the tumours resulting from the accumulation of the oily product of the skin, certain enlargements known by the name of "wen," or, in technical phraseology, *encysted tumours*. These are most commonly met with on the scalp, but may also occur on other parts of the body. They are usually globular in form, and sometimes so perfectly round as to look like marbles projecting from the skin. When laid open, they are found to be filled with the unctuous product of the skin, variously modified by its long detention, and sometimes so altered from its original character as to be scarcely distinguishable as the same substance. For example, the contents have sometimes the aspect of bread-sauce, sometimes of more or less solid fat, occasionally they resemble melted wax, and at other times, water of various tints of colour, and holding in suspension floating substances of different kinds. Besides these matters, it is no uncommon thing to find hair within these tumours, having an origin similar to the tufts of hair mentioned in paragraph 66. The pouch of the oil-tube, which is so inordinately

distended in this form of tumour, is technically called its "cyst," and this is the meaning of the name by which they are known to medical men. This cyst is sometimes curiously modified by the new conditions which it is made to fulfil; for example, it sometimes becomes hard and rigid, like a piece of parchment, and at other times is calcareous and stony in its nature. The treatment of encysted tumours is purely surgical; the contents must be let out, and the cyst, if possible, withdrawn.

223. As respects the treatment of disorders of the oil-producing apparatus of the skin, the various forms of affection call for the adoption of different means. The excess of oily product spoken of in paragraph 212, is best remedied by the application, with friction, of the following lotion to the face. This is to be used at night, and the following morning every trace of it washed away with abundance of soap. If the skin should be at all tender after this treatment, rinse it with the simple infusion of rose petals (§ 164). The lotion is as follows:—

LOTION FOR DISORDER OF THE OIL-TUBES.

Oil of sweet almonds, one ounce.

Fluid potass, one drachm.

Shake well together, and then add—

Rose-water, one ounce;

Pure water, six ounces.

Mix.

This same lotion, used in the manner described, is the best possible remedy for grubs and accumulations of unctuous substance, and is so harmless in its nature as to agree with the skin of most persons. When, however, it is not found to answer the purpose required, the sublimate lotion (§ 164), containing not more than two grains of the sublimate to half a pint of milk of almonds, may be tried; and supposing this also to be unavailing, let lemon-juice, diluted with one-half water, be tried, or the following:—

Hypochloride of sulphur, one drachm ;

Powder of gum acacia, one drachm.

Rub together until the sulphur is well mixed, and then add—

Water, half a pint.

Mix.

Keep this lotion in a cool place, and well corked.

224. The treatment of the fish-skin disease had better be left to the medical man. Should, however, such aid be difficult of attainment, the patient may use the alkaline ointment (§ 183) without any likelihood of inconvenience. He will find this keep down the scales and prevent their increase. After an application at night, the ointment should be completely washed away in the morning with soap. The occurrence of horns is so rare, that few of my readers, probably, will require to put in practice any course of

treatment for their removal; but should the necessity offer, the alkaline ointment kept constantly applied, with the addition of a covering of oiled silk, will be found effectual in softening them to a pulp, and removing them entirely. After the whole of the matter of the horn is washed away, the astringent lotion (§ 183) will be of service in preventing its renewal. Small sebaceous tumours, millet-seed tumours, serous cysts, and encysted tumours, all require surgical aid, the treatment consisting in laying them open, and adopting some means which shall prevent their recurrence.

225. ACNE.—Inflammation of the oil-tubes and glands, extending more or less to the neighbouring skin, gives rise to a well known eruption on the forehead, face, and back, called *acne** (plate 6, fig. 9). These pimples are so well known by most persons as scarcely to need description; they are conical, red, and hard; after a while, they become white and yellow at the point, then discharge a thick, yellow-coloured matter, mingled with a whitish substance, and become covered by a hard, brown scab; and lastly, disappear very slowly, sometimes very imperfectly, and often leaving an ugly scar behind them. To these symptoms are not unfrequently added considerable pain, and always much unsightliness.

* Pronounced *âc-ně*.

When these little cones have the black head of a "grub" at their point, they constitute the variety termed *spotted acne*. These latter often remain stationary for months, without increasing or becoming red; but when they inflame, they are in no wise different in their course from the common kind.

226. There is, however, a variety of acne which settles on the nose, and is a subject of some facetiousness of nomenclature, though "no joke" to the possessor. It is called, for example, "bacchia," from its occasional bacchanal origin, and "rosacea," from its rosy redness, I presume, certainly not for its beauty. But if its history be pursued, it might, with very good reason, be called *besieger*, not only from the siege which it lays to the nose and adjacent parts of the face, and the annoyance which it causes its victim, but from the manner of its aggression, and subsequent operations. It begins, for example, by very slowly throwing up a mound of red skin, and for months, perhaps, goes no further; then we see a chain of low barrows, extending to another mound in the act of rising, sometimes two chains passing in different directions, or perhaps a mound in the distance which the chain goes to meet. These operations are always remarkable for the slowness, but not less for their certainty of success, for

wherever the skin is hemmed in by these pimply ridges, it is as deeply red as the pimples themselves ; and after a time, when the whole nose, probably, and a considerable extent of the adjacent face, is covered by them, both the latter and the intermediate skin are marked by large veins, which spread out their branches like tributary streams of a large river. Occasionally, small collections of yellow matter form upon these pimples, but this is by no means their common character. They preserve a heightened colour under all circumstances, but undergo a change having relation to the state of the blood flowing through them. Thus, for example, when the circulation is active, they are fully distended and brightly red ; while in cold weather, or under the influence of causes which retard circulation, they are bluish, or even livid in hue.

227. There is another form of acne which occurs upon the chin, and is excessively obstinate and enduring. It attacks women as well as men, but is most common in the latter, and is much aggravated by the operation of shaving. The appearance of the eruption is similar to that of a severe kind of acne, namely, large, conical, red pimples, with hard bases, yellow heads in an advanced stage ; and later, hard, brown scabs. The disease affects the oil-tube and

neighbouring hair-tube, and therefore extends somewhat deeply into the skin ; moreover, from the relation which subsists between the hair-tube and the disease, each pimple rises at the base of a hair, and looks as if it were transfixed by the shaft of the latter. From the chin, the disorder not unfrequently spreads to the whiskers, and, by long continuance, produces considerable thickening and hardness of the skin over the whole extent of those parts of the face.

228. The treatment of acne must be constitutional as well as local. I am now of course supposing the eruption of a crop of these pimples, and not a few isolated ones, which may occur in any one from local causes without any disorder of health. The diet should be looked to, the degree of exercise considered, and the abuse of mental labour. Acne sometimes requires reducing remedies, and at others, stimulating ones. With regard to local treatment, several of the lotions and ointments already mentioned in the course of these pages are calculated to be serviceable ; such as, to begin with the mildest, the lotion for disorder of the oil-tubes (§ 223), the astringent lotion (§ 183), or the following, which is more particularly adapted to cases of this kind :—

Sulphate of copper, twenty grains.

Rose water, four ounces.

Water, twelve ounces.

Mix.

A stronger lotion, when the above are found to be too mild, is that of the hypo-chloride of sulphur (§ 223). The mode of using these remedies is to rub the pimples for some minutes with a rough towel, and then dab them with the lotion. Sometimes, an advantage is gained by having two lotions, one for the evening and one for the morning; the best for morning application being the sublimate lotion (§ 164). When matter collects at the top, and they are fully ripe, the pimples require to be opened, and treated in the same manner. In the variety affecting the skin, it is desirable to keep the eruption in a moist state all the night through, by the use of oiled silk over a piece of lint dipped in one of the above lotions, and use either the hypo-chloride of sulphur or sublimate lotion in the morning.

Acne rosacea requires a different treatment: it should be well fomented every night with a decoction of marsh mallow, as hot as can be borne, the fomentation being continued for full half an hour. As soon as the parts are dry, dab them with the hypo-chloride, or sublimate lotion, and lay over them a piece of lint, dipped in either of the above lotions, covering the whole with oiled silk. In the morning, wash them with soap, then dab them with the sublimate lotion, and leave them untouched during the

day. This is a general scheme of treatment. If I were to attempt to lay down rules to meet every emergency, the task would be a tedious one to my reader, and not less so to myself. In these pages, I propose not to offer a substitute for medical advice, that would be impossible; but simply to give my readers a rational view of disease, combined with a rational principle of treatment, in order that they may be able on an emergency to adopt a proper and judicious means of relief, appealing in every difficulty to the higher authority of the medical man.

CHAPTER XVIII.

ON THE DISORDERS OF THE HAIR AND HAIR-TUBES.

229. IN taking a survey of the disorders of the hair, the divisions previously adopted for the morbid affections of the perspiratory and oil-producing apparatus will be applicable here. The unnatural conditions in which the hair and hair-tubes are involved being referrible to augmentation and diminution in quantity, alterations in colour and direction, diseases of the hairs, and diseases of the hair-tubes.

230. Augmentation of hair in quantity can only be regarded in the light of a peculiarity, so long as it is confined to those parts of the body which are properly organized for the production of long hair. It does, however, sometimes happen that hair is produced in places where such a growth is unnatural, and that the unnatural growth is accompanied by an

altered state of the entire skin. This is the case in those little patches and spots which sometimes disfigure the face, and are called "moles." Moles are of a dark colour, generally covered with hair of a longer or shorter growth, and come under the popular designation of "mothers' marks." For example: when sufficiently large and moderately tufted with hair, no matter what their form, they are the representatives of the "back of a mouse." In moles, the discoloration dependent on alteration of pigment (§ 208) is conjoined with unusual production of hair; but they have none of the dangerous properties of the mothers' marks, occasioned by disarrangement of the blood-vessels (§ 204), and are only sources of annoyance from their size, their colour, or their position. There is no remedy for their removal, saving a surgical operation, and sometimes the inconvenience from their presence is such that this is submitted to. The operation is trifling; and when judiciously performed, no trace of such a proceeding is left behind.

231. Under the circumstances above detailed, and in others to which I need not more particularly refer, it comes to be a question, How hairs in improper situations are to be disposed of? I wish I could answer this question satisfactorily, for it is one that

I have addressed to me very frequently. I know of no specific remedy for such a purpose. Substances are sold by the perfumers called *depilatories*, which are represented as having the power of removing hair. But the hair is not destroyed by these means, the root and that part of the shaft implanted within the skin still remain, and are ready to shoot up with increased vigour as soon as the depilatory is withdrawn. The effect of the depilatory is the same in this respect as that of a razor, and the latter is unquestionably the better remedy. It must not, however, be imagined that depilatories are negative remedies, and that if they do no permanent good, they are at least harmless; that is not the fact; they are violent irritants, and require to be used with the utmost caution. This will be immediately seen when I inform my reader that depilatories are chiefly composed of quicklime, soda, and sulphuret of arsenic, all of which substances act by burning up and dissolving the hair. There could be no objection to this process, if it were conducted with safety to the skin; but the depilatory requires to be laid on the skin either in the form of powder or paste, and necessarily destroys the scarf-skin at the same time that it acts on the hair, for the scarf-skin and hair are, as I have shown in preceding chapters, identical

in composition. After all, the safest depilatory is a pair of tweezers and patience.

232. Diminution of hair in quantity, from its decadence, involves much more serious consideration than the opposite condition. I do not now allude to the fall of the hair dependent on age ; this is a natural consequence of man's infirmity, and cannot be regarded in the light of a disorder ; but sometimes the fall of the hair takes place in young persons, and then it becomes a serious evil. The degree of evil is necessarily much modified by circumstances ; if the subject be a young lady, the inconvenience is greater than if it be of the opposite sex. If the fall be limited to parts usually bald in the aged, again, the visitation may be bearable even in a young man. But when, as I have frequently seen it, the entire scalp is laid bare, and with it the eyebrows, eyelashes, whiskers, and beard are lost, the case is one of no common affliction. A wig but ill supplies the place of Nature's foliage, and burnt cork for eyebrows is only passable as a stage effect. But the annoyance is greater than all, when, instead of a total fall, round white patches of scalp become denuded, giving the idea, most unjustly, of some disagreeable or degrading disease. This is one of the numerous family of the ringworms of the public, but, like many other popular medical notions, wholly incorrect. The grounds of

the misnomer are simply these : a disease recognised under the name of ringworm produces a fall of the hair on the part affected, then comes the popular deduction, *ergo*, every fall of the hair is occasioned by a ringworm. But in the patches of which I am now speaking, there has been no previous perceptible disease ; indeed, the case is one, not of disorder of the skin, but of the nerves, which supply the skin. I had a curious case, in illustration of this opinion, about twelve months back. A woman was sent to me from the eye infirmary, where she was under treatment for disease of the eyes, in order that I might advise her with regard to a remarkable state of baldness. She was a highly nervous person, and subject to frequent and severe pain in the course of four of the principal nerves of her scalp, and it singularly happened that the baldness was limited to the lines of distribution of these nerves. I prescribed for her a remedy to reinstate the hair, and requested to see her again in a week. It was of course too early to expect any appearance of hair, but the pains in the head were gone, and the eyes so much better, that she had no occasion to return to the infirmary. If it were necessary, this is not the only evidence I could adduce of the direct nervous origin of baldness. But to return : in partial baldness of the scalp occurring in round patches, the skin is white, as smooth

as if polished, and obviously thinner than the surrounding skin. This thinness of the scalp is very remarkable in the baldness of age, the skin is almost transparent, the seams of the bones may be distinguished through it, and it appears to have scarcely any substance whatever. Indeed, I have in my collection a preparation of the skin of the scalp in which the latter is not thicker than paper. Partial baldness of the scalp is entitled to the designation "scall;" but I think it better to abstain from the use of this word, as scalled head is the term usually employed to distinguish those cases of baldness of the scalp occurring in patches resulting from watery or mattery pimples (§179, 184); or from another disease, shortly to be described, the true ringworm. Partial baldness may occur in any one, and at any time, and more usually attacks adults than children.

233. In the preceding paragraph, I have not particularly adverted to the loosening of the hair, which frequently occurs in young persons, or in those of the middle period of life, and which, if neglected, would become real baldness. Such a state as I am now describing is not uncommon in women, and generally terminates in its mildest form, in excessive loosening of the hair. The case, however, is far from being the hopeless one which is generally imagined; and if proper treatment be pursued, the hair

will grow afresh, and assume all its pristine strength. An useful practice in men, and those of the opposite sex whose hair is short, is to immerse the head in cold water, morning and night, dry the hair thoroughly, and then brush the scalp, until a warm glow is produced. In women with long hair this plan is objectionable; and a better one is to brush the scalp until redness and a warm glow are produced, then dab among the roots of the hair one or other of the following lotions. If the lotion produce smarting, or tenderness, the brush may be laid aside, but if no sensation is occasioned, the brushing should be resumed, and a second application of the lotion made. This treatment should be practised once or twice a day, or at intervals of a few days, according to the state of the scalp; namely, if tender, less; if insensible, more frequently. When the baldness happens in patches, the skin should be well brushed with a soft tooth-brush, dipped in distilled vinegar, morning and evening, or dipped in one of the following lotions:—

LOTION FOR PROMOTING THE GROWTH OF THE HAIR.

No. 1.

Vinegar of cantharides, half-an-ounce.

Eau de Cologne, one ounce.

Rose water, one ounce.

Mix.

No. 2.

Eau de Cologne, two ounces.
 Tincture of cantharides, half-an-ounce.
 Oil of nutmegs, half-a-drachm.
 Oil of lavender, ten drops.

Mix.

No. 3.

Mezereon bark in small pieces, one ounce.
 Horseradish root in small pieces, one ounce.
 Boiling distilled vinegar, half-a-pint.

Let this infusion stand for a week, and then strain through muslin for use.

If either of these lotions should be found too irritating to the skin, use them in smaller quantity and less frequently. No. 3 may be diluted with more distilled vinegar. If they have the effect of making the hair harsh and dry, this inconvenience may be removed by the use of oil or pomatum after each application of the lotion. Pomatums for the growth of hair are very inferior to the lotions, and the celebrated pomatum of Dupuytren is both clumsy and inefficient.

234. In the chapter upon the structure of the hair, I have narrated some instances of altered colour, and given an explanation of the nature of that change. Such alterations are curious, rather than of any practical importance, and they occur so rarely as to call for nothing more than a brief passing notice. A more frequent change, however, is that in which

the colouring pigment ceases to be produced, or in which a white calcareous salt is substituted for the natural pigment. This state constitutes "blanching of the hair." It must be a matter of common observation, that in those instances in which the pigment presents the deepest hue, blanching most frequently occurs, and greyness is most common; while in persons with light hair and light complexion, blanching is comparatively rare. There can be no doubt that the production in this climate of a dark pigment is a greater exertion to the economy than one of a lighter kind; and hence, when the power of the nervous system is reduced, the formation of pigment is one of the first actions which suffers. It is wisely ordained that it should be so, for colour of the hair is one of the conditions of existence most easily spared, and it is one also that may well serve as a monitor of human decay. When greyness shows itself in the hair, it is therefore an indication of want of tone in the hair-producing organs; and if this tone can be restored, the hair would cease to change, and, at the same time, further change would be prevented. The lotions for promoting the growth of the hair are remedies of this kind, and I know no better local means for checking greyness. They must be used as recommended in the preceding paragraph.

235. Seeing that cessation in the production of pigment is a consequence of deficient tone in the scalp, resulting from weakened energy in the nervous system, we have an explanation at once of blanching of the hair ensuing after fevers or constitutional disease, or of the same state following intense anxiety or alarm. From such a moment, pigment is no longer elaborated, and all the hair produced subsequently to the shock is white. But that already formed remains unchanged, because it is out of the reach of the living textures, and cannot undergo alteration. For this reason we must receive all statements of the hair becoming white in a single night with a proper degree of mental reservation. We are ready to admit, that all hair produced upon and after that night may be white, but no further. And in this admission we can readily believe that blanching of the hair may be dated from a single night; all the growing hair may on that night be formed white, but all above the level of the scalp retains its colour as completely as if it formed a part of an artificial wig. These considerations lead us to another kind of remedy for blanched hair, one which acts only on the formed hair, and has no power either of reaching that which is implanted below the level of the skin or the root. I allude to "dying;" I have heard of

persons who have been led to adopt this artifice under the supposition that the hair being once dyed will grow for ever after of that colour. If they had reflected in time that the dye acts only on the hair above the level of the surface, and that the hair continues to grow of the objectionable colour, so as to require a weekly repetition of a disagreeable process, they would, I think, have hesitated before they had offered themselves as willing slaves to a barbarous practice.

236. Altered direction of the hair may be discussed in a few words; the only situation in which the hair is known to give rise to inconvenience by irregularity in the direction of its growth, is upon the margin of the eyelids, where the lashes sometimes grow inwards, and by pressing against the front of the eyeball, occasion irritation, and even inflammation. When such a state as this occurs, the erring hair must be removed by means of a pair of fine tweezers, and the inflammation afterwards subdued by cooling and slightly astringent lotions.

237. The only disorder coming strictly under the designation of disease of the substance of the hair is one which is known in this country only by reputation as an inhabitant of Poland and Russia. I mean *plica polonica*. In this affection, the hair is

distended with a reddish coloured fluid, and has the appearance of being converted into flesh. The scalp is much diseased, and bleeds on the slightest touch, and so much pain is given by the trifling movement which accompanies the cutting of the hair, as to give rise to the impression that the diseased hair is really endowed with nerves. A large quantity of fluid weeps from the hair-tube, and agglutinates the hair into a repulsive mass, which is left for nature to remove; a process that requires from ten to twelve months to accomplish.

238. The hair-tubes are liable to a peculiar state of disorder, in which they produce a yellow, paste-like substance which collects within them in such quantity as to destroy the pulp of the hair, and by its further increase, to give rise to a most serious form of disease of the scalp. The development of this disorder is attended with considerable irritation and itching, and when the skin of the head is examined, a small patch of redness will be detected as the seat of the diseased action. Upon further inspection, a number, and perhaps all the hairs included within the area of this patch will be found encircled at their base by a minute yellow spot. In a few days, this spot rises above the level of the surface, and becomes a small pimple; and still later, the yellow matter of

the hair-tube continuing to exude, forms a small cup around the hair, the concavity of the cup being directed outwards, and its convexity being attached to the mouth of the hair-tube. It generally happens that a number of these sulphur-yellow cups, produced upon a small circular patch of skin, form a cluster; this arrangement constitutes the clustered variety of the disease in question. At other times, they are distributed singly over the scalp, and constitute the scattered variety. When they exist in the clustered form, they have somewhat the appearance of a piece of honeycomb embedded in the hair, and from this resemblance have received the name "favus," which literally means "the honeycomb." The disorder is, in reality, "the true ringworm," the most serious form of disease of the scalp, and highly contagious. As the disease is deeply seated in the hair-tubes, and continues to progress in them, the irritation and itching receive no relief from the escape of the matter in the formation of the cups, but, on the contrary, seem to increase, and in attempts made to relieve the itching, the hair comes away with the crusts. Indeed, if the hairs be gently drawn by a pair of tweezers, they will all be found loose and ready to come out on the most moderate traction, and in this way we are often able to detect the ex-

tension of the disease when no yellow matter is as yet apparent at the surface. This disease obeys the law of extension I have before had occasion to advert to as common in cutaneous disease, namely, exhausting itself in the part first attacked, and extending by the circumference, carrying devastation as it goes, destroying the hair, and forming a well-marked red circle, dotted with yellow points, as the invading column of its approach. This latter character, and the destructive nature of the disease, eating up, as it were, the roots of the hair, and causing the latter to fall, is the obvious origin of the popular designation "ringworm." If ringworm be not checked, it will destroy the whole of the hair of the scalp, and give rise to deep-seated disease, with enlargement and disease of the glands of the neck.

239. It is not the least curious part of the history of ringworm, that its yellow matter and crusts should, when examined with the microscope, be found to be composed of an organic formation, having the character of those vegetable growths known under the name of "mould," that is, consisting of little plant-like stems and branches, terminated at the extremity by clusters of sporules or seeds. Of late years, productions of this kind have been found in various parts of the body, but their vegetable nature is far

from being established. Whatever their nature, however, in a scientific point of view, there is every reason to believe that the disease may be propagated by the dispersion of these seeds, and this, in a practical sense, is the only important consideration, as pointing to a means by which they may be destroyed, and their reproduction arrested. The history of this disease, its yellow points and pimples, loosened hairs and dry yellow cups, will, I think, sufficiently distinguish it from every other affecting the scalp. I have before had occasion to mention disorders which had received the popular designation ringworm; but the characters of these were all widely different from that under consideration. Some were of the nature of simple rashes, lasting but a short time, and were found on the body as well as on the head; some were watery pimples, and attended by a profuse watery discharge; some were mattery pimples, and also attended by discharge; while another group were scaly and dry. Now, in the outset of the true ringworm, there is no discharge; but when, from neglect, the crusts augment in great numbers, and the yellow matter collecting in the hair-tubes, causes inflammation of the skin, discharges then arise, and frequently deep and painful excoriations and sores.

240. In the treatment of ringworm, the first point

medicine for its dangerous properties, but still occupying a place in the old woman's pharmacopœia. Old women, if they will insist on practising physic, should at least condescend to go for a while to school, and learn the difference between A and Z.

THE END.

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Ringworm - its Causes Pathology & Treatment

By Erasmus Wilson - 1847

Linnaeus was first employed by Sauvages from the appearance of the broken Hair as effected by the Moth Grub or moth worm

Taken in its strictest acceptation it ought to be restricted to Diseases producing a brittleness of the Hair & giving rise to its breaking off near the Skin

He considers that there are only two Diseases properly under the denomination of Ringworm & both are marked by an absence of Venation the most Eruptive complexion, Eczema, Impetigo and Erysipelas. - The most Eruptive are simple in their Nature & non-contagious - those stamped by the popular appellation are of dry Eruptions -

Dr Wilson considers Trichonosis in 3 Chapters 1st Favus or Honeycomb Ringworm, second the Trichonosis superficialis or common Ringworm & the 3rd Disease analysed or liable to be mistaken for Ringworm

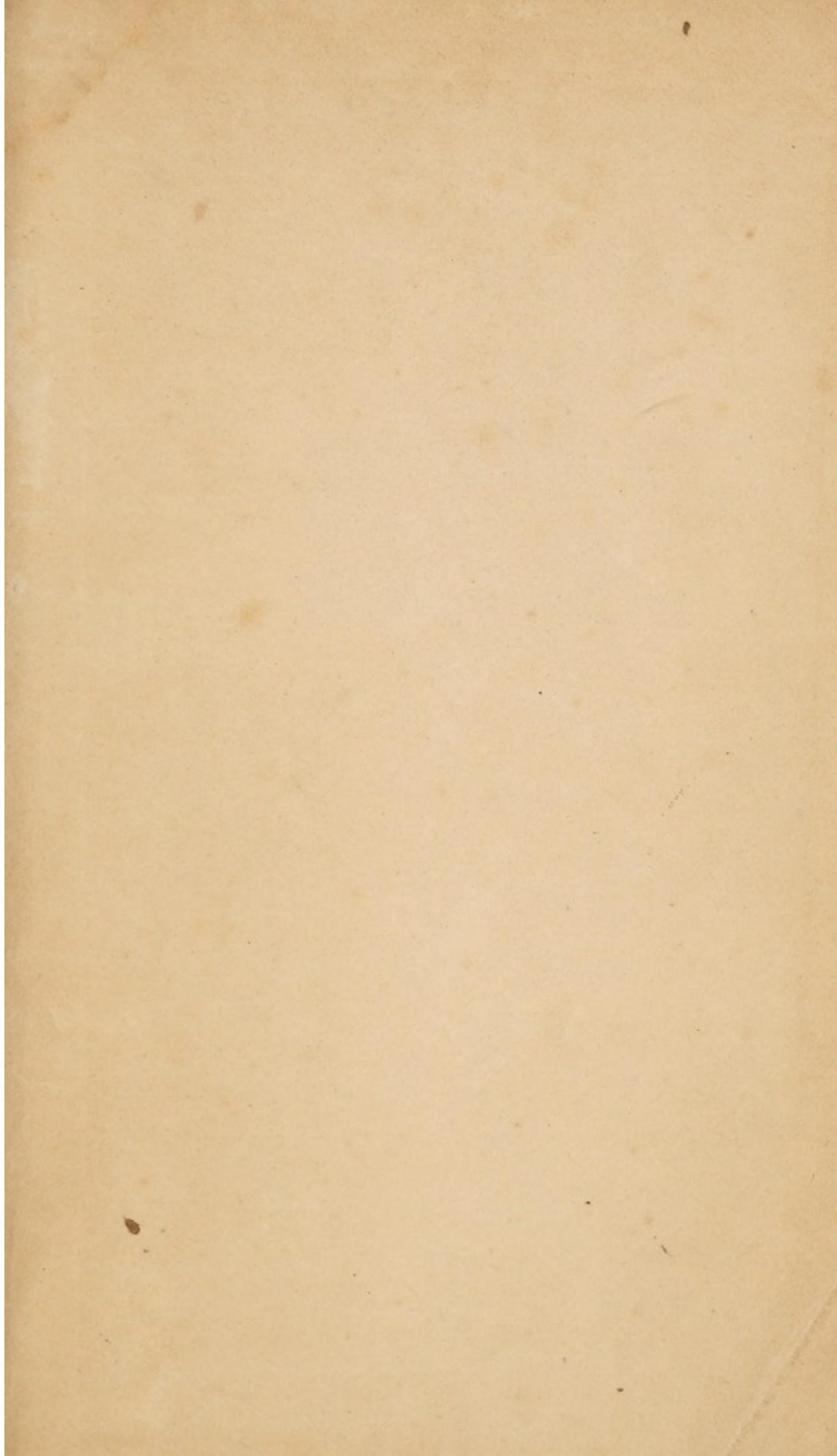
Dr Wilson considers Favus and common Ringworm as not contagious - he has given also a Description of Trichonosis fulva or Plica Polonica; alopecia areata - porrigo decalvans of Willan & Bateman & a brief summary of the distinguished signs or characters of special and general Diseases of the Scalp

Favus or common Ringworm he does not consider contagious - he thinks it the disease of deranged Nutrition - its cause being debility of the organization - originating, probably in defective organization resulting from innervation or perhaps even correct from impurity of Blood.

and their expression likewise much in reference
to the System of living which should be adopted for its
cure. It must not however be supposed that living
applies only to food; the other hygienic conditions
of Air, Exercise, abstinence of clothing are equally
necessary to constitute a healthful regimen.

Another predisposing Cause of the Disease is im-
proper Food, and this is a cause which is most active
in public Schools & large Establishments of
Children. I have sometimes had occasion to regard
the prolonged use of a vegetable Diet as the cause
of the affection, and am convinced that a milk
diet, continued for a long time without change,
will give rise to the Disease.

The restraints of nobility and amusement to which
Children are subjected in Schools, is another of
frequent cause of ringworm confined in un-
ventilated rooms, congregated in considerable
numbers, bounding their little Minds to distasteful
Labours - commencing their Studies the instant
they have swallowed their Meals & kept to
their Books for several successive Hours
in the Day it cannot be a matter of surprise
that the instinctive Functions of the Body should
suffer - Altho it is advisable to separate
those afflicted with these complaints for others - and
to be in any apprehension of contagion - but
that the diseased Youth may be placed under
a training as adapted for their cure & without
the total neglect of Education - destructive
of the future prospects of the Youth.



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Plague considered more as a contagious disease.

It having stated in the House of Commons

March 18. 1847 on the Decadence

Even in Egypt personal cleanliness was a general
security. — He found that among the Negroes

& Indians the mortality was 84 per cent. Mo

61 per cent. Arabs 55 per cent. Greeks 16 per cent. for

Americans & Copts 12 per cent. Turks 11 per cent. Italian

& other Nations of Europe 7 — French & English

The most civilized Nations only 5 —

Plague never observed within 4 degrees

of our latitude with cold latitudes —

exists in very high or low temperatures

In Egypt never farther South than the first Cataract

farther west than the province of Saioune

on the East never crossed the Arabian Gulf

The united States had no quarantine Law

Sea Lazaretti — Egypt & Turkey are the

of the Disease & midway between the Eastern &

