GENERAL

PATHOLOGY AND THERAPEUTICS OF THE SKIN.

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I. GENERAL NOSOLOGY OF THE SKIN.

THE pathological features of diseases of the skin correspond entirely to those of the diseases of organs in general. It is clear, however, that this subordination to general pathological laws can only be carried so far as the structure of the skin, and the character of its functions, do not require an individualization. However, each individual pathological process, in such a highly complex organ as the general tegumentary covering, will present a picture which is not simply a repetition of the same nutritive disturbance in another organ, for example, the liver.

The history of the pathology of the skin, indeed, presents a constant vacillation between complete denial of its individuality and its entire separation from the general pathological types. The most suitable method to be adopted appears to be that of comparative pathology.

We find that the *mucous membrane* consists of the same layers as the external integument, except that its epithelium is destitute of the horny layer, and there remains merely the laminated pavement epithelium, in addition to the basal layer of cylindrical (prismatic) or round cells, the latter being situated directly upon the connective-tissue stroma, as it is in the skin. From the cardiac extremity of the stomach to the anus, in a part of the air passages, in the male urethra and vas deferens, and in the female genitals from the external os uteri, *i. e.*, wherever the mucous membrane is not directly in contact with the air, the epithelium of the mucous membrane is formed merely of one or more layers of large cylindrical cells, which are ciliated in some parts.

In the larynx and the remainder of the respiratory tract, etc., the connective-tissue stroma is not provided with papillæ; the remaining mucous surfaces present a more or less distinctly marked papillary boundary which, in the intestines, appears in the shape of the intestinal villi. The lingual and vaginal papillæ each have a special epithelial covering.

The secreting glands are situated in part in the mucous membrane itself, in part in the submucous connective tissue. Certain tracts, for example, the bladder and vagina, contain no glands.

The casting off of the external epithelial layer, which manifests itself in the skin as desquamation, occurs in the mucous membranes in the form of a secretion of mucus.

The serous and synovial membranes are covered with a single layer of pavement epithelium, the cells of which, from their origin, are regarded as connective-tissue cells, and are distinguished from true independent epithelium cells. In the serous membranes there is no papillary structure.

It may be inferred from these brief hints that the chief difference between mucous and serous membranes and the external skin lay, in great part, in the epithelial layer of the former compared with the other layer of the skin, and furthermore in the follicles which are found in the tissue of these membranes, while the basal connective-tissue layers do not differ essentially from one another in their types.

In so far as a part of the diseases of the skin is attributable to a congenital abnormal growth of the epidermis as a whole or in individual layers, or to an anomaly in the physiological processes, a decisive difference will be presented in this respect from the anomalies of the mucous and serous membranes, covered with more delicate layers of epithelium cells. In a similar manner, various irritants will produce varying effects, according as the outer covering is an elastic resistant membrane, as in the integment, or is a delicate, easily-ruptured but easily-replaced layer, as in the other membranes.

Similar relations are recognizable between the glandular structures of the skin and those of other organs, as, for example, between the glomeruli of the sweat glands and those of the kidneys.

We may point also to certain similarities which exist between the skin and mucous membranes with a thick epithelial covering and profuse papillary formation, for example between the palm of the hand and the tongue, and to the fact that certain simple, hyperplastic epithelium affections mainly occur in both places. It is a striking fact, on the other hand, that that form of neoplasm which arises from a typical epithelium proliferation (epithelioma or cancroid) appears to be confined in the skin, as in the mucous membranes, to the papillary developmental form of the boundary, that accordingly it occurs only in those parts of the mucous membrane in which the papillary form is distinctly marked (the œsophagus, cervical canal of the uterus, etc.).

It would be easy to multiply analogies, but we will content ourselves by emphasizing again the statement that the pathological types in the skin differ indeed in many respects from those of similar organs, but that these differences must be attributed directly to differences of form in their development and structure—to a *genius loci*, which disappears at once when the structure of other organs approaches that of the external skin.

If we consider the morbid processes of the skin as a whole, the fact at once forces itself upon us that it is by no means easy to form such sharply-defined groups of symptoms that they can be clearly distinguished from other groups by their origin and method of development, their peculiar subjective and objective characteristics, their course, prognosis, and reaction to curative agencies. Then the observation is added that certain irritants, coming from the outside or developing in the organism itself, are related to these changes; at the same time that one and the same irritant may correspond to various deviations, one and the same deviation to various forms of irritant. The morphology of diseases of the skin constitutes a whole which is full of details, but comprehended with difficulty, and it is scarcely possible to make a dry enumeration and classification of all these changes really attractive to the reader. We will lay stress, therefore, only on those features in the general pathology of the skin in which the general pathological law is clearly expressed, whether in harmony with the processes in other organs or in contrast to the latter.

THE INFLAMMATORY NUTRITIVE DISTURBANCE IN GENERAL, AND THAT OF THE
SKIN IN PARTICULAR.

The various irritants which act upon the integument give rise to various processes
in the tegumentary organs, which may all be termed nutritive disturbances, but are to be
distinguished from one another according to the predominance of this or that factor.
Among these disturbances one category has always been regarded as a separate group, for
which the general term inflammatory processes has been chosen, the causal factors of
which have been termed "inflammatory irritants," and to which certain clinical features,
indicated by the words " calor, rubor, tumor, dolor, functio læsa," have been ascribed.

At the outset we will assume that "inflammation" of the skin, as well as of other
organs, must be conceived as something which is developing, changing, never as some-
thing which is stationary, finished.

The inflammatory process in the skin is characterized :

a. By changes in the circulatory apparatus which may increase from distention of
the vessels to abnormal exudation, to the passage of blood-corpuscles and plasma through
the walls of the vessels (hyperæmia and exudation).

b. By changes in the nutrition and growth of the tissue elements produced thereby
(parenchymatous inflammatory processes, changes in the shape of the cells, and nuclear
proliferation of the " stationary " elements).

c. By changes in the peripheral, sensory, and motor nervous apparatus (pain and
functional disturbance).

Which of these factors is to be considered primary, is still entirely unsettled at the
present day.

If we confine ourselves, therefore, to regarding the inflammatory process as co-ordi-
nate with the vascular, parenchymatous, and nervous processes, and to considering it as the
result of certain irritants with which experience has made us acquainted, we will finally
be able, from a clinical standpoint, to overlook the fact that the manner, situation, and
period of the beginning of the action of these irritants are still entirely in the dark, de-
spite numerous experiments. However, we will be compelled, at the outset, to ask our-
selves the question : is the inflammatory process, although not comprehended *pathogene-
tically* as a whole, to be regarded at least as a readily defined, sharply bounded *clinical*
entity ? The answer is not an unqualified affirmative ; a strict definition of the process
is impossible at the present time, and its boundaries have not been completely defined.

Accordingly, we must add the following explanation :

a. Every pathological process which presents the above-mentioned characteristics is
inflammatory.

b. It is not necessary, however, that all the factors should be present or demonstra-
ble. This is true to the least extent of the nervous symptoms, which are quite often absent.
Furthermore, the parenchymatous processes may often be so slight and temporary, that
they escape observation, or they become stationary, and are converted into tissue diseases
of a peculiar kind. Finally,

c. With regard to the circulatory processes, the clinician is justified in saying : *there
is no inflammatory process without a change in the walls of the vessels* (Cohnheim),
although these may attain but a slight grade.

It is best to call this process (with Virchow) fluxion, and to understand by this term
all those changes in which, as the result of so-called inflammatory irritants, a change
has been produced in the structure of the walls of the vessels which, with Stricker, we

may term a return of the tissue elements to the embryonal condition of the cellular ele-
ments, which had become fixed, to amœboid organisms. Accordingly no form of so-
called stasis can be called an inflammatory process, *unless associated with change in the
walls of the vessels.*

The latter gives rise either to the so-called "itio in partes" of the white blood-glo-
bules and their passage through the walls of the vessels, or it does not go so far, in which
event clinical experience or direct experiment teaches us that merely a *quantitatively*
smaller irritant action, not a *qualitative* difference of the pathological process must be
regarded as the cause of the phenomena of inflammation which have not reached their
full height.

All these processes, *i. e.,* all hyperæmias produced by such factors which, as a matter
of experience, would be followed by inflammatory exudation under other circumstances,
must be included under the conception of inflammation.

On the other hand, there are no true, purely parenchymatous inflammations, *i. e.,*
which run their course without fluxion and exudation.

It might be claimed that there are also hyperæmias which do not lead to the inflammatory altera-
tion of the vascular walls and to changes in the tissue elements. But the changes belonging in this
category, such as blushing and cyanosis, must be regarded simply as physiological or pathological
changes of the *degree of distention* of individual parts of the circulatory apparatus, therefore not as
inflammatory processes in the skin.

All other hyperæmias belong to the inflammatory processes and differ only in degree
from the exudative processes. An erythema traumaticum is exactly the same process as
an eczema traumaticum and may pass into the latter.

But one thing must be mentioned in this connection: in a complicated process like in-
flammation, we have to deal, in many cases, with transition forms as in all natural pro-
cesses. Active inflammations never occur without the development of venous changes,
and *vice versa*. We may, therefore, speak only of the *predominance of one or the other
form.*

After this general elucidation of the conception of inflammation, we will pass to a
description of the inflammatory process upon the skin in particular.

a. THE SUPERFICIAL INFLAMMATIONS OF THE SKIN.

If a moderate irritant of a thermal, chemical, or mechanical nature is allowed to act
upon a portion of the integument, thus, for example, the neck of a lady exposed for
some time to strong sunlight, or the skin merely rubbed vigorously with a coarse towel,
we will give rise to the alteration which is termed arterial congestion or fluxion. The
skin appears warmer, it becomes of a bright-red color, which disappears entirely under
the pressure of the finger, but returns forthwith ; it feels somewhat thicker, firmer,
tenser (more turgescent), and gives rise, at first, to itching, then to burning. The rosy-
red spots are due to the fact that the upper layer of the corium which contains
the final ramifications of the vessels, does not allow the contours of the individual
vessels to be apparent, but rather vague spots of redness. When these spots occupy
more extensive surfaces, the redness is usully termed erythema ; when they occur more
diffusely in smaller patches, it is called roseola.

The latter variety of hyperæmia, however, is often merely the initial form, and passes into
erythema in its further course. For inflammatory irritants usually act upon the skin in such a man-
ner that they affect, at first, the small supplying artery which constitutes the centre of a small vas-

cular district (to which, as a rule, a few papillary vascular meshes belong). Here the earliest trace of redness is first shown, and as the centre of such a vascular district often corresponds to the centre of the vascular circle which is formed under each follicle of the skin, this punctate redness often appears as a darker central elevation which is formed by the excretory duct of the follicle.

If the hyperæmia then spreads to the collateral branches, it also involves the hitherto intact portions of the skin between the individual spots and forms indefinite, larger patches of erythema. This condition increases to a certain extent, and then the individual symptoms gradually diminish and disappear. Either no trace of the entire process remains or, at the most, a moderate desquamation.

The arterial fluxion here described, which may be produced also by internal causes, corresponds entirely to the hyperæmic redness of the mucous membranes, except that in the latter, the epithelium of which is more delicate than the epidermis of the skin, the ramifications of the distended vessels themselves appear more sharply defined; secondly, that the process leaves behind an increased secretion of mucus.

This description corresponds exactly to the results of the parallel experiment in animals.

If a rabbit's ear is brushed with very dilute mustard oil, it presents within about three-quarters to one and a half hour a rosy redness and elevation of temperature and, under a magnifying glass, a moderate dilatation of the arteries, then also of the veins, which phenomena disappear within a few minutes to half an hour, and give place to the normal condition. Exceptionally some swelling of the entire tissue occurs, but this also disappears after a while.

The swelling of the tissues constitutes the transition to more severe forms of arterial fluxion in which more profuse transudation of blood plasma is added to the simple congestion, which soon disappears, and, at the same time, a larger number of white blood-globules appear to be mingled with the serum. We are justified in calling these appearances *inflammatory œdema* in Cohnheim's sense.

This inflammatory œdema complicates the majority of hyperæmias of the skin to a lesser or greater extent, provided that the irritant is not too weak, or its action has not been too brief.

Let us now assume that an irritant acts more intensely or for a longer period upon the rabbit's ear or the human skin; for example, more concentrated mustard oil is brushed upon it several times in succession.

In the rabbit's ear the experiment teaches the following: dilatation of the arteries, veins, and capillaries first occurs together with increased rapidity of the flow of blood, and redness, swelling, and some elevation of temperature of the concha, which phenomena disappear after some time. A few hours later, rosy redness, heat, and swelling again make their appearance, while the flow of blood in the neighborhood gradually becomes slower, and stasis develops in the capillaries. Corresponding to this, red dots and streaks (small hemorrhages) develop upon the ear; in certain cases, finally, vesicles form which, when they burst, leave spots destitute of the epidermis and from which a serous or bloody fluid flows. At this period the microscope shows, in the veins, the peculiar accumulation of the white blood-globules along the walls of the veins and which is soon followed by the extravasation of white blood-globules from the veins and capillaries, and red-globules from the capillaries.

The following are the appearances upon the human skin as the result of the parallel experiment:

First, filling of the vessels, diffuse rosy redness, which disappears upon pressure, an evidence that it is due to dilatation of the vessels; at the same time, elevation of temperature; pruritus, then pain, swelling, and thickening of the skin from the occurrence of a

fluid exudation, by which the ecchymoses—which occur occasionally, but not always—are concealed; finally, the formation of various changes upon the surface of the skin which have been called inflammatory efflorescences by pathologists.

The appearances found in inflamed skin shortly after death show that the process is in all respects analogous to that in the skin of the rabbit.

We possess more accurate direct knowledge, however, concerning the stage of exudation. In this stage, the inflamed tissue in the vicinity of the vessels, *i. e.*, the corium proper and especially its papillary layer, is found:

a. Moistened by transuded blood plasma.

b. Infiltrated with red, and, to a large extent, white blood-globules from the vessels.

A nutritive change is thus produced in the corium itself, which manifests itself by the following phenomena: the protoplasm of the cellular elements of the connective tissue becomes swollen, their nuclei appear to be increased, nuclear division and cell fission occur to a more marked extent, and thus soon presents to the eye filling of the entire connective-tissue layer around the vessels with young uninuclear and multinuclear cells of the most varied form, with and without processes, between which are free nuclei, singly and in groups. During these processes the fibrous connective tissue and elastic tissue remain free from any noteworthy change, and no distinct abnormality can be detected in the glands, their excretory ducts, and the adipose tissue. The epidermis, however, presents a different condition. Its implication gives rise to the development of efflorescences (anthemata) and in the first place,

1. *To the formation of spots and nodules.* The first change in the tissue of the corium, the hyperæmia, corresponds to a greater succulence of the cells of the epidermis, especially the lowermost, youngest ones, then the so-called stratum lucidum, the basal horny layer, the contours of the cells and nuclear remains of which again begin to show more distinctly.

While the changes in the papillary layer spread farther, and the papillæ and then the deeper layers of the cutis become filled with fluid and cellular inflammatory transudation, the succulence of the elements of the epidermis also increases, so that it appears enlarged in depth, inasmuch as its outermost boundary, formed superiorly by the horny layer and inferiorly its boundary towards the papillæ, pushes itself forward, and a more marked projection of the thickened interpapillary cones into the tissue of the corium may be recognized.

For this reason also, the papillæ appear to be elongated, although the rigid boundary between the epidermis and the cutis, formed by the lowermost cylindrical cells of the Malpighian layer, does not appear displaced or present itself less sharply.

The slight elevation of the surface produced by this process is concealed usually by the change of color, and the entire change in the integument is called a spot or macula.

The following further advance in the process now occurs: the individual vascular tracts or territories of the papillary layer, which correspond to separate districts of erythema, appear more sharply defined as individual districts of swelling, above which also the cells of the Malpighian layer become swollen, without losing their serration, while their nuclei appear less distinct or become divided (Renaut). Elevations of the epidermis thus develop in patches which correspond to the irregular infiltration of the tissue of the corium and the corresponding protrusion of the epidermis, and become visible to the naked eye as inflammatory nodules, solid swellings of the skin, *i. e.*, as such whose fluid contents are still inclosed in the cellular elements which are swollen by its means.

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Free fluid, i. e., a larger accumulation of serum, pus, or blood between the corium and the epidermis or within the latter, does not occur during the nodular stage of the process.

If merely a moderate irritant has acted upon the skin and the quantity of exudation has not exceeded the absorptive capacity of the elements of the epidermis, the process either has reached its height with the diffuse hyperæmic swelling, the macula, or with the formation of the nodule, and the corium then gradually returns to the normal.

2. *Formation of vesicles and pustules.* If the intensity of the exudative process in the corium does not diminish, a process occurs in the hitherto solid-looking nodule which holds good for all vesicular and pustular formations. This is:

a. The swelling and granular opacity of the cells of the Malpighian network in the lower layers and the slight separation of the serrations from those of the other cells (præpustulation according to Renaut).

Then b, the formation of a meshwork within the projection of the epidermis belonging to the nodule.

Starting from the stratum lucidum, a transformation occurs of the swollen cells of the prickle layer of the rete into a very bright, transparent body of the shape of a lentil lying transversely, which is bounded laterally by dense columns of swollen cells; in the middle, however, a fibrous meshwork is formed by fibres and bands crossing one another in all directions, the meshes of which are composed of compressed, flattened elongated epithelium cells which, according to Unna, have undergone a sort of fibrinoid change, and the interspaces of which are filled with a moderate amount of serous transparent fluid and pus-corpuscles.

The cavity thus formed within the nodule, traversed by strands and filled with serum, converts this into another form of efflorescence, the vesicle. When looked at from above, this is a transparent, rounded elevation, the base of which is occasionally surrounded by a red, hyperæmic zone. The wall of the vesicle is more or less tense and occasionally shows, in the middle, a flat, plate-shaped, less transparent depression, an umbilication.

If pricked from above, such a vesicle allows only a few drops of serum to escape, because the partition walls of the meshwork prevent the simultaneous opening of the entire vesicle; if the entire top is cut off, we will notice on its lower surface a whitish-yellow layer, consisting of the ruptured strands of the network and loosened cells of the epidermis in a condition of fibrinoid change.

While the papillæ to the side of the vesicle have not changed their elevation, the papillary bodies below the middle of the vesicle commonly seem to be pressed downwards somewhat so that the epidermic portion of the vesicle rests as if in a flat saucer of the corium.

The process of vesicular formation ends either:
a. With the absorption of the contents of the vesicle without destruction of its wall; or,
b. With the rupture of the walls, and the discharge of the serous contents of the vesicle, often with the formation of crusts. If the vesicular walls have not ruptured until the process within has run its course, a fresh layer of cells of epidermis will have formed already and take its place. During an acute course, however, the walls often rupture before the exudative process has terminated; after the contents of the vesicle have escaped, there then remains a red deep spot which secretes considerable serous fluid, and at which the papillary body, covered merely with the layer of cylindrical cells, is laid bare.

Or, finally c, with the further development of the vesicle into other forms of efflorescence.

If the original irritant has been sufficiently strong to effect a marked extravasa-

tion into the corium and its filling with a larger number of young cells, the character of the process in the epidermis is changed in such a manner that the fluid contained in the meshes of the network is mingled with an increasing number of young cellular elements which cannot be distinguished from the young cells collected in the cutis and among which may be demonstrated, here and there, spheroidal accumulations of cells and nuclei, also bodies provided with processes (wandering cells, Biesiadecki), finally granular detritus and fat granules.

The contents of the efflorescence are now no longer termed serous but pustular, although there is really merely a quantitative difference between them, and the efflorescence itself is termed a pustule.

In its complete development, this forms a round, straw-yellow or grayish elevation of the surface, usually surrounded by a red zone, very little or not at all translucent, and the walls of which ordinarily are tensely drawn. It is often noticed that the umbilication which had been present in the vesicle is lost after the transformation into the pustule; in other cases, the umbilication does not become evident until the contents have become purulent.

Under the microscope, the network of the pustule, compared with that of the vesicle, appears more extensive laterally and inferiorly; furthermore the basal cell layer of the Malpighian layer underneath the network appears to be as densely filled with young cells as the papillary layer of the corium so that the boundary between both is indistinct or entirely obliterated.

3. *Further development and retrogression of the pustule.* In one series of cases, the cellular mass accumulated in the papillary layer is absorbed or is converted into normal connective tissue, without marked development of granular degeneration. The degeneration is then confined to the pustule itself, the fluid contents of which dry up, and together with the fatty, granular degenerated cellular masses, form a brownish crust which is laid bare by the bursting of the horny layer. Beneath this crust, however, and centrally from the lateral healthy cells of the Malpighian layer starting from the stratum lucidum (?) a new layer of cells has formed in the shape of a band between the incrusting pustular mass and the corium, its upper layers of cells being destitute of nuclei and appearing to be flattened; a new young epidermis has formed, above which lies the crust, covered by the original pustular wall, and thus inclosed as in a capsule. Finally, the old pustular covering falls off, the crust springs like a lentil out of its pod and pustulation is completed, leaving behind a newly formed, young, somewhat deeply situated epidermis, beneath which the papillary body returns to the normal. Umbilication belongs to the vesicular as well as the pustular forms; indeed, a central depression of the surface is observed occasionally in the first stages of the exudative process.

This depression is not produced by the traction of hairs or the like, but is the result of a disproportion between the space occupied by the network and the too small quantity of the exudative fluid in it. This umbilication, which v. Basch and I have termed the primary umbilication, often disappears as soon as greater tension occurs; it may also be produced when the covering is tightly stretched, i. e., when no umbilication exists, by puncture and discharge of a small quantity of fluid. But a second variety of umbilication may develop, when the pustule begins to dry, and from the same cause as the primary, viz., the disproportion between the space occupied by the pustule and the contents which are now being absorbed and drying up.

We will now consider those cases in which the nutritive disturbance is more active and long continued, and the upper part of the corium cannot remain master of the morbid changes. In these cases granular and fatty degeneration of the cellular masses and abscess formation occur, not only in the parts of the pustule which belong to the epider-

mis, but also in the papillary layer situated underneath it, indeed often extending into the depth of the corium. The abscess cavity extends from the top of the pustule down into the corium, there forms a suppurating loss of substance, an ulcer, and terminates in the development of cicatricial, band-shaped connective tissue, above which a new-formed, delicate epidermis has formed, starting from the lateral layers of the epidermis. The cicatrix left over after deeply-spreading pustules is thus developed, consisting of the flat, firm tissue of the corium destitute of papillæ, extending under a delicate epidermis.

Superficial inflammation of the skin and catarrh. In very thin parts of the skin, for example, in the points of transition of the skin into mucous membrane, hyperæmia manifests itself by an almost diffuse redness, as in true mucous membranes, and the termination in desquamation passes insensibly, in such places, into that of increased secretion of mucus.

In disturbed development of the epidermis, the nuclei of the Malpighian cells atrophy from excessive enlargement of the nuclear space. In desquamation, then, the former process takes the place of the latter; a number of cell nuclei atrophy instead of forming keratin, thus lose the resistance peculiar to the latter and the diseased epidermis cells are cast off in an incomplete state.

The normal secretion of mucus from the mucous membranes also constitutes nothing more than a desquamation of the peculiarly changed upper layers of the epithelium, which evidently corresponds physiologically, if not chemically, with the cornification and desquamation of the horny layer.

It is certain that in the affection of the mucous membrane we also have to deal with a disturbance of mucin formation, and also with an early desquamation of the cells of the epithelial layer which have not yet reached their highest development.

Every increase of the secretion of the mucous membrane associated with congestion, and which is produced by an inflammatory irritant, is termed a catarrh, and we assume various grades according as the desquamation of the mucin-containing epithelium cells occurs merely with a secretion of serous fluid or a more profuse formation of pus occurs (purulent catarrh). But such a catarrh is not simply an increased secretion of mucus in the epithelium cells or a more extensive transformation of collaginous and chondrogenous intercellular substance of the connective tissue into mucin. Its essential feature consists of the increased exudation of blood serum, mixed with more or less cellular elements, from the hyperæmic vessels into the tissue. The catarrhal secretion does not necessarily contain a larger amount of mucin, but rather a larger amount of serous fluid in which the mucin is dissolved. Under all circumstances the essential feature of catarrh of the mucous membranes is not increased secretion of mucus, but an increased sero-purulent exudation upon the surface.

Herein I find the justification for applying the term catarrhal dermatitis or catarrh of the skin to the analogous process in the external integument.

Upon the mucous membranes, also, efflorescences occur after stronger irritants, and especially upon those places which are covered with tesselated pavement epithelium. Here also we often observe larger and small transparent vesicles, and find erosions or even superficial ulcerations with suppurating surfaces left over upon their site, etc.

Under such circumstances the question cannot be shirked whether no form of superficial inflammation occurs upon the skin which not alone is anatomically and physiologically analogous to superficial inflammations of the mucous membranes, but also closely resembles, in its clinical history, the symptomatology of mucous catarrh. This clinical relationship would find its expression in a clinical history presenting as distinctly the character of a diffuse process, at least in a certain stage, as catarrh of the mucous membranes, and like this would respond in the same manner to external or internal inflammatory irritants as the external periphery of the organism. These conditions are indeed fulfilled by that morbid process of the external integument which we term eczema.

The fact really is, that the process histologically is entirely similar in both instances. On the whole, the histological examination of eczematous integument teaches nothing else than that of catarrh of mucous membranes; as a matter of course, however, varying according to the differences in the structure of the individual tissue layers of both organs.

In like manner the anatomical examination of eczema corresponds entirely to those appearances which we have described in the examinations of similar forms of efflorescence in inflammations of the skin in general. It is therefore entirely unnecessary to give detailed descriptions and appearances of the eczema process in this or that stage, and from this or that portion of the skin, which are so constantly repeated in the text-books.

However, I must call attention here to the most recent histologica l examination which Gaucher[1] made in a case of general eczema of long standing, and among which the following results are emphasized by the author:

1. Congestion of the papillary vessels, and infiltration of the corium with embryonal cells.

2. Transformation of the cells of the Malphighian layer into vesicles with complete disappearance of the nuclei (called by German histologists "dropsical swelling of the cells"), and complete destruction of central groups of cells in some interpapillary rete cones.

3. A partial separation of the epidermis which cannot be attributed to the method of preparation, and is not observed in normal integument.

4. Ulcerations upon the tongue (which have been left over evidently by the efflorescence).

The first point is entirely in harmony with the general appearances of inflammation in irritated skin.

The third point corresponds to the clinical appearances of the observed case, viz., a quite uniform œdematous swelling of the epidermis which had lasted some time. This also holds true of the fourth point.

With regard to the second point, however, perhaps investigation may render certain whether the above-mentioned appearances are not identical with those described by Renaut as præpustulation. The destruction of central groups of cells in some interpapillary rete cones, described by Gaucher in connection herewith, was described long ago by v. Basch and myself, in our work on the anatomy of the variolous process (1863).

Perhaps the fact of the matter is, that the vesicular transformation of the cells and their destruction in true pustular formation are observed less readily because they are concealed by the progressive change of the epidermis cells in the interior of the efflorescence into a network ; but that it is distinctly recognizable in the skin *between* the pustules or upon the entire surface of the skin, if instead of circumscribed spots of suppuration only a *diffuse* inflammatory swelling and exudation develop, as occurs occasionally in superficial inflammatory processes upon the skin.

Something may yet be said at this time concerning the peculiarities presented by some forms of efflorescence—in the first place wheals. These present anatomically no other appearances beyond the well-known ones of inflammation in the first stages, viz., hyperæmia and inflammatory œdema. But we must emphasize the fact that œdema plays an essentially prominent part in urticaria, and that it evidently arises from spasm in some vascular districts and paralysis in others, i. e., as an angioneurotic œdema. By this means alone is the external appearance of wheals and the occurrence of alternate pale and red parts around and under the œdematous swellings (the wheals) essentially influenced. The disappearance of the wheals without residua shows that only slighter grades of inflammatory congestion occur.

Finally we must refer to the histological appearances in certain forms of nodules and pustules which develop from follicles or preferably from the tissues surrounding them (acne and sycosis).

In acne and sycosis, perifolliculitis is always present (dilatation of the vessels and cellular infiltration of the corium in the vicinity of the sebaceous glands or the hair follicles, and swelling of the epidermis cells above them, with elongation of the prickles

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[1] Ann. de Derm , 1881.

and appearance of wandering cells in the rete (Barthélemy[1]). In addition, inflammation and abscess formation in the interior of the glands have been described, and by all observers, atrophy of the sheath of the hair with separation of the latter; Barthélemy also describes onion-like bodies in the epidermis (section of atrophic excretory ducts of hair-follicles).

The differences of opinion depend upon the fact that some (Kœbner) regard as the primary event in sycosis, the process in the interior (folliculitis barbæ), others (Robinson[2]) regard the perifolliculitis as primary, the atrophy within the hair-follicles as secondary; while Kaposi looks upon the interior of the hair-follicles as the starting-point in acne as well as in sycosis.

My examinations lead me to believe that the morbid irritant may come into play in two ways in both processes: first, primarily in the vascular district around the glandular bodies, so that a perifolliculitis develops in this instance at the start and runs its course as such with the formation of nodules or even abscesses.

Or secondarily, in the interior of the glandular bodies or hair-follicles, inasmuch as a morbid process of growth or secretion of a mechanical or other kind (parasitical) forms the primary process in the enchyma cells of the sebaceous glands, or in the root sheaths of the hair. In acne, occlusion (comedo formation) of the excretory ducts then occurs with formation of abscess in the interior of the glands, and finally perifolliculitis.

In sycosis the disease of the root sheaths, which has developed in this manner, may be followed by death of the hair shaft, and by a spread of the process outwards into the connective-tissue portion of the hair-follicle and perifolliculitis. In this case, accordingly, the perifolliculitis is a secondary process. It will not be proper to separate these latter forms (retention forms, Virchow) from the purely inflammatory ones, because transitions always occur.

b. THE MORE DEEPLY SPREADING INFLAMMATIONS OF THE SKIN.

We have to deal here, not with the action of irritants of a different nature from those which produce erythema, etc., but merely with a point d'appui which is situated more deeply or extends more deeply into the distribution of the larger vascular trunks of the corium.

In order to render the difference clear, we will consider, for example, the effect exerted on the one hand by abnormal temperature; on the other, by animal parasites, according as they act with greater or less intensity, and according as they are applied to the healthy skin or to that in which nutrition and circulation have been morbidly changed. We will find that moderate elevation of temperature produces an erythema which occasionally progresses to the formation of nodules or vesicles, or superficial excoriation of the skin, but terminates then by the formation of a new horny layer over the intact corium. This process corresponds, evidently, to superficial dermatitis. But if the intensity of the heat assumes greater proportions or is allowed to act for a longer time, symptoms of destruction of the horny layer occur, or incomplete stasis of the circulation in the corium, or, finally, if the action is so violent that congestive phenomena are not produced at all, necrosis of the tissues occurs at once, with destruction of the papillary body, even of the entire corium as deep as the subcutaneous connective tissue, i. e., effects such as are observed in the well-known three stages of burns. This also hold good with regard to the action of parasitic animals upon the skin.

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[1] Ann. de Derm., 1881.
[2] New York Med. Journ., 1877.

The erosions which are produced by lice (entomoses) or by the itch parasite may be termed superficial inflammations of the skin, although we are well aware that the lesion of continuity alone does not suffice to produce an inflammatory condition of the skin; otherwise every prick of a needle would produce the same effect as the bite of a flea. It may be stated in passing that we have to deal, accordingly, even in the stigmatoses (as I call those superficial inflammations of the skin which begin with an erosion) with the introduction beneath the horny layer of the epidermis of an irritating substance arising in the animal organism. An analogous effect develops in the cutaneous and subcutaneous connective tissue in those cases in which an irritant which acts at one point, and is at the same time vigorous, reaches the depth of the skin from the outside, for example from the prick of pulex, œstrus, filaria medinensis, or in which the direct point d'appui of such an irritant, which is present in the body, is furnished in the manner indicated and at the proper depth.

We will find that in burns, the inflammatory phenomena fall into the background so much the more in comparison with the necrobiotic processes the deeper the burn has acted. But so long as mortification of the cutis is not present, the inflammatory symptoms are observed as in eczema, while the epidermis, as a rule, constitutes a mortified shrunken layer, which is separated from the papillæ or, like the papillary bodies, is filled with closely approximated cells and nuclei, and no longer presents a distinct lower boundary. Occasionally the lumen of some of the larger vessels are surrounded by young cells and filled with blackish, coherent contents, while other adjacent vessels still present a distinct lumen. In burns of the third grade, nothing can be seen either of exudation cells or of serous distention of the tissues, but the entire corium and the subcutaneous tissue are traversed by blackish, firm bands, between which are visible the firm meshes of the former connective-tissue network, containing crumbling masses of destroyed fat-tissue and other detritus.

The anatomical conditions in circumscribed phlegmons, viz., furuncles, carbuncles, Aleppo and Biskra boils, and splenic fever boils, may be gathered in brief from the following appearances in furuncles:

Upon a vertical section through a crusted furuncle as large as a pea, the epidermis was found converted into an opaque, readily detached mass, beneath which was an apparently structureless mass, composed of granular detritus, the remains of elastic fibres, and fat-granules, which occupied the position of the former papillary body; beneath this, with a flat surface superiorly, was a tissue infiltrated with exudation corpuscles, the meshes being formed of bands of connective tissue and elastic fibres. The sebaceous glands and coils of the sweat-glands were intact deeper down, but, like the adipose cells, partially covered with cellular infiltration.

THE INFLAMMATORY NUTRITIVE DISTURBANCE OF THE SKIN IN ITS RELATION TO VENOUS-LYMPHATIC STASIS. CHRONIC INFLAMMATION OF THE SKIN. TERMINATIONS OF INFLAMMATION OF THE SKIN.

We must now point to the fact that during the further course of superficial as well as of deep-seated inflammations of the skin, certain changes may develop in the tissues themselves, which change essentially the conditions of the return flow of blood, of lymphatic absorption, and of the lymph current in the diseased skin. These changes may arise from general conditions inherent in nutrition or may be produced solely by the inflammatory process in the skin.

The latter condition may be brought about by a functional or anatomical disturbance of circulation which may occur in cardiac disease, as well as when nutrition is enfeebled from any other cause, in cachexiæ from dyscrasia, in short in all those processes which depend upon diminished energy of the blood-pumping machine itself or upon a functional disturbance in the conducting pipes. Under certain circumstances, however, the same causes may exercise the same effects merely upon certain systems of the body or upon