Robinson (A.R.)

POMPHOLYX

[CHEIRO-POMPHOLYX (HUTCHINSON): DYSIDROSIS (TILBURY FOX).]

A STUDY ON THIS DISEASE WITH SPECIAL REFERENCE TO ITS NATURE AND PATHOLOGICAL HISTOLOGY.

BY

A. R. ROBINSON, M.B., L.R.C.P.& S., EDIN.

SPECIAL PATHOLOGIST TO THE NEW YORK CITY ASYLUM FOR THE INSANE; ATTENDING PHYSICIAN TO THE BELLEVUE BUREAU OF OUT-DOOR POOR, CHILDREN'S DEPARTMENT; MEMBER OF THE NEW YORK COUNTY MEDICAL SOCIETY; OF THE NEW YORK DERMATOLOGICAL SOCIETY AND OF THE AMERICAN DERMATOLOGICAL ASSOCIATION; PRIZE ESSAYIST OF THE BELLEVUE MEDICAL COLLEGE ALUMNI ASSOCIATION, 1877, ETC.

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Special Pathologist to the New York City Asylum for the Insane.

HISTORY: In the American Journal of Syphilography and Dermatology, January, 1873, Dr. Tilbury Fox, of London, published the first article on this disease. He named the affection dysidrosis, and stated that "it is characterized by the retention in the follicles of the skin of sweat rapidly and freely secreted. The disease bears the same relation to the sweat follicles that acne does to the sebaceous glands. The retention of the sweat and distension of the follicles are followed secondarily by congestion of the sweat follicles, by the formation of bullæ, maceration of the epidermis and perhaps more or less dermatitis. The sweat glands are frequently seen dilated here and there over the affected surface, and never seem to recover their proper character. The origin of the disease is a distension of the sweat duct, not only of its superficial, but also of its deeper part, and this is followed by the continued distension of the duct, and the aggregation and coalescence of the vesicles. It depends on a paresis of the nerve supply of the sweat apparatus, whereby its functions become deranged."

Mr. Hutchinson, of London, a surgeon of unusual attainments and of high and well-earned reputation as an original and trustworthy clinical observer and pathologist, published, in 1876, in his "Illustrations of Clinical Surgery," a drawing of this disease to which he gave the name cheiro-pompholyx. He made no mention of Dr. Fox's article, and said he did not think any correct clinical description of the disease had been previously given. He consid-

ered the contents of the vesicles or bullæ to be serum, and the disease itself a neurosis. His description of the disease will be given further on in this article. Upon the publication of this article, Dr. Fox (Lancet, April 15, 1876, page 553) attacked Mr. Hutchinson for not referring to his article on dysidrosis and for not having recognized his assumed claims as the first to have described the disease. He drew attention to the similarity in their descriptions of the disease, and in the use of certain terms such as sago-grain appearance, a coincidence which he imagined to be due to Mr. Hutchinson's familiarity with his (Dr. Fox's) paper. He considered Mr. Hutchinson had failed entirely in comprehending the nature of the disease, " which is an affection of the sweat glands and consequently the contents of the vesicles or bullæ are sweat and not serum as maintained by Mr. Hutchinson." It was shown, however (Lancet, April 22, 1876, page 618, and April 29, 1876, page 639), that Mr. Hutchinson was quite familiar with the disease years before Dr. Fox had recognized its special character, and that in fact the patient from whom Dr. Fox obtained his first impressions of the disease had been fifteen years under Mr. Hutchinson's observation before Dr. Fox saw her. This was the same patient of whose hands a drawing was given in the " Illustrations of Clinical Surgery." This drawing had been used by Mr. Hutchinson for years previous to the appearance of Dr. Fox's article, to illustrate his lectures upon this disease given by him at the London Hospital and at Blackfriars. There is therefore no ground whatever for Dr. Fox's claim to priority in the matter, neither was Mr. Hutchinson, to use his own words, indebted to Dr. Fox "for even a sago-grain." As to whether it is a disease of the sweat glands or not will be shown conclusively when I treat of the nature of the disease later on, and give the result of my own studies on the subject.

Whilst, therefore, the credit of having first recognized and lectured upon the disease belongs to Mr. Hutchinson, it is nevertheless to be regretted that he did not sooner publish his views and thus not only have done justice to himself but also have aided science.

Through the kindness of Dr. Fox, who showed me several examples of the affection at his clinic in University College Hospital, and drew my attention to its characteristic diagnostic characters, I was acquainted with the disease whilst studying in London, and in this city I have seen a considerable number of mild cases of the affection. I have had also a most excellent example of the disease in a patient who has been for some time under my observation and care, and from whom the material was obtained which now enables me to discuss the disease and to decide as to its true nature.

Symptoms: I will give Mr. Hutchinson's and Dr. Fox's description of the clinical characters of the disease in preference to one by myself, partly because they are more familiar with its symptoms than I am, and consequently their descriptions are of more value; and partly because I wish to show by them that the case whose

history and symptoms I will afterwards relate, and from whom portions of skin were removed for microscopical study, was a most excellent example of this disease.

Mr. Hutchinson's description of the affection is briefly as follows: The more severe forms which I have seen have always been in women, and usually in association with a highly nervous temperament. The disease appears to be characterized by rapid and symmetrical development, by tendency to spontaneous cure, and by the liability to recur over and over again in the same individual. The hands are the parts first affected; the feet come next; and in a few instances a rash appears over the rest of the body. In the majority of cases the hands alone suffer, and in all they are the parts most severely affected. A tendency to spontaneous absorption of the fluid contained in the vesicles or bullæ, even when the latter are very large, is a very remarkable feature. It is not connected with any local cause nor is it influenced by local treatment. The eruption begins with intense burning and itching on some part of the hand, usually between the fingers. After a short time—a few hours or a day or two—there are seen, deeply placed in the skin, small accumulations of clear serum, looking like sago-grains. These are perfectly transparent and not unfrequently resemble the vesicles of scabies sufficiently to excite suspicion. They differ, however, from those of scabies in being much more deeply placed, having flatter tops, in being usually closer grouped together instead of scattered, and in the entire absence of burrows. In some it occurs during hot weather, but in most instance no cause can be given for its occurrence. Those who have had it once will very probably have it again, and several of the facts in its clinical history coincide pretty nearly with what is true of herpes of the lips and of the prepuce. I do not recollect even to have seen a well-marked example of it in a patient under the age of puberty, nor in a very old patient. The tendency to speedy and spontaneous disappearance, leaving the skin quite sound, supplies a feature of positive difference from eczema, of which the indefinite duration and the tendency to persist and become aggravated are such marked characters. Symmetry, spontaneous cure and liability to relapse are its clinical characteristics. In minor degrees the affection is tolerably common. Many, indeed perhaps most of us, are liable at times in connection with slight derangements of health, or possibly with exposure to the sun, to the occurrence of a very irritable sago-grain eruption on the sides of the fingers. The so-called sago-grains are deeply placed effusions of serum, but in a large majority of cases they undergo spontaneous absorption after a few days, and not even peeling of the epidermis results. They never by any chance result in eczema. In those liable to this slight affection the disease is prone to recur repeatedly at intervals perhaps of a few years. More severe cases, in which the vesicles coalesce and develop into bullæ, are not very uncommon, their subjects being, so far as my experience has gone, almost invariably young women. In several of the most severe cases which I have witnessed the eruption was attended by ex-

treme depression of spirits. Although the eruption always shows a tendency to spontaneous disappearance, yet, in some instances, it may last a couple of months and require treatment. In one case under my care the liability to attacks had extended over thirty years. In this case the vesicles always broke, and a state much resembling that known as psoriasis palmaris resulted in the palms, whilst on the sides of the fingers it looked more like eczema.

Dr. Fox's description of the disease coincides very closely with that of Mr. Hutchinson's, an occurrence not to be wondered at since the same patient furnished both of them the best example of the affection perhaps that they have ever seen. Independently of this patient, however, Dr. Fox has very carefully studied the clinical characters of the disease in a great number of patients, some of whom he kindly showed me and explained to me his views of the disease. Dr. Fox says "the disease, in its slightest form, is confined to the hands, occurring in the interdigits, over the palm and along the sides of the fingers, and on the palmar surfaces. It makes its appearance in those who habitually perspire freely, and the patients feel weak and depressed. The eruption consists of minute vesicles deeply imbedded in the skin, and are at first isolated. They do not readily burst, and when a few days old look like sago-grains imbedded in the skin. The vesicles afterwards become more distended and raised. They are not pointed, but oval, eventually become faintly yellow in color, and run together and form bullæ. The hand is then stiff and painful. If the eruption is left undisturbed, the fluid is partly absorbed, partly evaporated, the cuticle then peels off, leaving a non-discharging, reddened, exposed derma. In some of the milder cases only vesicles are formed. When disappearing altogether from the hand the palm is left harsh and slightly scaling. In some cases a red, dry, slightly scurfy, painful surface is left behind and becomes chronic. No patient is well who has this disease. In severe cases there is great nervous debility."

From this curtailed description of Dr. Fox's, it is readily seen that both Dr. Fox and Mr. Hutchinson are describing the same disease, though their views as to its nature are so widely different, as has been already stated in giving the history of the affection.

And now to the history of my patient.

L. S., born 1846, is of medium height, light complexion and weak muscular development. In 1849, one of his thighs was fractured twice, after which time his mother says he was sickly and nervous for a number of years. In 1866 was married, and six children have been born to him since that time, three of whom are dead and three living. Two children (boy aged 5 months and girl aged 2 years) died of spinal meningitis, and one (a female child) died of pemphigus. The pemphigus commenced on the ninth day after birth, as a small blister the size of a pea, on the right side of the abdomen, below the umbilicus. Within twenty-four hours the bullæ had reached the diameter of one inch. A few days later, another appeared on the left side of the neck, which rapidly increased in size and attained a length of three or four inches. At the same

time smaller bullæ appeared on both temples near the eyes, in the armpits, and over the rest of the body. On the 12th day (3d of the sickness) the pulse was 140 and temperature 103° F. On 14th day pulse 100 and temperature 102¼. It lived fifteen days during which time its bowels were regular and it nursed well until the 15th day. The bullæ left a raw, sore surface behind. Luke-warm water was used for bathing it. This was the fifth child of the family. The sixth child has had eczema capitis. In February, 1871, he received an appointment in the New York fire department, since which time he has always been connected with this service. Previous to his marriage a few vesicles would appear occasionally on his hands, but the first severe attack was in July, 1871. This attack lasted about two months, appearing both on the hands and feet, but commencing on the hands. The feet were not attacked until about one month after the hands. The eruption occupied the entire palms of the hands, the palmar aspects and sides of the fingers, and a portion of the plantar surfaces of the ungual phalanges. On the feet it appeared only on the soles, from which it removed the entire corneous layer of the epidermis. According to the patient's statement, the eruption during this attack consisted of vesicles, at first deeply placed and isolated, but afterwards frequently uniting and forming bullæ. The vesicles almost always dried up, their contents being absorbed without a rupture of the walls taking place. Even the large bullæ generally dried up without rupturing. If large areas of the skin were bereft of all that part of the epidermis above the vesicles or bullæ, *i. e.*, the corneous layer of the skin, all that was observed beneath was a reddish, smooth surface. Various applications were made to the hands in the treatment of the disease (it having been regarded as an eczema), but no benefit was derived from their use. He then ceased treatment and the disease disappeared spontaneously, having lasted about two months. In 1872 he was bitten in the right hand by a dog, and the dread of hydrophobia made him very nervous and depressed in spirits. In February, 1877, the second severe attack occurred, though isolated vesicles appeared every now and then during this interval of nearly six years. During this last attack, which still continues (June 14th), he has been under my care. The eruption had lasted about three weeks when I first saw him. It had commenced on the palms of the hands near the wrist, and spread over the entire palms and between the sides and on the palmar surfaces of the fingers. When I saw him the majority were seated between the fingers. The eruption has changed but little in its mode of appearing and in its course since I first saw him. An outbreak is always preceded by a tingling, burning sensation in the parts, and the patient is more than usually depressed and nervous. The eruption appears as small clear vesicles, deeply placed in the skin. They may be single or collected in groups of two, four or more. Very frequently the vesicles forming a group are all of the same age and size. The eruption always was symmetrical, and I have very often observed that exactly corresponding parts of the hands or feet became affected at the same time. If but a single vesicle existed it almost invariably dried up. Where there was an

aggregation of vesicles they were at first isolated, but afterwards frequently united and formed a bullæ. If then the liquid was absorbed, the skin covering them became very hard and dry. I stated that the vesicles appeared to contain a perfectly clear liquid, but this afterwards generally became more or less opaque, though scarcely ever yellowish in color. This latter occurred only when large bullæ were formed and the liquid slowly absorbed, *i. e.*, in other words, it was observed only when the bullæ were of several days' standing, and, as will be seen afterwards, was owing to the number of pus cells present in the liquid. The vesicles were never seen to have a red base. The walls of the vesicles appeared of a darker color (from compressed cells) than the surrounding skin or the contained liquid. This really made the vesicles look like sago-grains imbedded in the skin. The vesicles gradually become larger, and raised. Isolated vesicles in the palms of the hands seldom became raised above the level of the skin previous to absorption. Where they appeared in groups they always became raised above the general surface, as also most of the isolated vesicles between the fingers. They were never pointed, but always had a more or less flattened top. After the absorption of the contents or rupture of the vesicles or bullæ, a reddened surface (on account of the thinness of the epidermis) was left behind. At no time was there a cracked or discharging surface or any appearance resembling that of eczema in this region. Occasionally the eruptions spread peripherically, especially in the palms of the hands. There has been no change in the appearance of the vesicles since I first saw him, but at present the disease is not so severe, the eruption consisting principally of isolated vesicles and but very few bullæ. Occasionally, however, an "outbreak" occurs lasting two or three days. Then the eruption presents more of the character it had in an earlier period of the disease. The feet are also affected, but only in a slight degree, a group of vesicles appearing occasionally here and there. Their appearance is always preceded by a tingling in the part. They appear symmetrically, and often on exactly corresponding parts. There has never been any accompanying eruption on the other parts of the body. I have tried various local applications and naturally without any benefit except keeping the parts soft. Internally he has taken iron, strychnine and pure phosphorus, and evidently with some benefit. To-day I have prescribed Fowler's solution of arsenic in five drop doses, three times a day.*

The patient is exceedingly nervous and depressed in spirits. He was so nervous that he hesitated several weeks before allowing me to remove a second portion of skin from his finger. Even then I was obliged to benumb the part with ether spray before using the knife. He says his forearms and hands feel benumbed and "sleepy," especially in the morning, if he keeps them elevated above the bedclothes. He sweats a great deal, yet the hottest day in summer is not too hot for him.

Before proceeding to give a description of the mode of forma-

* July 12th. After taking the arsenic one week the eruption disappeared entirely, but reappeared seven days after ceasing its use.

tion and structure of the vesicles and bullæ in this disease, I will give a short account of the clinical characters and structure of the eruption in the different skin diseases in which vesicles or bullæ occur; in order the better to be able to decide the question as to whether pompholyx is a separate and distinct disease, or only one of the other previously known vesicular or bullous diseases appearing in a locality whose anatomical characters and situation influence its development and course in such a manner that it receives additional or special characters.

Vesicles or bullæ occur in sudamina, miliaria, pemphigus, herpes, hydroa, burns, eczema and erysipelas.

In sudamina, the liquid composing the vesicle is enclosed between the layers of the stratum corneum; both the base and summit of the vesicles being formed of the cells of this layer. The liquid is acid or neutral, and is nothing but retained sweat, the disease itself being merely the retention of sweat in the corneous layer, either from rupture of the walls of the sweat duct, or from some obstruction to its free passage to the surface of the skin. The vesicle always consists of a single chamber. The disease generally appears on the neck, about the shoulders and on the trunk as clear watery elevations, which quickly dry up and are followed by slight desquamation. The disease is not symmetrical in its appearance, is not preceded by nervous symptoms or pain in the affected part, in fact bears no resemblance clinically with pompholyx.

Miliaria is supposed to be only inflamed sudamina, and in this case the contents of the vesicles are alkaline and not acid. The structure of the vesicles remain, however, the same as in sudamina. I have my doubts as to the correctness of this explanation of miliaria, and hope before the present summer passes away to further investigate this subject.

In pemphigus the eruption consists of blebs seated upon an inflamed base, which is quickly covered over by the enlarging bullæ. The latter are generally isolated, of a round or oval form, elevated above the general surface and reach their maximum of size in a few hours. The liquid is at first alkaline and transparent; but afterwards become turbid and acid. It is serous in nature, being derived direct from the blood. The fluid within the bullæ is sometimes absorbed; in which case the latter shrivel up without bursting. At other times the blebs burst, and a slight ulceration takes place where the eruption was seated. Sometimes rupture of a blood-vessel occurs and the contents of a bleb becomes sanguinolent. The eruption generally occurs in successive crops, and is accompanied with slight smarting and soreness in the part attacked. The disease rarely attacks the head, palms of the hands or soles of the feet in adults, although, according to my experience, pemphigus appearing in children within the first few days of extro-uterine life generally shows itself on the two latter localities. In the bullous syphilide the contents are more pustular than serous, and dry to a thick scab. According to Haight (Sitzungsberichte der K. K. Academie in Wien, 1868, Bd. lvii.),

the summit of the bullæ in pemphigus is formed from the corneous layer whose cells do not color in carmine, and its base is formed from the mucous layer over which a double layer of flat cells lies. "The cells of the under mucous layer are somewhat elongated, those of the upper layer flattened, with their long axis parallel to the corium surface. The papillæ are somewhat swollen and higher, penetrated by fine spaces, and their blood-vessels insignificantly enlarged. From this drawing out of the cells of the malphigian layer the bulla is at first fan-shaped, but afterwards it is simple, the effused liquid filling the entire bullous space."*

Herpes is characterized by the appearance of vesicles or bullæ seated always upon an inflamed base. They are collected into groups of two or more vesicles or bullæ which are distinct from each other. The vesicles of a single group are generally of the same age, and they do not as a rule burst; but dry up and the contents disappear by absorption. The liquid is at first clear and alkaline, or neutral; but afterwards becomes opaque and acid. The eruption is preceded and accompanied by burning pain, heat and tension in the affected part. The disease is generally unilateral. The local forms of herpes resemble each other very closely, differing only in the mode of arrangement and number and size of the vesicles in the groups. In the vesicular syphilide the vesicles are seated on a dark base, are met with most frequently on the body and limbs, and probably never on the feet and hands alone (Fournier). In herpes zoster a perpendicular section through a bulla shows, according to Dr. Haight (l. c.), the corneous layer raised, the corium surface exposed, and between them a flattened compartment containing the effused liquid. "The corneous layer consists of several layers of flattened cells without nuclei, and has on its inner surface one or more similarly flattened cells of the upper malphigian layer containing nuclei. The cavity is divided into several large spaces by thick bands, which spaces are again subdivided by a fine network. The thicker bands lie stretched perpendicularly between the corneous layer and the interpapillary part of the corium. They consist of several rows of closely-packed spindle-formed cells, having a nucleus which colors deeply in carmine. In every space bounded by these bands a papilla projects, and the number of spaces in a bulla depends upon the size of the latter and the number of papillæ. The spaces are covered by a network which passes in every direction, and is formed partly from spindle-shaped nucleated cells, and partly from nucleated cells provided with several branches, and also from fine fibres. Epithelial cells are attached to the surface of the corium and between them small round cells similar to those lying in the corium. In the loose corium tissue a few round, granulated cells about the size of white blood corpuscles are found. The nerve fibres in the corium are swollen, the mark substance softened and the axis cylinder lies eccentrically." I cannot accept without fur-

* In the description of the formation of the vesicles or bullæ in pemphigus, herpes, erysipelas and burns, I quote the statements of other observers, as I have not studied the subject myself.

Fig. I.

FIG. I. represents a very early stage of the vesicle formation. The vesicle *a* had its origin from the bloodvessels of the papilla seen directly beneath it. The contents of such a young vesicle are clear serum, and no round cells are to be seen either within the papilla or between it and the vesicle. The cells between it and the vesicle are paler in color and somewhat changed in form.

Fig. II.

FIG. II. exhibits a later stage than Fig. I. The cells in the vicinity of the liquid become more pressed and flattened as the vesicle increases in size. The corneous layer is slightly macerated, and the cells detached in two places, in this figure. The liquid in this vesicle came from the papilla situated below and slightly to the left of the vesicle. The wood-cut does not show that so clearly as appears in the section or in my drawing on paper.

ther proof than that derived from the section of a single nerve trunk, that the above-mentioned condition of the nerves is always present in herpes, or that it has anything to do with the production of the eruption. I am rather inclined to regard the condition found by Dr. Haight in his section as a secondary and occasional condition, produced by the excessive amount of liquid in the part and not as a cause of the herpetic eruption. The number of the thicker bands also cannot depend upon the size of the bulla but only upon the number of papillæ affected.

In erysipelas bullæ occasionally occur, but the clinical character of the disease is so well understood and so entirely different from that of pompholyx that it is unnecessary to enter into the description of the formation of the bullæ in this disease, further than to state, that they closely resemble those of herpes, with the addition, that there is extensive infiltration of the corium with serum and round cells.

In eczema vesiculosum the vesicles appear upon a swollen and reddened base, the vesicles burst and the secretion dries to crusts, upon the removal of which, a moist, red secreting surface is seen. The disease can attack any part of the cutaneous surface, is of uncertain duration, and when seated on the palms of the hands produces a rough, painful, cracked surface, which shows but slight tendency to heal without proper treatment.

According to Biesiadecki (Sitzungsbericht der K. K. Acad. Wien, 1867), in vesicular eczema the papillæ are broadened and lengthened by infiltration with cells and liquid. The connective tissue corpuscles of the papillæ are large and soft and increased in number Numerous spindle-shaped cells stretch from the papillæ into the mucous layer, press the cells of the latter from each other, and reach even as far as the corneous layer. They often build in the mucous layer a thick network, within which lie the epithelial cells. If the process stops at this stage only a papule is formed ; but if it passes on to the formation of vesicles, then there is a greater increase of cells in the papillæ, the superficial cells of the mucous layer become swollen and burst, and the epidermis is elevated. According to the quantity of liquid passing from the papillæ to the corneous layer will be the size of the vesicle.

In vesicles from burns of the first grade the papillæ are wider and longer, and the papillary blood-vessels three times their normal size. Over the changed papillæ the epidermis is raised, and on the inner surface of the latter a single layer of contracted epithelial cells lies, whilst between this layer and the corium thin fibres are spread out. If the exudation is excessive these fine fibres become torn and are found clinging to the under surface of the epidermis and upper surface of the corium. Between these fibres the stretched out cells of the mucous layer appear, and a few round cells are present within the vesicle.

As the term hydroa has not as yet been employed to represent any special vesicular or bullous disease, but rather anomalous forms of pemphigus or herpes, and as the anatomical structure of

the vesicles has not been studied by any miscroscopist, it is unnecessary to here reproduce the description of the disease as given by those authors who have made use of the term, further than to state, that as regards location and clinical characters there is no resemblance whatever between this disease and pompholyx, except the presence of vesicles in both affections.

In studying the nature of the liquid in the vesicles and bullæ of pompholyx the contents of the small vesicles were examined microscopically after mixing them with serum obtained from a frog's eye, whilst that contained in the bullæ was examined without the addition of any indifferent fluid. The contents of the small vesicles and of all vesicles of only a few hours' existence were examined in serum, as without this procedure the liquid dried up before it could be properly examined. In the very earliest stage, i. e., during the first few hours of the existence of a vesicle, the contents contained no formed elements ; but in a later stage small, round bodies of the size of lymph corpuscles were to be found, and the number present was as a rule proportionate to the age of the vesicle or bulla. It is owing to the presence of these bodies in the liquid that it frequently assumes a yellowish color in the later stage of the vesicles or bullæ. In the earlier stage these bodies show amœboid movements similar to those observed in white blood corpuscles. They color in carmine and hæmatoxylin. They are, in fact, nothing else than out-wandered white blood corpuscles. Their presence pointed to the probability of the liquid in which they exist having had its origin in the blood, i. e., that it was effused serum.

Examined chemically the contents were always slightly alkaline or neutral, and never acid ; and although sweat is generally acid, yet in this case that fact would not have been sufficient to have proven that the liquid was not sweat, and consequently that the disease was not an affection of the sweat glands, since the sweat also was neutral. The sweat in the immediate neighborhood of a group of vesicles, as well as on other parts of the hand, was found to be neutral every time I examined it. In the later stages the liquid frequently becomes acid. Testing, however, with nitric acid to decide as to the serous or sweat nature of the contents, gave decisive results. An albuminous coagulum was immediately produced, with the nitric acid in the usual proportion obtained from serum, whilst testing the sweat in the same manner, not a trace of a precipitate was observed. Thus the disputed point between Mr. Hutchinson and Dr. Fox was clearly decided by this simple test, and it is surprising that neither of the gentlemen engaged in the controversy thought of this means of deciding the question, or of defending their position, and more especially Dr. Fox, as he was the attacking party. Before coining a new name for a disease, and especially before making use of a term so suggestive as dysidrosis, one certainly should enter into a thorough study of its real nature, and thus avoid the error which so often follows supposition or mere guess work. Everything in pompholyx points against its being an affection of the sweat glands ;

Fig. III.

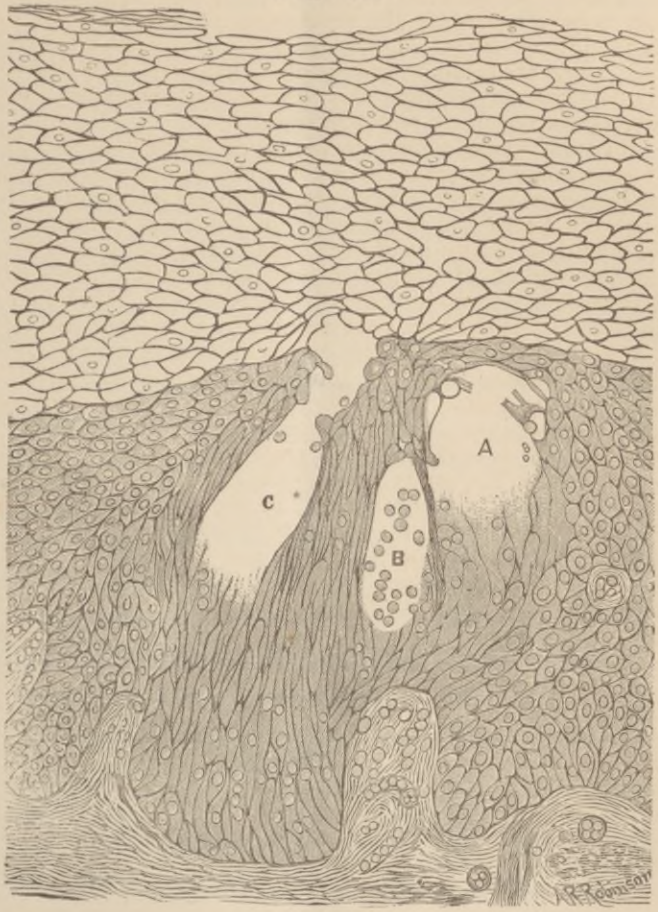


Fig. III. shows the simultaneous formation of three vesicles from three adjoining papillæ. The bands separating the vesicles correspond to the inter-papillary spaces. Between *A* and *B* the separating band has become very narrow, whilst that between *B* and *C* is still broad. The stretching and flattening out of the cells of the Malpighian layer is well shown in this drawing. In *B* pus cells have appeared, and some are present in the papillæ and in that part of the Malpighian layer lying between the corium and the vesicles. On the right is to be seen the apex of a papilla cut across. This drawing does not show the origin of the different vesicles from separate papillæ, but a drawing of this section was made because it shows the manner of the separation of the vesicles in the beginning of the process and of their union afterwards.

therefore there was all the more necessity for previously examining chemically the nature of the contained liquid, before claiming to be the discoverer of a hitherto unrecognized disease of the sweat glands.

Thus the ordinary test for albumen would have decided the question had it been employed, and in my hands did decide, that as far as the contents of the vesicles and bullæ were concerned, *the sweat glands had no part whatever in their production.* Hence the term dysidrosis, for this disease at least, cannot be any longer employed and consequently must be stricken from the nomenclature of skin diseases or used synonymously with sudamina.

In laying so much stress upon this test with nitric acid I do so with a full knowledge of the experiments of Leube (Centr. f. d. Med. Wissen. 1869), by which he proved the occasional excretion of albumen by the sweat glands. The quantity found was always very small, and required special manipulation to show its presence. These experiments, therefore, have no weight in the present question.

Histology. In order to study the origin, structure, mode of formation, course, etc., of the vesicles, portions of skin containing in all thirteen separate vesicles in different stages of development, were taken from two different parts of the fingers. There was an interval of about four weeks between the time of the first and second cutting. The excised pieces of skin were washed with water to remove any adherent blood, and placed, first in Müller's liquid for two weeks, and afterwards in alcohol, until they became sufficiently hardened for making thin sections. The sections were first examined in glycerine without previous staining, and a second time examined in the same liquid, after coloring them with carmine. From the large number of vesicles examined I was enabled to trace the whole process from its commencement as a small effusion of serum, to its termination by absorption of the liquid ; or escape of the contents by rupture of the cells covering the vesicle.

The liquid comes from the blood-vessels of the papillæ, and if the vesicle is very small the entire liquid comes from a single papilla. It passes through and between the cells of the lower malphigian layer and collects in different situations in different vesicles. There is no definite restricted location for the first collection of the liquid, though the rule is for it to collect in the upper malphigian layer at a distance of two or three layers of cells from the lower surface of the corneous layer. Sometimes, however, it collects immediately beneath the corneous layer, between this layer and the upper surface of the cells bordering on the stratum corneum, i. e., between the malphigian and corneous layers of the epidermis. If but a single papilla is affected, that is, if the liquid comes from the blood-vessels of a single papilla, the vesicle has but a single chamber (see figure 1). The liquid at the place of collection presses the cells apart in every direction. On this account the cells become changed in form. They are gradually flattened and drawn out, more especially those cells which line the sides of the vesicle. The more the vesicle increases in size the more the cells are flattened out, until they at last appear as fibres in which no nucleus is

visible. The cells forming the summit of the vesicle are not so much flattened, and even when the vesicle bursts and the liquid escapes to the free surface, this occurs, not so much by a flattening out of the cells forming the covering, as by a rupture and separation of these structures. In fig. 4, where the vesicle has attained a large size, the cells of the malphigian layer immediately beneath the stratum corneum will be seen to still maintain much of their original shape. The cells of the corneous layer at an early stage of the vesicle are affected, and in different places over the vesicle become detached from each other, leaving spaces filled with a watery fluid. On this account a portion of the corneous layer is frequently removed even when the vesicles do not burst. The blood-vessels in the papillæ are at first but slightly changed, and but few round cells are found outside of their walls ; but in the later stages they become more dilated ; though they seldom become what one would call widely dilated. In these later stages also out-wandered round cells appear in greater number in the papilla, and passing in the same direction as the effused serum, they are found also in the malphigian layer and within the vesicle. Sometimes the collection of those round cells is so great in the malphigian layer that it is impossible to distinguish the form and outlines of the cells forming the lower two or three cell-layers of this structure (see fig. 4). The serum in passing from the papilla to the place of collection causes marked changes in the form and appearance of the cells between which it passes. They become drawn out, paler in color, and less granular in appearance from the imbibition of serum. Generally the change of form and appearance is so great that their outline becomes indistinct, and only occasionally is the nucleus to be seen. Sometimes they appear to reach from the corium to near the corneous layer. It is, however, frequently impossible to see where they terminate, as the malphigian layer has more the appearance of being composed of long bands or fibres than of cells.

Thus we see in the case of a single small vesicle that the change in the parts depends upon the age of the vesicle and the amount of fluid effused, consequently a vertical section of such a vesicle would show different appearances according to the period at which it would be examined. In the earliest stage only the cells of the lower malphigian layer would be drawn out, and those cells surrounding the liquid slightly flattened. But few round cells would be seen, and the blood-vessels of the papilla would be scarcely changed. The number of layers of cells from the upper malphigian layer lying betwen the vesicle and the corneous layer would be greater than in a later stage. This of course would not be true of those cases in which the liquid at the commencement is situated between the malphigian and corneous layers.

In the later stages, the vesicle is larger, the cells more flattened, their margins more indistinct, the blood-vessels more enlarged, and a greater number of round cells present in the papillæ, malphigian layer and vesicles. The liquid will also lie nearer the corneous layer and the corium (as the vesicle increases in size in all directions),

Fig. IV.

FIG. IV. A large vesicle and two smaller ones. The large vesicle is of a few days duration, and the entire section shows changes which are described in the text. Pus cells are present in great number in the liquid of such a vesicle, and in the structures directly beneath it. Here the origin of the vesicle *A* from the papilla beneath it is very distinct. Also the origin of the vesicles *B* and *C*, from their respective papillæ *B'* and *C'* is well marked. The vesicles *B* and *C* have become united by rupture of previously separating bands. Part of the corneous layer has here become removed.

In all the drawings the corneous layer is represented by non-granular, non-nucleated cells, with the exception of a few cells in Fig. III., but in reality there was not this sharp distinction in the sections. Where the corneous layer is so thick as in these specimens, very many of the cells have a more or less distinct nucleus, and occasionally some granular matter, and they color in carmine. Only when the corneous layer is thin, is the line of separation well defined.

and the corneous layer will be more broken up. Thus it is clear that from a single vesicle or a single section the structural changes which occur in this or any other vesicular disease cannot be found out.

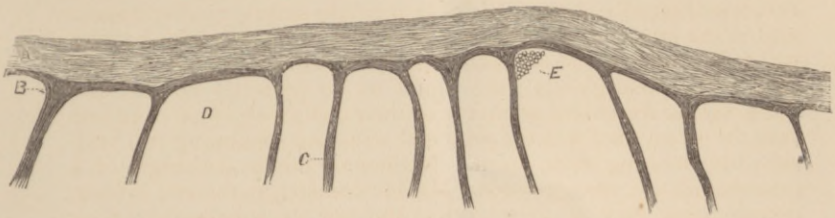
If more than one papilla is affected the appearance is changed, though only in some points. The liquid which comes from the different papillæ does not at first collect in the same place, but the liquid from each forms a separate vesicle, which afterwards unite and form a single larger vesicle. In figs. 3 and 4 such a condition is represented. The condition of all the cells except those between the different vesicles is similar to that already described as occurring when only a single papilla is affected. The cells lying between the different vesicles become flattened out into long fibres, and their nucleus gradually disappears with the lengthening out of the cell. In figs. 3 and 4 we have three vesicles separated by two bands composed of cells from the malphigian layer. As the vesicles arise from the papillæ these bands therefore must, and do correspond to the interpapillary portion of the stratum malphigii, and their size depends consequently upon the size of the vesicles and the resulting amount of pressure exerted upon those bands by the enclosed liquid. At first they are nearly as broad as the interpapillary space ; but gradually become thinner and thinner, and the cells composing them more and more flattened and drawn out, until finally they are ruptured, and the vesicles which it had previously separated become united. In fig. 4 the vesicles b and c have become thus united. Therefore we are not justified in saying that a given vesicle is chambered because such bands are present, since they separate different vesicles from each other and not different parts of one vesicle. If the affected papillæ adjoin each other, as in figs. 3 and 4, and especially in fig. 3, then they may appear to the naked eye as forming a single vesicle. A very common occurrence in this disease however is the formation of bullæ from the coalescence of two or more vesicles. In this case the vesicles are originally separated from each other by a greater or less distance according to the number of papillæ lying between them. When this occurs the vesicles spread, in the usual manner, and the liquid extending horizontally between the cell layers, the vesicles unite before the summit is ruptured. By this union of the effused liquid bullæ are formed, corresponding in size to the amount of liquid contained in the coalesced vesicles. The liquid passes horizontally either between the corneous and malphigian layer, or between the cells of the latter, and the intervening band is ruptured in the same manner and its cells become changed in the same way as when the vesicles arise from adjoining papillæ, as already described. This union of separated vesicles and consequent formation of bullæ is accidental, depending upon the amount of resistance offered to the escape of the liquid to the free surface by the structures forming its covering, and upon the distance between the separate vesicles. The disease must therefore be regarded clinically as a vesicular and not as a bullous eruption, though that is a matter of little importance, as the line of separation is so ill defined and merely arbitrary.

In the later stages of the disease, in which several adjoining papillæ are affected, the cell infiltration is greater comparatively than when a single papilla is affected. Instead of being restricted to the papillæ there is considerable round-cell infiltration along the course of the blood-vessels close to the mucous layer, between the papillæ. This infiltration of the upper part of the corium and into the malphigian layer is well seen in fig. 4. On account of the amount of cell infiltration into the latter their cells are no longer to be distinguished. This out-wandering of round cells accounts for the occasional opacity of the vesicles in the later stages, as they appear also in the liquid, as I have already written. No change whatever was to be found in the subcutaneous tissue beneath any of the vesicles. The sweat glands were found to be perfectly normal, and there was no distension whatever of their ducts with sweat. In one case ~~the~~ sweat duct was the principal structure separating two vesicles and delaying their union. Neither are the local changes of a catarrhal nature, as suggested by Mr. Hutchinson, as the cell infiltration consists only of round cells, and not of spindle-shaped or epithelial-like cells, as in catarrhal inflammations. As regards the nerves, they appeared quite normal. I studied carefully a considerable number of sections of nerve fibres, and I do not believe that they are changed at their periphery ; at least in such a manner as to be observable with the miscroscope. I believe the disease to be a neurosis, and dependent upon a change in the central nervous system not of the brain but of the spinal cord. Hence the little value of local applications in this affection.

We thus see that this disease is not one of the previously known vesicular or bullous diseases, but an affection entirely distinct in its clinical characters and in the changes which occur in the part affected.

In giving a name to this disease I have been guided by the wish not to add a new name to an already overburdened nomenclature, as is that of skin diseases. The term dysidrosis, as used by Dr. Fox, has been shown to be such an incorrect term, that it must be entirely discarded. As the disease so frequently attacks the feet as well as the hands, the term cheiro-pompholyx, as given to it by Mr. Hutchinson, cannot be retained. Recognizing, however, Mr. Hutchinson's claims and also the fact that the term pompholyx has not been employed by recent writers to designate any skin disease, the term pemphigus being employed instead of it, I have chosen to name it simply pompholyx. It is not intended by the use of this term to signify that the disease has any relation with pemphigus, indeed a study of its clinical characters and the mode of formation of the vesicles will show that it bears no closer relation to pemphigus than it does to herpes. I therefore use the term pompholyx to represent this disease, and think that it should no longer be synonymous with pemphigus, but that the latter should be used to denote pemphigus as understood by all modern writers, whilst the term pompholyx—a different word but also signifying a bleb—can be employed to designate this affection whose clinical history and

Fig. V.



A. Corneous layer. *B*. Upper Malpighian layer. *C*. Inter-vesicular bands. *D*. Portion of vesicle. *E*. Pus cells in vesicle.

This section was taken from a bulla five-eighths of an inch in diameter. The bulla was composed of 15 or 20 vesicles ; it was of several days duration, and the liquid contents contained an immense number of pus cells. Some are still to be seen at *E*. In removing the covering of the bulla, the bands separating the different vesicles became torn apart. Previous to this artificial rupture the bands stretched from the lower to the upper Malpighian layer. All the vesicles were situated between the cells of this layer, and separated from the corneous layer by two or more layers of cells of the rete Malpighii. This drawing, as well as the others, shows that the liquid very rarely collects between the corneous and Malpighian layers, a circumstance which accounts for the unfrequent bursting of the vesicles or bullæ.

In this section the cells composing the bands were so flattened out that they appeared only as fine lines. The cells of the upper layer, which formed the upper boundary of the vesicles, were also greatly flattened and very indistinct. The corneous layer was but little changed.

The portion of skin from which this section was taken, was removed on July 31, 1877, the disease having recurred upon his ceasing to take the arsenic. This was as large a bulla as had ever appeared during the disease.

nature I have here endeavored to describe. I hope the term will meet the approval of Mr. Hutchinson and dermatologists in general.

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