WHITE (Jas. C.) With the writer's compliments.

CLINICAL ASPECTS

AND

ETIOLOGICAL RELATIONS

OF

CUTANEOUS TUBERCULOSIS.

BY

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CLINICAL ASPECTS AND ETIOLOGICAL RELATIONS OF CUTANEOUS TUBERCULOSIS.[1]

BY JAMES C. WHITE, M.D.,
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THERE is no disease within the special province of this Association which so much demands its earnest consideration as this, which has been selected for formal discussion to-day; for not only is tuberculosis of the vital tissues one of the most fatal and widespread destroyers of man, and in its cutaneous forms the source of frightful disfigurement, but great confusion exists with regard to the nature and mutual relations of some of its manifestations. The diversity of opinion which exists in the profession throughout the civilized world upon this point, has been made prominently manifest in the innumerable discussions and reports upon the action of Koch's remedy, which have been published during the past year. Such a universal and synchronous census of prevalent professional views upon any subject in medical pathology is unparallelled in history. If this cyclonic experimentation in therapeutics, fanned into a popular craze by the public press, and conducted to a lamentable and almost ridiculous end by the over-enthusiasm of its medical supporters, who in many instances knew as little of the external phases of the disease they were treating as they did of the remedy they were employing, shall result in no more immediate good than the creation of a proper interest in the study of the manifold manifestations of cutaneous tuberculosis, it will not have vexed the world in vain.

[1] Read at the meeting of the American Dermatological Association at Washington, September 23, 1891, introductory to the discussion upon Cutaneous Tuberculosis.

It is my function, as I interpret the instructions of the Council, to place the subject in its clinical and etiological relations before you in as simple a form as possible for discussion. Before this body it will be unnecessary more than briefly to indicate those well-recognized conditions of the skin, which have been hitherto assigned a more or less individual or independent position in cutaneous pathology among dermatologists, and which, with certain other less clearly defined conditions, it will be my object to show, are only progressive phases or clinical forms of a single affection.

I. — LUPUS VULGARIS.

I may be pardoned if I attempt to define before you the meaning of this term, as ordinarily used, by the briefest sketch of the lesions which characterize its course. The vast and needless number of specific terms which have been invented to express each particular phase of development or involution and every clinical form shows the great diversity of these manifestations. Several distinct types of its primary stages are recognized. The formation of apparent macules varying in size from a point to a pea, or larger areas of irregular outline, neither of which are elevated above the general surface, but are felt to represent infiltrations of the cutaneous tissues of varying depths — *L. maculosus, planus.* Papules, tubercles, nodules, or much larger areas elevated above the surrounding skin to the extent of a line to a half-inch. Like the former lesions these are found to extend more or less deeply into the skin, and exhibit the same boggy, yielding consistence when pressed upon with any blunt pointed instrument. These constitute *L. tuberculosus, nodosus, elevatus, tumidus, non-exedens, non-ulcerosus.* A more minute description of these ordinary early lesions, included under the common term lupoma, would be wholly superfluous.

Some modifications of these forms occur through progressive changes in the surrounding cutaneous tissues. Thus we may have an accompanying lymphangitis, persistent œdema, teleangiectasis, great general thickening or pachydermia, with papillary hypertrophy of the affected regions, *L. œdematosus*, *hypertrophicus*, *papillosus*, *elephantiasicus*, etc.

All these cutaneous changes constitute the various manifestations in its periods of progressive development or evolution.

Lupus undergoes involution or retrogression by interstitial resorption, fibrous degeneration, and ulceration. The earliest indication of the first named process is a change in the epidermal covering of the primary lesions in the form of scales in varying amount, *L. exfoliativus*, *psoriasicus*. Then follow a shrinking and depression of the elevations, and the slow formation of a smooth scar, an atrophic process. The fibrous forms of metamorphosis are divided by Vidal and Leloir into a so-called *L. sclereux*, which is never total, and is regarded by them as a slowly progressive form of development which remains virulent, containing bacilli and yielding positive results on inoculation, and *L. sclerosus*, *fibrosus*, a retrogressive change, no longer virulent, and not to be confounded with the scar formation which follows ulcerative forms.

Ulceration takes place in lupus tissue in a variety of forms, *L. exedens*, *ulcerosus*, which, according to the rapidity or penetration of the process, has received other designations — *superficialis*, *serpiginosus*, *profundus*, *vorax*, *phagadenicus*. The determining causes of this secondary process are not clearly understood. It is most probably not the result of the action of the tubercle bacillus, but of the accidental introduction into tissues already impressed by the former of suppuration-producing cocci.

The outcome of this destructive process is the eventual formation of true cicatricial tissue, and the development during its course of a variety of transitory conditions: crusting stages are *L. crustosus, rupoides;* excessive or exuberant granulation is *L. fungoides, vegetans.* Finally, the cicatrix is established, capable itself further of hypertrophy, *L. keloides,* and of presenting every possible appearance in its permanent state, according to the seat, treatment, etc.

These are the cutaneous changes which constitute the conditions ordinarily comprised under the term lupus. With so many elements of expression at command, it is evident that with its chronic course and associated dermatoses of occasional occurrence, dermatitis, erysipelas, etc., it is capable of exhibiting very great variety of appearances in individual cases.

II. — TUBERCULOSIS VERRUCOSA, VERRUCA NECROGENICA.

Verruca necrogenica, or anatomical tubercle, had long been recognized as a chronic, inflammatory, wart-like tubercle, affecting primarily the fingers of persons working in dissecting and autopsy rooms, ward-tenders, and butchers. In the last revision of our system of classification, in 1884, it was placed under "hypertrophies of the epidermal and papillary layers," next to ordinary verruca. Besnier and Vidal were the first to call attention to its occurrence upon persons making autopsies of subjects dying of consumption, and its resemblance to some forms of lupus. In 1884, bacilli were discovered in its tissues. In 1885 they were also found in several instances in the tubercles which had probably been produced by tuberculous inoculation, and in the inflamed axillary glands connected therewith. Early in 1886, Riehl and Paltauf published their article on "Tuberculosis Verrucosa Cutis," in

which the clinical and anatomical features of this now well-recognized form were described, and its probable identity with the more restricted anatomical tubercle established. The presence of the tubercle bacillus in the lesions of all clinical varieties was also demonstrated. Since then its peculiar and multiform features have become familiar to dermatologists everywhere, as its occurrence is found to be by no means rare, and but few fail to regard it as a phase of cutaneous tuberculosis. It may fairly, I think, be accepted as the ordinary form of manifestation in the cutaneous tissues of the inoculation of the same with tuberculous matter, whether derived from the cadaver of man or other animal, or by contact with infective material from living subjects. There is a considerable variation in the character of the lesions, from the primary and small nodule of more or less inflammatory type with its subsequent wart-like papillary hypertrophy, to the more extensive areas of deeper infiltration and greater prominence, characterized by well-marked verrucous transformations of some parts of its surface, by isolated or grouped, dull or purplish-red tubercles or nodules in others, and by depressed cicatricial changes in the central or other portions. Areas thus affected may be an inch, or even several inches in diameter, and may present various combinations of the above lesions. The papillomatous features may be wholly absent. When the plaques are multiple, and this condition is by no means infrequent upon the hands, we have opportunity of seeing how varied may be the expression of the disease even upon the same individual. The amount of inflammation incident to the developmental stages is variable also, manifesting itself in zones of surrounding dermatitis, or in the formation of superficial or deeper foci of suppuration within the diseased tissues. It rarely undergoes ulceration. But I need not more particularly

describe a condition with which you are all familiar, and concerning which several members of this Association have recently published communications. Among them Dr. Morrow's case is especially noteworthy, as occurring upon the face and presenting so exceptional a form of papillomatous lesion.

III. — TUBERCULOSIS CUTIS.

This title was applied, before its true and more comprehensive significance had become so generally accepted by dermatologists, to certain rare forms of disease, which must be here mentioned. In nearly all text-books and general treatises on skin diseases, even those most recently published, one finds the same definition, a brief transcript in fact of the description of certain ulcers observed by Jarisch, Chiari, Kaposi, and others, occurring about the orifices of patients in advanced stages of consumption, upon the lips, about the anus and vulva, and extending to the adjoining mucous membrane. These ulcers were discreet and shallow, had eroded, slightly infiltrated, irregular edges, and presented a reddish-yellow, granulating surface. Miliary tubercles were found associated with their extension within the buccal cavity, and in one instance within the true cutaneous tissues surrounding the ulcer. There is no apparent reason for regarding these classic cases as otherwise than exceptional forms of local auto-inoculation, assuming a rapidly ulcerative state from the generally depraved condition of the patients' tissues. There is certainly nothing in them to warrant the establishment of a special class on their account.

Under the title *dermatitis tuberculosa acuta*, or general miliary tuberculosis, Heller has described the case of a child in which there was an outbreak of macules, papules, vesicles, and bullæ over the whole

surface, subsequent to the development of caseous glands adherent to the right innominate vein. Bacilli were found in the contents of the vesicles, and in sections of the affected tissues.

Under the term *tuberculose pustulo-ulcereuse* Dr. Gaucher, of Paris, described at the last meeting of the International Congress of Dermatology an affection occurring in young children, characterized by impetiginous pustules, superficial in their early stage, but terminating in deep ulcerations, circular in shape, and covered with crusts. Inoculation of the pus from these lesions upon animals produced mild peritoneal tuberculosis. He regarded it as identical with some of the cases described by older writers as *impetigo rodens.* The process was of benignant type.

IV. — SCROFULODERMA.

This is a term most commonly applied to the progressive changes which take place in the skin covering so-called scrofulous glands in the neck. The primary seat of the process is generally either in the subcutaneous fibrous tissue, in the lymph glands themselves, or in the periglandular structures. Briefly described there is first noticed a firm, circumscribed infiltration beneath the skin, which slowly becomes larger and more prominent, and finally is felt to soften. The overlying skin is sooner or later implicated, becomes hyperæmic, thinner, and finally breaks down at one or several points, allowing the escape of the fluid matters beneath. Thus is established an ulcer. These ulcers vary greatly in appearance, size, numbers and duration, and heal after months or years, by the formation of variable scars. The process in its various phases has received the following names: scrofulous glands, scrofulous sores, white swelling, cold abscess, *gommes scrofuleuses, gommes scrofulo tuberculeuses.* Similar

chronic changes resulting in destruction often take place in the skin overlying tuberculous disease of joints and bones.

Here, too, must be placed tuberculous dactylitis, a condition of the fingers and toes, principally the former, in young children, characterized by bottle-shaped enlargement and chronic inflammation of the over-lying integument, and terminating often in destructive ulceration of the same. This affection is of much more common occurrence than the syphilitic process, which it so closely resembles, and is, in my opinion, often mistaken for the latter. The ulceration resulting from all these forms, but especially that connected with scrofulous glands in the cervical region, sometimes extends far beyond the original underlying disease into the surrounding integument, and may continue to progress indefinitely, destroying large areas of skin, or new foci of ulceration may establish themselves in the neighborhood of the primary ulcer by the process of auto-inoculation without doubt.

Closely allied to these ordinary forms of glandular tuberculosis is a rare affection described by Hallopeau and Goupil under the title *Lymphangiectasie suppurative tuberculeuse*. Swellings form along the course of the lymphatics, varying in size from a filbert to a small egg. The overlying skin softens and ulcerates, and gives issue to a discharge of lymph containing bacilli. The process upon the lower legs is accompanied by much swelling.

Certain dermatoses have been regarded by writers as forms of scrofuloderma, as the so-called lichen scrofulosum. They are disorders of the skin occurring at times in patients who are affected by tuberculosis, but they are in no way tuberculous processes.

Perhaps some reference should here be made to Unna's "tuberculous eczema," so-called. That the

skin immediately surrounding tuberculous lesions in an active state may be stimulated into a sympathetic dermatitis of eczematous type is well known, and that an eczema in a person affected with tuberculosis of any tissue of sufficient gravity to impair general vitality may be somewhat modified by such an impression is not improbable, but I have seen no reason advanced for recognizing a specific tuberculous eczema. Such an appellation without proof is as objectionable to me as the expression "syphilitic eczema."

Finally, in connection with such pseudo-tuberculosis, I desire to state that in my opinion there is not sufficient evidence for regarding lupus erythematosus as an affection to be considered in this paper.

There are some other forms of disease of the integument, tuberculous in character, which are occasionally met with, closely allied to some of the clinical forms above described, which, I have reason to believe, are not ordinarily recognized as such, and which I have been in the habit of designating as unclassified tuberculosis. With the simple statement that they are mostly deep-seated, chronic processes of restricted area and often associated with evidences of tuberculosis elsewhere, I will not attempt to define them more particularly now. This is equivalent to the statement of my opinion that we are not yet thoroughly familiar with all possible manifestations of cutaneous tuberculosis.

Such then are the tissue changes by which tuberculosis manifests itself in the cutaneous structures. The mere enumeration of the processes shows how varied are the methods by which the skin expresses its resentment of the irritating presence of the virus. We find that we may have erythema, followed by deep infiltrations of corresponding size and hyperæmic elevations, ranging from small papules to tubercles of large size,

which may gradually undergo absorption and leave atrophied scars, or soften and remain in conditions of discharge and open ulceration indefinitely, destroying by serpiginous progress large extents of integument, and terminating in depressed or hypertrophied scars. Firm and densely sclerous infiltrations without marked tumidity and verrucous outgrowth, not tending to secondary changes. Forms of flattened papilloma-like hypertrophy of extremely slow development. Ulceration and destruction of the skin overlying glands primarily affected; deep and prominent, circumscribed nodular infiltrations often of considerable size (gummata), leading to destructive softening and ulcers of indolent type. Tumidity and breaking down of the integument covering phalanges, and primary affections of the larger bones and joints as well. In the surrounding areas of skin not immediately affected we may have dermatitis of various grades and kinds, as well as the implication of subcutaneous structures in the process, the glands, lymph vessels, fibrous tissues, cartilage and bones.

The particular nature of the minute anatomical changes which give rise to these varied appearances, it is not my province to speak of; this will be presented to your consideration by our more competent colleague, Dr. Bowen.

By the concurrence of certain of these lesions in various arrangements and combinations, differing somewhat in sequence, course and duration, in the locality affected and clinical history, more or less well-marked groups have come to be recognized as forming independent affections. It would be needless to look backwards and endeavor to discover a satisfactory reason as to why these ever varying types of one disease have been so long kept apart and regarded as distinct affections. Loose observation, narrow views of pathology, respect

for the dicta of the older teachers, antagonism of schools, have prevented us from recognizing and properly interpreting the identity of the anatomical and clinical features common to all these pseudo-independent phases. We see the same disposition to unduly magnify the importance and individuality of distinct clinical forms in the two great kindred diseases, syphilis and leprosy, until recently. Sharply marked dividing lines have been supposed to separate the former into well defined stages to the confusion of the student and practitioner, and the equally artificial division between the so-called anæsthetic and tubercular forms of the latter has largely delayed the recognition of its essential etiological nature. The true method of determining the mutual relations of the various diseased conditions we are discussing is by close observation of the features common to them all, and their points of approach and commergence (to coin a word) in individual cases, and not by confining our efforts to demonstrating how far apart certain selected clinical types apparently stand. Let us consider, then, what evidence we possess to-day, unbiased by previ ously formed opinions, so far as possible, of their clinical and etiological unity.

I. The concurrence of various clinical forms in the same individual.

Since my attention has been especially directed within the last few years to the question of the probable tuberculous character of various obscure conditions of the skin, which I had previously and hastily regarded as chronic inflammatory processes, warty hypertrophies, ulcers of uncertain origin, scrofulous sores, bone disease, questionable syphilitic lesions, or other undetermined cutaneous changes, which make up that too large residuum in the classification of cases in hospital clinics, often bunched under the title, "uncertain di-

agnosis," and my understanding of their real nature has been made clear to me, I have been surprised to note the frequency of association of various clinical forms in the same person. Perhaps I cannot better illustrate such concurrence than by placing together the notes of cases bearing upon this point, which have fallen under my observation in the past three years.

(1) Girl, aged seventeen. Enlarged glands in neck in state of ulceration; extensive ulceration of surrounding skin; patch of serpiginous lupus on upper right thigh.

(2) Girl, aged eighteen. Chronic ulcerating glands in neck; chronic tubercles on leg in state of ulceration; ulcer on palate; lately, tubercular lupus of nose.

(3) Man, aged thirty. Serpiginous lupus of face, of varied type, said to have begun after a cut upon its site. Fifteen years' duration. Lately, a patch of deep tubercular infiltration upon arm.

(4) Girl, aged sixteen. Swollen glands in neck for eight years. Lately, active ulceration extending in broad belt from ear to ear.

(5) Girl, aged twenty. Scrofulous glands in neck, some of them in state of ulceration. Tubercular and ulcerative lupus on front neck. Sclerous lupus of face. Solitary and large tubercle on back.

(6) Child, aged eight. Verrucous tuberculosis of wrist. Lupus-like tubercles on knee and arm.

(7) Child, eighteen months old. Tuberculous dactylitis of fingers. Chronic scattered tubercles on same arm.

(8) Child, aged nine months. Dactylitis of one hand. Scattered nodules and tubercles on arms and legs.

(9) Child, aged six. Swollen glands in neck, surrounded by large areas of cutaneous ulceration; exuberant ulcerative lupus of nose.

(10) Man, aged sixty-three. Multiple tuberculosis

verrucosa of fingers of left hand. On same forearm tubercular, ulcerative and fibrous lupus occupying a large area.

Some of these cases offer striking illustrations as well of the concurrence of such cutaneous forms with pulmonary or deep joint tuberculosis, but I shall ask your attention to such association later. They will recall, I doubt not, many similar cases within the recent observation of all of you, and are numerous enough to establish the fact of the frequency of such mixed manifestations in the same person. The very frequent connection of lupus proper with the so-called scrofulous state, is well known. I need only refer to the familiar statistics of Raudnitz and Pontoppidan, recently collected. The former found evidence of scrofulosis in thirty per cent. of 209 cases of lupus, and the latter determined a scrofulous basis in a still larger percentage in lupus.

Several objections would be raised, I am aware, by the opponents of these modern views of unification to evidence drawn from facts as these just presented. First, that the simultaneous or consecutive occurrence of such forms is mere coincidence, or that lupus is associated with scrofuloderma, because they are both indications of a depraved vitality, although independent affections. This is, of course, simply a restatement of the old dictum, the very proofless assumption which so long remained unquestioned. Second, that the cutaneous lesions exhibited in my cases, with the exception of the "scrofulous" glandular disease, disposed of as above stated, were merely the protean manifestations of lupus alone. But this would be extending the definition of lupus to an extent so comprehensive as to include every form of cutaneous tuberculosis, or, in other words, to admit the unity we are contending for. Third, it may be asked, How do you know that

the extraordinary lesions described by you as associated with your lupus and scrofuloderma cases are tuberculous in their nature, admitting for the moment that the latter changes are so? Because in many examples of all these forms this fact has been established by careful examination of their anatomical and bacterial elements, and by inoculation experiments conducted by many competent observers. It may be also legitimately replied, How does one know that unusual forms of cutaneous lesions occurring in an analogous affection are positively syphilodermata? Does one challenge the syphilographer to establish such diagnosis by microscope and inoculation? No, one must trust the skilled observation of the accomplished dermatologist to recognize the nature and position of many changes in the cutaneous tissues by shades of difference in appearances so minute that they cannot be expressed in words.

II. The presence of the *bacillus tuberculosus* in all clinical forms.

The data on which this all-important proof of the essential identity of these conditions rests are now so numerous, have been gathered by so reliable observers in all parts of the world, and are on record in so many well-known publications, that it will only be necessary for my purpose to present them in as succinct a shape as possible.

(1) *Lupus.* In the active and developmental stages of every lesion recognized as characteristic of lupus vulgaris bacilli occur. They are found inside and outside of cells, often in the tissues surrounding the lesion, are always sparsely distributed, and are of low vitality compared with the activity they manifest in other forms of tuberculosis. In the retrogressive phases they are still less abundant, or cannot with our present tests be discovered at all.

(2) *Tuberculosis verrucosa.* The bacillus has been found in every active stage of every clinical variety of this form also.

(3) *Tuberculosis cutis.* In the various forms of disease above described under this head, including the general acute miliary affection and a variety of ulcerative processes, bacilli have been found, in the fluids of vesicular and pustular lesions, and in the secretions of ulcers.

(4) *Scrofuloderma.* In every form of cutaneous scrofulosis the bacilli also occur. In the glands in their active and caseous stages of inflammation, in the discharges from the overlying skin, when implicated in the process, and in the ulceration of the integument spreading from such foci or excited in surrounding areas through probable auto-inoculation. They were discovered also by Hallopeau in the suppurative lymphangiectasie described by him.

There are few dermatologists now, I presume, who doubt the occurrence of this bacillus in every form of cutaneous tuberculosis, or who misjudge the negative significance of its relative sparseness and inactive qualities in these various clinical phases. That this bacillus is the direct exciting cause of all the lesions we have been considering, there can be, I think, as little remaining doubt. The gross character of these cutaneous manifestations, their course, and their very diversity of type is in close analogy with that other great bacillus disease, leprosy, as with syphilis, whose kindred nature, I doubt not, will ere long be as positively demonstrated. It is of little moment to discuss whether the bacillus produces this manifold impression upon the cutaneous tissues containing it by its mere mechanical presence, or by the irritative action of ptomaines or other chemical agents produced by it, the responsibility rests upon the tangible bacterium.

That this bacillus in all these forms is the same, and that it is identical with that of pulmonary tuberculosis is proved by the results of

III. Inoculation Experiments.

Here, too, it would be wholly a waste of time for me to present to you the details of the experimentation so extensively conducted in all parts of the world since the introduction of this test by Professor Koch. It has established the following facts:

The bacilli of pulmonary tuberculosis when inoculated upon guinea-pigs produces tuberculosis. Pure and prolonged cultures of the same produce like results.

The cutaneous tissues of scrofuloderma, lupus, anatomical tubercle, tuberculosis verrucosa, and miliary tuberculosis have all repeatedly produced more or less general tuberculosis when inoculated upon this animal.

According to Lingard the intensity or virulence of the effects of such inoculation varies in accordance with the activity of the bacillus growth in these respective forms. Thus guinea-pigs inoculated with the tubercular matter found in sputa or verrucous tuberculosis, die of tuberculosis on an average in 80 days, inoculated with material from scrofulous glands in 206 days, and with lupus tissue in 331 days. These results are confirmed by Leloir's investigations. He regards the difference between lupus and other forms of tuberculosis, so far as their comparative virulence is concerned, to be one of quantity rather than of quality.

Now the natural conclusion from these experiments is that these materials, derived from such various clinical forms of disease, produce one and the same form of tuberculosis in animals, because they are all merely varying expressions of the same disease. An objection has been raised, as you know, to the soundness of

such conclusions on the ground that these inoculations should reproduce the respective local forms from which the material employed was derived; that is, that lupus inoculated should produce lupus. Setting aside the reports of the few cases in which such local lesions have resulted as might be thus interpreted as too exceptional to establish such a possibility, it seems to me a perfectly satisfactory explanation, that the cutaneous tissues of the animals experimented upon are simply an unfavorable soil for the development of the bacillus tuberculosus. Is it not as difficult to inoculate leprosy upon animals (or syphilis) and does not the bacillus of leprosy show a strong selective affinity for certain human tissues over others? The inoculation of material from syphilitic lesions upon human tissues does not reproduce the form of lesion or stage of the disease from which it was derived. Why then should this be expected of the lesion or stage of tuberculosis hitherto called lupus? We know too little of the conditions which influence the biology of bacilli to permit such arguments to control legitimate deduction from the positive data furnished by these experiments.

IV. Auto-inoculation. Transference of infection from one host to another.

But opportunities are not wanting of studying the effects of the inoculation of many or all these forms of tuberculosis upon the human skin, although this has not been conducted by design or studied in the initial stages. Instances of the transference of the disease from one part of the cutaneous surface to another, or from one host to another, are so numerous that this origin of skin tuberculosis cannot be denied. The history of the sequence of development of many a case of multiple forms, of which examples from my clinic have been already cited, warrant this conclusion. The details need not be repeated. Cronier reports

cases in which lupus was developed after spontaneous openings of caseous lymph glands, collections of pus in bones, and deep fistulas. Five were cases of gland origin, three of osteomyelitis. Achard cites numerous cases of lupus verrucosus occurring on the seats of former subcutaneous gummata. Such secondary forms can immediately follow the evacuation of matter, or after long periods, if the discharge become chronic.

When we consider how exceptionally restricted is the seat of lupus generally, how extremely slow in its ordinary course to invade even its peripheral tissues, confining itself to a small and single area for twenty, fifty or even more years, it seems to me that the consecutive invasions of new territory, often widely separated from each other, can be most reasonably explained in the majority of cases on the theory of re- or auto-inoculation. We find in accordance with this view that multiple seats of lupus forms occur most frequently in children, in whom the disease is more active and open than in adults, whose cutaneous tissues are no doubt more susceptible of infection than those of the latter, and with whom transference of infectious materials from one part of the surface to another is so likely to occur from habits of picking sores, from the more frequent nudity of portions of the integument, and from the more restless contact of the hands with all parts of the body. Cases have been frequently reported where lupus has developed primarily upon the seat of wounds. We shall see below, other evidence of successful direct inoculation of tuberculous matter.

A study of the clinical history of cases shows, too, that cutaneous tuberculosis may be transferred from one person to another, without necessarily repeating the form from which it was derived. The following are cases observed by myself:

Child, aged eight. Verrucous tuberculosis of wrist. Scattered tubercles on knee and arm. A younger sister has similar tubercles on one arm of later development.

Girl, aged seventeen. Verrucous lesions and open ulcerating forms upon both feet. Serpiginous crusting lupus on one thigh. Duration of process three years. Has lived in closest intimacy with a sister who presents extensive areas of multiform tuberculosis of the skin of many years' duration.

I might refer to other instances of lupus occurring in more than one member of the same family within my experience, but these are under present observation. They are not of so frequent occurrence as to indicate that cutaneous tuberculosis is readily or often transferred from one host to another, and this is in accordance with our knowledge of the comparative inactivity or low vitality, and sparse development of the bacillus in these forms.

On the other hand, there is an extensive collection of observations, which demonstrate how readily the skin may become infected by bacilli in the more active condition and greater abundance in which they occur in the sputa of pulmonary tuberculosis. Jadassohn reports a case of the development of lupus upon the site of a tattoo mark, coinciding with the lines of the design. The operator had phthisis, and mixed his pigments with his own saliva. Dubreuilh has collected seventeen cases of tuberculosis of the penis after circumcision, in which the ritual operator was in consumption. The peculiar nature of this operation is well known to you all. In several of these bacilli were found in the lesions. Behrend gives an account of a patient with laryngeal and pulmonary phthisis, who was bitten by a gnat on the finger, produced an excoriation of the part by scratching, and wetted it

repeatedly with saliva. This terminated in a sore, which did not heal, and presented every appearance of cutaneous tuberculosis. In Dubreuilh's case a young woman washed the handkerchiefs containing the sputa of a phthisical patient. Nodules developed upon her fingers, followed by swelling and suppuration of the axillary glands. In the next few weeks small nodules appeared along the course of the arm, which broke down and discharged. The original lesions upon the hands became verrucous. Bacilli were found in all the lesions and in the discharge from the axilla. Inoculation in guinea-pigs gave positive results.

Here follow the cases of cutaneous tuberculosis which have occurred under my own observation within the last three years, in which favorable conditions for such infection through sputa existed:

Woman, aged thirty-two. Chronic tubercular mass on thumb of two years' duration. For a long time previous to its appearance she had been nursing her husband in consumption.

Child, aged eighteen months. Scattered tubercular lesions on arm, with dactylitis of hand. Mother died of consumption after nursing it six months.

Child, aged nine months. Dactylitis and many scattered tubercles on limbs. Mother had phthisis.

Woman, aged sixty-five. Diffused infiltrated patch on back of hand, and verrucous lesion on finger of same. Was nursing daughter in consumption when it appeared.

Woman, aged sixty-six. Multiform lesions on back of left hand and forearm of six years' duration. It appeared while nursing daughter in consumption.

Child, aged twelve. Open ulcerative lupus of nose. Sclerous lupus on neck. Sister has ulcerative tuberculosis of palate.

Woman, aged fifty-eight. Verrucous tuberculosis

of finger. It appeared two years ago, just after nursing daughter, who died of consumption.

Woman, aged forty-eight. Open ulcerative tuberculosis of left wrist of eighteen months' duration. Husband and daughter have died of consumption within the last two years. The latter had "open sores."

Girl, aged six. Swollen glands in neck, surrounded by extensive ulceration for three years. Exuberant ulcerative lupus of nose of six months' duration. Father died of consumption when she was fourteen months old.

Man, aged sixty-three. Numerous tubercular and ulcerative lesions covering large areas upon the left forearm. Several deeply infiltrated verrucous forms on fingers of left hand. The disease began on finger seven years ago, about the time of the death of wife from consumption.

Woman, aged twenty-four. Tuberculosis verrucosa of left forefinger of five years' duration. Mother died of chronic consumption two years ago, and was nursed by her.

Woman, aged forty-eight. Verrucous tuberculosis of two fingers of nine months' duration. Had previously attended a patient in consumption, who had also had for four months an "open sore" on neck.

These cases of probable inoculation might be corroborated by great numbers of others taken from recent reports. Dubreuilh, who has collected sixty of them, presents the following account of the usual course of the process: The earliest lesions after inoculation in an adult are generally either a panaris or an ulcer with a livid erythematous border, becoming later verrucous in portions or over its whole area. In the vicinity of the primary sore nodules, either within or beneath the cutaneous tissues, often appear along the course of the lymphatics, presenting at times the as-

pect of scrofulous gummata, and followed by adenitis. In infants tuberculous meningitis has often supervened, and in adults these local manifestations have frequently terminated in pulmonary tuberculosis. He concludes farther, that infective matter derived from surgical tubercle, which is poor in bacilli, produces a cutaneous tuberculosis of slow progress, lupus forms, which is also poor in bacilli, whereas the inoculation of tuberculous sputa gives rise to painful ulcerations and carious lesions rich in bacilli.

Now it may be claimed that all such cases as these by no means prove the fact of inoculation, but that they may be explained on the old theory of diathesis, which has hitherto given such complete and easy satisfaction. Everybody must admit that diathesis, so-called, is only an inferential condition, and rests on no scientific or tangible basis whatever, whereas inoculation with infective matter and consecutive tissue changes, both local and universal, is a fact capable of the clearest demonstration. If, then, we can explain a series of observed facts, which closely resemble in their successive details the undoubted phenomena produced, artificially or otherwise, by inoculation, why should we ever think of interpreting their occurrence on a purely imaginative basis of causation? Why should we resort to pure assumption or supposition until natural and physical methods of accounting for their occurrence are first shown to be of impossible application? The days of diathesis are numbered, I believe, and their figmentary existence will vanish when it is shown that they are no longer necessary to explain the occurrence of diseases which closer observation is demonstrating to be capable of interpretation under laws which come within the scope of scientific reasoning and experimentation. A diathesis will, in my opinion, ere long be shown to be as unnecessary for the ex-

planation of all the phenomena of tuberculosis, as it is to-day for leprosy, and always has been for syphilis.

In every one of the cases I have reported from my own observation, the undoubted opportunity for inoculation was present. It is, of course, impossible to fix the precise date of this event in studying the history of a case at a period so remote from its inception, nor have we yet positive knowledge of the period of incubation, or sufficient data as to the appearances of the earliest local manifestations after inoculation. Such evidence as these family cases present would be accepted without the slightest hesitation as a satisfactory explanation of the source of syphilitic infection developing in wife, child, or nurse of a patient affected with this disease. Why then should we regard with more scepticism the lessons as to the contagiousness of tuberculosis which these cases teach? When we consider the possible opportunities of contact with the infectious sputa of consumption, which occur in families under the existing carelessness and ignorance concerning their dangerous character which everywhere prevails, it is only surprising that such cases are not more frequent. It can only be explained on the ground that the cutaneous tissues of man are but slightly susceptible to the reception, and afford an infertile soil for the development of the bacillus tuberculosus. Leloir, in his recent communication to the *Congrès de la Tuberculose*, gave the results of his inoculation of lupus tissue upon animals in two hundred cases. He found that it never produced tuberculosis in the guinea-pig when inoculated into the hypoderm, but that it almost infallibly produced the disease when inoculated into the peritoneum of the same animal. It may be considered probable, indeed, that a sound epidermis is a complete shield of safety against the dan-

gers of inoculation by surface contact. Would that the mucous membranes possessed the same immunity!

V. Association with pulmonary tuberculosis.

Another proof of the identity of these various forms of cutaneous disease with tuberculosis, is their by no means infrequent connection with the pulmonary form in the same person. I need only quote from well-known statistics to establish this significant concurrence: Besnier has reported that twenty-one per cent. of his lupus patients died of phthisis; Leloir states that of nineteen lupus cases ten were in consumption; Sachs reports that of 166 cases of lupus thirty-four per cent. had tuberculosis in some form before the cutaneous manifestations, and sixty-two per cent. subsequent to the development of the latter. Such ratios might be largely extended by quoting the figures of other observers. The following three cases from my clinic within the last year will serve as an illustration of such association of forms in America, an experience which would be corroborated by the observation of all who are present, I have no doubt.

Girl, aged sixteen. Lupus of nose of six years' duration. Unmistakable signs of tuberculosis of right upper lung.

Woman, aged forty. Tuberculosis of left thumb, and palm and back of right hand. In advanced chronic consumption.

Man, aged thirty-five. Sclerous and ulcerative lupus of upper thorax. Apex of lung affected.

The secondary infection of the skin in pulmonary tuberculosis admits of ready explanation, for sputa rich in active bacilli must be constantly coming in contact with the fingers in the use of the handkerchief, and the hands are often used to wipe the mouth after expectoration or coughing among the poorer classes, as is well known. The prevalence of such uncleanly

habits and the infrequency of such transfers, strongly illustrates, as just mentioned, the immunity of the skin to such chances.

The development of pulmonary tuberculosis subsequent to the existence of cutaneous forms upon an individual, may be explained, of course, by the direct transfer of infective matter from open lesions upon the surface to the air-passages, and such extension to internal organs in any way is in accordance with the clinical record of kindred diseases. The manifestations of syphilis may be confined wholly, or for a considerable period of its course, to the skin, whilst in leprosy it may long be the only field of exhibition before other tissues are affected.

I should not neglect in this connection to mention the opinion which prevails among French dermatologists, that pulmonary tuberculosis is often developed as a result of the operation of scarification, as used by them in the treatment of lupus, in consequence of thus setting free the bacilli to enter the general circulation.

In connection with this question of self-infection, it may be of interest to note that at the meeting of the *Congrès de la Tuberculose* just referred to, M. Lespinne described certain manifestations observed at times in cases of lupus, chiefly in ulcerative forms, which indicated a general intoxication of the system. They consisted of rapid elevation of temperature, catarrhal symptoms of the mucous and serous tissues, and a typhoidal condition, simulating a dothinenteritis, or acute miliary granulation. As soon as the elimination of these infectious products has been accomplished, these phenomena disappear, or they may be the precursor of a more general tuberculosis. He has seen them terminate in this disease of the peritoneum and lungs. In his opinion this state of general infection could be caused either by the bacilli or the agents of suppuration in the lupus tissue.

With all this accumulation of varied evidence bearing upon the question, the concurrence of various forms upon the skin of the same person, the demonstration of one bacillus in all these clinical forms, the uniform results of the inoculation of such tissues and the bacterium itself upon animals, the clinical proofs of re- or auto-inoculations of these forms upon the original patient and of their transference to others, the established association with pulmonary forms of the disease, with all this evidence, I say, I do not see how any reasonable doubt can be entertained with regard to the essential identity of every form of tuberculosis with which we are acquainted.

RELATIVE FREQUENCY OF CUTANEOUS FORMS.

It has been common belief amongst us that lupus is far less prevalent in this country than in Europe, whilst pulmonary tuberculosis is of more frequent occurrence here than there. Of the correctness of the former opinion I have presented statistical proof to this Association in former communications.[1] Such unequal prevalence among nations may well be explained by the differences in habits of personal cleanliness which characterize them. But with the enlargement of our definition of lupus we have been considering, these figures need revision, and the inquiry should comprehend all forms of cutaneous tuberculosis. With regard to the comparative prevalence of these various clinical forms amongst ourselves, I can only present the following brief statistics gathered from my own observations during the last two years in my clinic at the Massachusetts General Hospital. In this period sixty-nine new cases of cutaneous tuberculosis were recorded, representing the following clinical varieties: Scrofuloderma, thirty-four; lupus vulgaris,

[1] Variations in Prevalence, etc., 1876. Immigrant Dermatoses, 1890.

five; other forms, thirty. This subdivision is not intended, of course, to represent sharply differentiated processes in all cases, but it loosely expresses with sufficient accuracy, the relative prevalence of the clinical varieties as they occur here. The ratio of their combined number to all cases of skin disease observed at my clinic during the same period is 69 to 4,644.

AGE.

It was the tenet of Professor Hebra that lupus rarely, if ever, developed after the age of twenty, and usually showed its first manifestations in childhood. This rule was often used to determine diagnosis in doubtful cases. It may be that typical lupus does present itself in the majority of instances at this early period of life, and, if so, it must be accounted for by the greater susceptibility of the skin in youth to the reception of the specific germ. We see confirmation of this in the character of the lesions and the greater activity of the process which lupus always exhibits at this age, and its not infrequent spontaneous and complete extinction after middle life. So far, however, as the history of the other clinical forms we have been considering, teaches, it is apparent from the case above cited within my observation, that no such limitation to the dangers of inoculation exists, and that the skin exhibits such susceptibility both in middle life and at advanced age.

HEREDITY.

Upon this important etiological question, I beg to reproduce here, the opinion I expressed in a paper on "Hereditary Dermatoses" communicated to the International Congress of Dermatology and Syphilography held at Paris, in 1889, and I do this with less

hesitation because it has not been published in a form generally accessible to members of this Association.

That general or pulmonary tuberculosis is hereditary and transmissible has been commonly accepted as a perfectly settled fact, as it seemed to furnish the only plausible ground for its marked occurrence in families. It has never been denied, however, that it might develop independently of inheritance. When its bacillus nature was recognized, it furnished a satisfactory explanation of the occurrence of the latter class of cases. But it also raises the question, if it will not likewise account for cases hitherto regarded as hereditary, that is, for every case. Admitting the infectious character of tuberculosis in any form at all, and the capability of transference from person to person by direct contagion or inoculation, is the theory of hereditability longer necessary? *A priori* we cannot deny the possibility of intra-uterine infection, even if the connection between mother and fœtus is so little directly intimate, nor of the preceding bacillous inoculation of ovulum or the male germ. Such cases of congenital infection are extremely rare. The burden of proof in this question should, it seems to me, as was said of leprosy, be transferred to the advocates of the hypothesis of heredity. As to the transmission of a predisposition which shall render a person more liable to the disease after birth, but which is not the disease and requires a fresh infection to make such peculiar fertility available, that is a nicety in the problem of heredity which I cannot appreciate, considering that the bacillus of every form of tuberculosis is readily received and developed in the normal tissues of perfectly healthy animals. So, too, with regard to some tissue changes of childhood regarded as the indirect result of tuberculosis and not tuberculosis itself.

Mr. Francis Galton, in his recent interesting work

on "Natural Inheritance" gives the history of 66 marriages in which one of the parents had "consumption." There resulted from these unions 413 children, of which number 107 had, or were suspected to have, consumption, equal to twenty-six per cent. Inasmuch as its prevalence in the general population is sixteen per cent., his inference is that this increase in rate may be fairly attributed to the greater chances of infection in such families. He found, too, that when the mother was the consumptive parent, the proportion of consumptive children was larger than when the father was the affected parent, which he explained by the fact that during infancy the child "lies for hours daily in its mother's arms, and afterwards lies much by her side, breathing the tainted air of her sheltered rooms." If the infant may acquire the disease from the milk of tuberculous cows, why not also from that of its diseased mother? We may not claim then that any case of cutaneous tuberculosis in any form is inherited until every possible source of extra-uterine infection has been eliminated.

CONCLUSIONS.

In conclusion, it seems to me, that on the evidence in our possession, collected within the last few years, under a more enlightened and unbiassed judgment as to its pathology, and presented in a necessarily brief and incomplete form in this paper, we are warranted to regard the various clinical conditions of the skin we have been considering, as simply cutaneous phases of one comprehensive affection, which, with its pulmonary and other tissue manifestations, constitute that most important of all diseases, tuberculosis; as much a unit as the equally multiform cutaneous lesions and other tissue changes which characterize syphilis and leprosy. In my opinion it would greatly conduce

to the quicker adoption of this consistent view of the true relations of all its forms, if we should entirely cease to make use of such independent terms as lupus and scrofuloderma, and hereafter designate such clinical or local varieties by no more distinctive titles than we employ in the description of the manifestations of leprosy or syphilis. The sooner and clearer we make it apparent to the public and the profession that all lesions of tuberculosis are dangerous and contagious, and mutually convertible, the more easily shall we gain control over the future course of the greatest scourge of mankind.

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