

4. We often find vessels in the lupus nodule which are absolutely lacking in tuberculous nodules.

5. In the older portions of the lupus neoplasm we may perceive an increased formation of spindle-shaped elements which increase to such a degree that the entire patch thereby gains the character of recent cicatricial tissue.

6. Furthermore it should be emphasized, in opposition to the essential substratum of conjunctival tuberculosis which always manifests itself in the form of roundish nodules clearly demarcated from the surroundings, that in the products of lupus the miliary structure plays but a subordinate part, and that the lupous infiltrations represent rather the configuration of an irregularly arranged network with thickened nodal points.

7. Finally he claims for the lupus granule the capacity of direct suppuration which is not possessed by tubercle.

With these anatomical differences enumerated by Baumgarten we can concur in general. But, as above pointed out, the fourth paragraph—the non-vascularity of tubercle—must receive some limitation. In the very first stages, tubercle is as free from vessels as the lupus granule. Gradually, however, the formation of vessels is effected in both; but in a higher degree in lupus because in tuberculosis the development is more acutely followed by disintegration. There is merely a difference in degree in reference to the quantity of vessels.

Again, as regards the suppurative capacity of the lupus nodule, it appears to me still doubtful whether at present we can speak of a true primary “suppuration.” A cutaneous lupus nodule never changes into a pustule, a lupous ulcer never spreads by acute “suppuration,” but slowly in the course of years the marginal portion around the ulcer disintegrates, its infiltration having been microscopically demonstrable long before symptoms of degeneration become externally visible. It is a characteristic of the lupous ulcer rather to form little puriform secretion. What is here called “pus” is nothing but necrotic tissue and detritus from inflammatory cells which appear more copiously only after the lupous new-formation has perished.

But Baumgarten himself adds: “I hold the differences to be sufficient to warrant a separation of the two processes from a purely anatomical standpoint. It is another question whether there is not an internal, *i. e.*, a genetic connection between both diseases; thus, that perhaps lupus has branched off from the main trunk of tuberculosis as a ramification attaining in the course of time a certain independence and provided with peculiar permanent deviations.”

This question, in our opinion, may now be answered positively.

Although clinically the objection may be raised that the combination of lupus and general tuberculosis is but very rarely observed, still we may, on the other hand, point to those “latent” forms of tuberculosis which likewise run their course without the occurrence of general disease. On the other hand, in the morbid group termed scrofulosis, we shall regain the clinical connecting link between the two apparently so different forms of tuberculosis.

Experimental inoculation has unfortunately yielded here no incontrovertible result. Lupus particles were introduced into the anterior chamber of rabbits. But while Cohnheim, Hänsell, and others reported negative results, Schüller and Hüter have published successful positive experiments and in accordance therewith they interpret both diseases as the sequels of the same tuberculous poison, only that the noxa is weaker in lupus.

As opposed to the positive results of Schüller, the negative ones seem to me to lose their force; all the more because in lupus we probably have to deal with minimal quan-

ties of bacteria, so that it is likely, in a series of inoculation experiments, that sometimes bacterial, that is virulent particles, sometimes non-poisonous ineffective particles of tissue may have been employed.

Schüller reports the following about his experiments:

“By inoculating into the lungs particles of lupus tissue, I succeeded not only in provoking tuberculosis, but also, by fractional cultivation, in developing from lupus tissues micro-organisms whose inoculation into the lungs was followed by distinct and widespread miliary tuberculosis, and the injection of which into a joint incited characteristic tubercular arthritis with secondary general tuberculosis. These experiments are absolutely demonstrative. Any other, possibly accidental tuberculous infection was guarded against by the strict isolation of the animals. The animals were cared for in positively healthy, new stables, separated from the others by a large court-yard, and tended by a special person. (Besides, in other rabbits inoculated with the blood of animals affected with lupus [according to Lenz's experiments] tuberculosis could be reproduced.) Therefore, the question will admit of no doubt. Former negative results may perhaps be explained by the difficulty of securing appropriate lupus tissue containing specifically active micrococci.

Finally, the histological differences between lupus and true tuberculosis seem to me to show the similarity of the two processes. Indeed, in tuberculosis we have the same pathological tissue processes as in lupus, only more *acute* in course and of higher degree. For this reason we have in lupus the slower development of the inflammatory granulum with more ample vascular development; thence, too, slower destruction at the centre (necrosis of coagulation) and points of recovery at the periphery, with the formation of spindle-cell tissue (cicatricial tissue).

Nevertheless the local malignancy of lupus is no less than that of tuberculosis. It is only by the implication of the entire organism that tuberculosis (*sensu strictiori*) is more malignant than lupus confined to the skin.

The single lupus nodule, like the single tubercle, finally succumbs to a specific necrobiosis; but in a lupus patch the basis tissue is not so largely involved, while in tuberculosis it is regularly implicated in the caseation. In this variability we can distinguish an essential difference as little as in the spontaneous recovery of the papular forms of syphilis as opposed to the constant disintegration of the gummous products.

It is true, caseation is characteristic of tuberculosis, but still it is merely a secondary phenomenon, caused by the continuous deleterious influence of the virus which before incited the inflammation and new-formation. “Therefore, *ceteris paribus*, the earlier or later onset of caseation will depend on the intensity and duration of the influence of the tuberculous noxa.” Schüller is also inclined to ascribe importance to the quality of the tissue within which the tubercular inflammation takes place; in lupus, therefore, the condition of the cutaneous organ. In fact, cases of true tuberculosis of the skin are exceedingly rare; even in cutaneous diseases developing over tuberculous patches in bones and lymphatic glands, we frequently encounter, not “tubercular” ulcers, but true lupus, “because the penetrating tuberculous noxa suffered a weakening of its intensity from some still unknown cause.” It is of interest, too, that while lupus migrates, true tuberculosis of the skin has no progressive character.

For us, therefore, lupus is one of the forms in which tuberculosis occurs in the skin, modified by the small quantity of active virus; hence, it must also bear the clinical stamp of an infectious disease.

Does the clinical picture of lupus present the character of an infectious disease?

The developmental history of every single case gives us little information upon it. The simultaneous occurrence of several cases of lupus in the same family has been observed

very rarely; nothing at all is on record of the infection of a healthy person by lupus; as regards heredity, we have the unanimous verdict of authorities that those affected with lupus neither inherit the disease nor transmit it to their children; finally, stress is laid on the fact how rarely a combination of general tuberculosis with lupus is to be observed.

It will be possible to prove, however, that all the clinical relations above discussed can be most plausibly explained on the basis of our point of view of lupus—as a modified tuberculosis.

As a matter of fact, general tuberculosis (used in the older, restricted sense) is rarely to be observed with lupus. But this explains itself from the following reasons:

1. Lupus virus is for the organism a weaker and less dangerous noxa, on account of the quality of the organ in which it is localized. Schüller maintains even that the microorganisms representing the tuberculous virus suffer a direct impairment of their infective power, because they vegetate in the skin under more unfavorable nutritive conditions. He drew this conclusion from the observation that it was sufficient to offer to the microorganisms developed from lupus tissue relatively more favorable conditions of growth (by direct articular injection) to bring their activity back to its full power.

In the same way Koch's observation, that in cultures the growth of the tubercle bacilli is very decidedly influenced by the temperature, may possibly explain the impairment of the intensity of growth in the skin.

2. Again, the localization of this tuberculosis in the skin is a factor causing the relative harmlessness in this way, that the products of disintegration do not get into the circulation from the cutaneous investment in sufficient quantity to produce acute general tuberculosis of rapid course; the processes remain local, and as such not specially injurious to the general organism; just as a cheesy lymph-gland is succeeded by general tuberculosis only when it can in some way bring larger quantities of its cheesy masses into the current of the circulation. (For even in the most florid forms of pulmonary phthisis, general acute miliary tuberculosis is of relatively rare occurrence!)

For these reasons lupus does not become the cause of general tuberculosis!

Inversely, true tuberculosis does not always produce lupus, even when the cutaneous tissues are attacked. Then, owing to the greater intensity of the virus, it may produce genuine tuberculous ulcers. Lupus is always tuberculosis of the skin; but tuberculosis of the skin has other forms besides lupus.

3. All the more frequently, however, lupus is coupled with the complex of symptoms designated as scrofulosis.

The objections of Kaposi, who does not recognize this connection, do not seem to me to be justified. He says we have no reason to derive lupus from scrofulosis because, of the many hundreds of lupus patients we have seen, in but very few were these conditions (cheesy infiltration of the glands, the skin, keratitis, etc.) found, and in other hundreds, of scrofulous patients no trace of lupus can be discovered. "The same is true of tuberculosis," etc. (p. 624). The first point is in direct contradiction to by far the greatest number of other observers of all countries; as to the second objection, it is not necessary that in every scrofulous lupous skin disease should develop, any more than the so-called scrofuloderma is a regular occurrence in scrofulous patients.

Raudnitz has recently examined the lupus material of the Prague clinic with a view to its etiology. In 209 lupus patients he found only 30% in whom there was obvious scrofulosis, so that he expresses himself against a constant relation between lupus and scrofulosis, "although, on the other hand, the concurrence of both affections cannot be

looked upon as accidental." In twenty-one cases there was decided hereditary taint, in nine others this appeared probable.

An investigation by Pontoppidan showed that in one-half to two-thirds a scrofulous basis was demonstrable.

Inasmuch as the unity of scrofulosis and tuberculosis is no longer doubted, and as, on the other hand, the connection between lupus and scrofulosis appears to us to be proven, we may, even from a clinical standpoint, include lupus in the group of tuberculoses. For scrofulosis is nothing else but a peculiarly localized tuberculosis, in which the virus, when it penetrated into the body, reached and localized itself in the lymphatic glands without direct injury to the mucous membranes which acted as points of entry. Frequently enough such a scrofulosis is completely recovered from; at any rate it remains harmless to the general organism as long as its products are not transferred to other organs. Only after the tubercular virus is spread in the body and additional disseminated patches are established in more favorable and more dangerous developmental locations, the disease begins which is called tuberculosis in a more restricted sense. The difference of tuberculosis from scrofulosis and lupus, therefore, does not lie in the variation of the poisons (though perhaps in the quantity of the virus), but in the variable spread in the body and in the different importance of the affected organs. Of these, lung tissue, succumbing most rapidly to the disintegration, is most dangerous to the organism; neck, lymphatic glands, and skin, however, remain localized foci of disease, usually without any injurious influence on the body.

In this connection we may point to another infectious disease, the pathogenetic fungi of which are very well known—actinomyces. Similar to syphilis and tuberculosis, that affection presents the most variable forms of disease, although in all, the same fungus has been demonstrated as the exciting cause. Sometimes we find the most perfect tumors, the granulation tissue of which even attains a relatively high development, approaching that of perfect connective tissue, with giant-cells (Weigert), etc. Sometimes, again, there is nothing like a tumor, but chronic abscess formation, carious osseous processes, and phlegmonous suppurations are the pathological processes caused by the actinomyces. But they all have a common etiological factor—the ray fungus.

Again resuming the results obtained, we would assume genetically but one tuberculosis of the skin which, however, appears in different forms:

a. *Tuberculosis* in a more restricted sense, with the formation of ulcers seated in the cutis, and with miliary tubercles, as a part of general tuberculosis.

b. *Lupus*, a less harmful form of tuberculosis, usually remaining confined to the skin.

c. *Scrofuloderma ulcerosum*, *i. e.*, ulceration arising after the opening of the so-called cold cutaneous abscesses. (*Scrofuloderma papulosum* of Auspitz does not, in our opinion, belong here; it is, as Hebra correctly states, a lichen scrofulosorum.)

4. The infectious nature of lupus is most clearly recognized when considering the clinical course of a single case; the gradual irresistible progress of the process into the neighborhood, and especially the local relapses, cannot be understood without assuming the presence of a reproductive germ of disease, *i. e.*, of pathogenetic organisms; particularly instructive are the not uncommon cases in which healthy flaps from the forehead, which have been transplanted for the formation of an artificial nose, become attacked by lupus before long.

We shall not be mistaken if we assume that in the adjoining and the basis tissue of the destroyed nose an organized virus has remained behind, which infected the healthy skin.

5. Finally, direct infection from without is not excluded, especially in cases in which there is an absence of signs of tuberculosis and scrofulosis in other organs; for the tubercular micro-organisms penetrate through small fissures or wounds into the skin, where, if they have time to breed, they deposit products superficially. Schüller attempts thus to explain the great frequency of lupus in the face, in the neighborhood of the nostrils, and of the mouth; not only that rhagades and superficial defects there are frequent, but the inspiratory current is said to be an auxiliary leading the microbes there by preference. On the extremities, too, lupus usually occurs on the hands, fingers, and toes, that is, points likewise more exposed to external injuries. According to Raudnitz, lupus occurred primarily at the nose, the inner canthus, and lip in 38.2%; on the cheek, in 27.4%; on the trunk and extremities, in 24.5%. Inversely, Schüller supposes that the organisms circulating in the blood deposit local foci in the skin, and thus may produce lupus.

But eruptions of lupus over softening, cheesy glands and abscesses, *i. e.*, infection of the skin from within, have been certainly demonstrated and observed with sufficient frequency.

Patho-anatomically the process is: the virus causes an inflammation; but the inflammatory products, under the specific influence of this virus, take the course peculiar to tuberculosis—after a progressive development of the inflammatory cells into epithelioid and giant cells, they perish, with the tissue framework present, by necrosis of coagulation and caseation; another characteristic is the irresistible peripheral extension of this first inflammatory, then necrobiotic process.

The process runs its course exclusively in the connective tissue.

The implication of the epithelial formations occurring in lupus is quite secondary. Histologically this proliferation, which not rarely assumes large dimensions in an "atypical" manner, is of importance. But the proper nature of lupus has nothing whatever to do with this epithelial growth; lupus is a new-formation in the connective tissue, and causes, on the one hand, an excitation into more active growth of the epithelial stratum, but, on the other, a diminished resistance, without which a proliferation into the connective tissue would be impossible. The carcinomatous processes have just as little essential relation to the lupous process as these "atypical" epithelial proliferations. That carcinoma will develop more rapidly and more malignantly in this friable granulation tissue is natural, but otherwise we can see nothing but an accidental combination in this development of carcinoma into lupus.

1. Tuberculosis of the Skin.

The knowledge of tubercular affections of the skin dates only from the last few years. Their occurrence is uncommonly rare in comparison with tuberculosis in other organs. Generally, the nature of these cutaneous affections is first recognized in the microscopic examination made post-mortem.

Without any special precursors, isolated, roundish-oval ulcerations arise which soon become covered with crusts and are but moderately painful. After removal of the crusts, a reddish-yellow, granulated, slightly bleeding, shallow ulcerous surface presents itself. The borders are slightly infiltrated, but soft; not undermined, though displaceable on their base; they are not smooth, but jagged and eroded, from an aggregation of small depressions, covered with pus. True "miliary tubercles" of the ulcers, or even of the uninjured skin, are among the greatest rarities.

The ulcers spread by continuous, very slowly progressive destruction of the surroundings, becoming "serpiginous," thus sometimes giving rise to the confluence of adjoining isolated ulcers. Still the ulcers generally remain small, rarely exceeding the size of ten to twenty square centimetres. Of course, there is no such thing as healing of these ulcerations which, as above stated, occur only in very greatly developed tuberculosis. The seat of the ulcers is almost invariably in the immediate neighborhood of the orifices covered with mucous membrane: upper and lower lip, points around the anus and vulva, glans. Other parts of the cutaneous investment are very rarely attacked.

Vidal observed a peculiar case in a patient aged 22, suffering from pulmonary phthisis. Seven months before, the patient had noticed on his breast two closely adjoining, hard nodes about the size of beans; they gradually softened and opened after increasing discoloration of the overlying skin, discharging a whitish, tough mass. Similar nodes by degrees developed in the face, on the shoulder, the arm. Vidal interpreted these nodes as tuberculomata—a diagnosis which he verified microscopically after the autopsy (scrofuloderma?).

The DIAGNOSIS rests on negative rather than positive facts.

In the first place, tubercular cutaneous ulcers occur only in the course of very intense general affection, a few months previous to the death of the patient. It will not be easy, therefore, to diagnose them in the absence of evident tuberculosis in other organs. A specially valuable indication is the simultaneous presence of tubercular affection of contiguous mucous membranes; this will be particularly serviceable in the case of suspicious ulcerations on the lips if the oral cavity be at the same time affected (Küstner). The oral affection consists of ulcers accompanied by pain; they may now and then develop on the soft palate from isolated grayish-white nodules the size of a millet-seed, hence true "miliary tubercles." These nodules change into small, roundish superficial losses of tissue of corresponding size, which soon spread and coalesce into soft, jagged ulcers. At the periphery, fresh nodules seated in the mucous membrane spring up and gradually perish in the same manner. In a case described by Jarisch, the affection had spread in one week over the whole soft and hard palate.

Should no miliary tubercles be found during life to settle the diagnosis, the latter is formed without difficulty by the microscope post-mortem. In the pretty uniformly infiltrated tissue of the bottom (deprived of its epithelial covering), as well as in that of the borders, we find the lymphoid, epithelioid, and giant cells composing the roundish nodules caseating in the centre; besides, we often find them at a great distance from the proper seat of the disease, in macroscopically apparently healthy tissue. These formations, to be designated at once as "tubercles," are often situated along the vessels.

From the above-described symptoms, it follows that the diagnosis in the main will have to be formed by exclusion.

As opposed to the serpiginous-ulcerous syphilides, tuberculosis is characterized by:

1. The materially slower course.
2. The lesser painfulness.
3. The absence of the solid, firm infiltration which is characteristic of syphilitic ulcers with generally wall-like elevated margins. In tubercular ulcerations we shall have to search for the scattered grayish-white nodules (miliary tubercles), and the small roundish exulcerations due to the disintegration of the small marginal nodules.

Epithelioma is clearly distinguished by the hard quality of its borders and the much more rapid course.

Tubercular ulcerations on the genitals and in the urinary passages resemble chancres and are easily mistaken for them. In the scant literature we find reports of extensive

ulcerations of the urethra which appeared like a chronic gonorrhœa; also of numerous minute ulcers situated on the glans, its neck, and partly on the inner layer of the prepuce, many of which represented the features enumerated as characteristic of chancre—deep base and sharply sloping margins. The differentiation will be easily furnished by experimental inoculation. In the case of a soft chancre, it will be possible to produce with almost absolute certainty inoculation ulcers which may be further transferred in generations, and having the period of incubation peculiar to soft chancre. In the case of tubercular ulcers, however, the demonstration of bacilli or the inoculation of animals will render an accurate diagnosis possible in many doubtful instances.

Mention should also be made of the ulcerations of the skull belonging under this head; they may be due to tuberculosis of the bones of the skull, and are important as mistaken for gummous ulcers.

“With rather vague symptoms and at first unchanged cutaneous investment, an abscess formed on the skull having so relaxed a feel as to be taken for a traumatic cephalhæmatoma, and containing, when opened spontaneously or operatively, ample quantities of a characteristic cheesy pus. After laying the abscess open by a large incision, its inner surface was found covered with numerous fungous granulations containing many cheesy miliary tubercles as shown by the microscope. These granulations could be easily wiped off in a characteristic manner, and then the diseased part of the cranial bones whence the abscess had sprung became clearly evident.”

The laxity of the neoplastic mass, the fluidity of the contents of the abscess distinguish this tubercular process sharply from the firm infiltration produced by syphilis.

2. Scrofuloderma.

By the name “scrofuloderma” we designate those affections of the skin which arise under the direct influence of scrofulous processes. Granulation-like masses form which develop in the subcutaneous cellular tissue, where they cause extensive detachment of the skin from its support, gradually blend with the overlying cutis, and after thinning of this cutaneous covering—which finally, of the tenuity of paper, consists only of the well-preserved epithelial elements of the skin and of very dense elastic fibrous networks—leads to the production of typical ulcerations.

These subcutaneous masses of granulation arise either primarily in the subcutaneous connective tissue or, more frequently, as sequels above softening scrofulous lymphatic glands. Perilymphangitic abscesses at times also form the starting-point of these processes. The course in every one of these cases is a rather analogous one.

There is formed a moderately firm circumscribed infiltration which may be displaced under the epidermis; it is unaccompanied by pain or any other subjective inconvenience (période de crudité). The shape is round or oval. Corresponding with an increasing softening (période de ramollissement) of the tumor, often the size of a pigeon's egg, the epidermis is gradually implicated in the process; it adheres to the tumor, becomes hyperæmic, assumes a bluish-violet aspect, and grows thinner and sensitive. Finally, often after the lapse of months, the covering over this now clearly fluctuating cold abscess is perforated (période d'ulcération) and from a small irregular opening a thin yellowish-white fluid is discharged which consists mainly of white blood-corpuscles in a state of fatty degeneration. This completes what we call scrofuloderma ulcerosum.

The form, size, and depth of these ulcers vary greatly and depend upon the point of origin of the infiltration. If it has sprung primarily from the subcutaneous tissue, a

superficial, shallow ulcer results. If one or more lymphatic glands have taken part in the infiltration and softening, we will witness the formation of a deep, sinuous ulcerous cavity from which long fistulæ often extend into the depth. In a few rare cases the infiltration and succeeding deliquescence assume particularly large dimensions. The skin and soft tissues beneath, and even cartilage and bone, are attacked and destroyed, so that fearful mutilations may occur in the face by the loss of the lips, the nose, the palate, etc. The borders are moderately infiltrated, often as thin as paper, soft, relaxed; they are demarcated from the base of the ulcer by an irregular, thin margin—a condition caused by the maceration progressing at the inferior surface; they are also undermined, that is to say, the extent of the ulcer is larger than the opening of the original abscess. In the region of the subcutaneous abscess formation the margins of the skin are discolored livid, almost violet, and shade gradually into the healthy skin. The base of these ulcerations is uneven, and shows limp, pale granulations, covered with yellowish, thin masses of pus, which bleed easily. When the secreting masses dry, thin brownish or yellow-colored crusts arise, beneath which fresh thin, fluid pus soon reaccumulates in large quantity. There is no special infiltration of the base and of the margins, nor any painfulness! Now and then there may be very prominent proliferations, before the excoriation and ulceration of the cutaneous investment occur. With this there may be developed not only one, but several small openings. Particularly on the hand we may observe such forms which then give rise to great deformities by the deeply retracted cicatrices and the changes in the bones which are not rare.

The number of the processes occurring simultaneously in the same individual is usually limited and varies between two and six. Characteristic for all these forms is the torpid course and a corresponding lack of acute inflammatory symptoms; hence it happens that patients have no suspicion of the origin of the tumor and have their attention directed to the affection only by the evacuation of the abscess.

How chronic the course is is shown by the gradual enlargement as well as by eventual closures. In the latter are formed smooth, pale and flexible—or, in the case of very irregular ulcerations, distorted—cicatrices crossed by a network of bridges of healthy skin. The most common seat of these ulcerations is on the leg, the neck, and the face. The size varies much and not rarely reaches a diameter of three to five centimetres. Dühring includes in this category the cutaneous affection described by us as *acne cachecticorum*. However, as this is an affection of *scrofulous persons* and not a *scrofulous* affection, we hold this classification to be inappropriate.

A more general form is described by Van Harlingen: a woman aged 70 had been affected for twenty years with a disease which had begun as a slowly increasing roughness of the skin of the lower extremities and had led to reddish-brown to ashy-gray discoloration. Initial nodular efflorescences covering the entire skin gradually changed into macular or scaly patches, nodes, and ulcers. The patient died of exhaustion. Examination showed universal cellular infiltration in the corium which was evenly distributed without the formation of groups.

DIAGNOSIS.—The diagnosis is based on the one hand on the above-described, characteristic appearance of the developing masses of granulation, as well as on that of the ulcerations already disintegrated; on the other hand, too, on the simultaneous presence of other processes peculiar to scrofulosis; on the eye, lymphatic glands, bones, with the pale, anæmic, often bloated skin, etc.

In the *differential diagnosis* have to be considered:

1. All those ulcerations, sometimes called *ecthyma*, sometimes *rupia*, which we,