ON EXTERNAL TUBERCULOSIS

- that is to say -

the manifestations of Tuberculosis which present themselves superficially on the human body

by

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While the literature of medicine is rich in contributions regarding tuberculosis, there is a relative paucity in respect of that part of the subject embraced under the term External Tuberculosis. This is the more remarkable because of the evident character of superficial lesions. We are only beginning to realise the variety and frequency of these tuberculous manifestations. On this account it seemed worth while to devote special attention to such lesions, in so far as they were represented in the large clientele of a Tuberculosis Dispensary.

The observations which follow are based on cases seen during four and a half years in the practice of a London Tuberculosis Dispensary, situated "across the Bridges" in the home of dirt, poverty, ignorance and tuberculosis.
When we consider the amount of infective tuberculosis that exists around us, we may well be astonished at the relative infrequency of tuberculous manifestations in the skin. Not that this latter is by any means a rare condition, for it occurs with much greater frequency than is generally supposed.

Contrary to the belief of some its development is not peculiar to youth. Cases have been described where the onset was observed in the 6th, 7th or even 8th decades of life. Certainly we meet with it much oftener in earlier life, but it is in these also that we commonly find manifestations of tuberculosis in general.

But with an annual mortality from tuberculosis amounting to 50,000 or 60,000 in the British Isles its relative rarity will be conceded by all.

One would imagine that the opportunities for its development as a result of anto-inoculation in these cases are ideal—a constitution undermined by months or years of wasting disease, a progressive tachycardia, a broken-down immunity that has failed to afford protection from the primary infection, and the presence in enormous numbers of live tubercle bacilli in the excretions.

In the case of lupus vulgaris, where the inoculum is in many cases exogenous, the marvel is that we do not find affected one member at least of every household in the slums and poor localities which harbours an open case of tuberculosis.

And again, consider the instances of blood-spread from a primary focus. The great prevalence of tuberculosis, even among apparently healthy persons, has been brought home to us in recent years as the result of post-mortem examinations, clinical refinements and tuberculin tests.

It is unnecessary to go into details. No exception will nowadays be taken to these statements: that in large towns, by the time puberty is reached, about 90% of the population has been tuberculised, and that tuberculous lesions are found in something like 75% of autopsies on adults who have died from causes other than tuberculosis.

And yet, in spite of all these potential sources, how very seldom do we recognise cutaneous tuberculosis as a consequence of a blood infection. If it be one of the grosser manifestations we are probably alive to the fact, but remembering the essentially protean character of tuberculosis in other systems we must assume that there are lesser degrees which show atypical appearances. If we suspect a tuberculous origin, perhaps from the association of disease elsewhere, perhaps from some outstanding clinical feature, we may label it a tuberculide till we have more definite proof; and, if we be in a state of diagnostic destitution about any skin lesion, it is well to turn over in one's mind the possibility of tuberculosis as an etiological factor, ere we fly to such cloaks as "heat-rash" and/
and "porridge-rash" behind which we may take refuge.

To account for this relative infrequency various theories have been adduced. Thus it has been said that the skin is resistant to the tubercle bacillus, and that since in childhood the tissues are more delicate and this resisting property is less than in later life, so we have the determination of onset of lupus vulgaris at this period.

Again, it is assumed that the skin is a poor nidus for the growth of the bacilli, one reason for this being the low temperature to which they are exposed, or the sudden changes of temperature with consequent loss of vitality.

We may take it as proved that tubercle bacilli can be absorbed from mucous surfaces, and find their way into subjacent lymph channels without showing even microscopic traces of their passage, and it has been claimed that they can likewise traverse the intact skin without giving rise to any apparent lesion.

The problem is a complex one and probably no one factor can solve it. Different strains of tubercle bacilli show differing virulence, massive infection may succeed where a slight one fails, repeated inoculation may bring forth a harvest where a single one does not take root. And the skin of one individual reacts to various stimuli in different fashion from that of another. And the resistance of one skin is greater than that of another skin. But it seems to me that most important points in connection with the soil are the influence of trauma, and the sensitiveness of the body fluids to any entering bacilli. In exogenous tuberculosis of the skin how often we are given a history of a break in the continuity of the skin previous to the onset. Not only do the bacilli gain a direct entrance, but they thus lodge in a weakened tissue.

That there is a relative defence of the body against super-infection in tuberculosis is well recognised. Koch found that, by injecting living tubercle bacilli into the skin of guinea-pigs which were already tuberculous, necrotic changes and ulceration developed at the site of inoculation, but that this ulceration very quickly healed. On the other hand, a similar inoculation into healthy animals resulted in a progressive disease with no tendency to spontaneous cure. In the former case the tissue changes showed themselves immediately, in the latter only after an interval of many days. These phenomena, and countless experiments on other animals give the same results, show that a primary infection is able to protect the tissues from a second one, in virtue of a sensitiveness to the bacilli which has been evoked by the first infection. Thus sensitiveness is shown to go hand in hand with immunity, and it may help to explain many facts e.g. why we seldom see the cutaneous tuberculosis developing in the subjects of active pulmonary tuberculosis. Lupus vulgaris develops so rarely in the course of progressive lung disease that few have met with more than an odd case where this complication supervened. When we do see acute tuberculous/
culous ulceration it is in the later stages, when the body is saturated with toxin and no adequate reaction of the tissues is possible. In 4 cases in which I did a V.P. there was a minimal or negative reaction, thus proving a failure of sensitiveness. Post-mortem warts are found in "open" tuberculous patients much less frequently than in butchers and mortuary attendants - yet the number of phthisics is infinitely greater than the number of those others, and the opportunities of the former for infection of the skin are offered continuously.

Again, were it not for some such protection we should expect to find laryngeal, abdominal and cervical glandular disease as a complication of all our infectious lung cases.

It may be objected, however, that we commonly find these skin affections in those suffering from the so-called "surgical" forms of tuberculosis. It may be that the two infections have developed simultaneously, or it may be that the localised forms do not manufacture, or send into the general circulation, sufficient anto-tuberculin to lead to the formation of a continuous supply of antibodies adequate to cope with an infection of another tissue by virulent bacilli. This would explain why pulmonary disease commonly supervenes in the course of localised tuberculosis. The insufficiency of antibody content is also shown by the persistently low opsonic index which is obtained in the local forms.

In lung disease it is otherwise. Here we have an anto-toxic disease. Bacillary products are constantly being absorbed in greater or less quantity into the blood. If this absorption be satisfactory as to dosage the immunising response to each provides the body fluids with immune bodies enough and to spare.

Many years ago Jonathan Hutchinson made the observation, regarding lupus vulgaris, that when multiple the multiplicity was attained at the very onset. After lupus is well established, excepting satellites no new patches are produced.

Such antibodies as are developed in the tissues of a case of chronic tubercle of the skin may, short of leading to spontaneous cure of the condition, be able to devitalise the bacilli and hold them in check. That some such influence is at work is shown by the sparsity of the bacilli, and by the findings of the Royal Commission that these were attenuated in the series of cases investigated by them.

A view that is widely held in France and is gaining ground in this country is that there is in tuberculous infections a scale of virulence and a scale of specificity. The two factors that determine the issue, once the bacillus has gained entrance into the body, are the number and degree of virulence of the micro-organisms, and the amount of resistance the tissues are able to set up. As these factors vary so enormously so the resultant clinical manifestations are of the utmost diversity.

The top rung of the tuberculosis ladder would be characterised by a massive infection of intense virulence occurring in

+ Clinical Journal Vol. 3 p. 347.
a subject of intensely low immunity, and this is represented by the acute tuberculous septicaemia that has recently been described - Landouzy's typhoo-bacillus infection. Here the process is so acute that tubercle formation appears to be inhibited and death rapidly ensues. At autopsy on such a case no tissue reactions suggestive of tubercles were to be found, but the lesions were merely those of congestion and degeneration. Slightly lower in the scale would be placed general miliary spread - less virulence and greater resistance (and a longer duration) allowing of an attempt on the part of the tissues to react.

Down more steps and one finds in order acute pulmonary tuberculosis, chronic tuberculosis, "surgical tubercle", true tuberculosis of the skin, scrofulosis and the tuberculides. At the very bottom of the latter a place would be found for certain "banal" conditions where the virulence of the bacillus is almost nil while the resistance is intense - the antithesis of the septicaemic type - referred to by Poncet and Leriche as the "Tubercular Inflammations". The various affections of the skin and annexae which we find in the tuberculous may be divided into 4 groups.

1. Those which we can prove conclusively to be manifestations of the reaction of the tissues to tubercle bacilli in situ - Tuberculoses of the skin.

2. Those which are incapable of such definite proof, but in which we have reasonable grounds for presuming a tuberculous origin, in some instances at least, either directly or indirectly - Tuberculides.

3. Those which have been at one time or another credited with a relation to tubercle, but on insufficient evidence, or which are so rare as to be of little importance.

4. Those which are admittedly non-tuberculous, but which are more or less frequently found in association with tuberculosis.

But the boundaries demarcating these groups from one another are by no means hard and fast - they are ever changing. Modern improvements in histological and bacteriological technique, and an ever-widening conception of the activities and of the possibilities of the tubercle bacillus, are enabling us to relegate to each manifestation its proper place in the group-system.

The non-tuberculous lesion of yesterday is the tuberculide of today, the tuberculide of today may well be the tuberculosis of tomorrow.

* The / X
† La Tuberculose Inflammatoire, by Poncet & Leriche, Lyons.
The conditions included under group 4 are of little interest. They are not peculiar to tuberculosis but are found also in many other wasting diseases.

It is most in the advanced stages of tuberculosis, and more especially in pulmonary disease, that they are seen.

The skin shares in the general toxaemia, its nutrition is impaired and its functions are perverted. The lowering of vitality allows of the easy penetration of micro-organisms into its substance, and of the deposition of fungi in its superficial layers. Of the latter Microsporon Furfur has long been associated with phthisis. It had even been alleged that the fungus plays some part in the etiology of the disease. Such a view is as erroneous as it is fantastic.

Walker (Introduction to Dermatology, 5th Edition p. 332) has seen pityriasis versicolor much less frequently in Edinburgh of late years than he did formerly. This is beyond doubt the result of the education of the people in physiological living, more particularly as regards the wearing of clean undergarments and the regular application of soap and water to the body.

Such too has been my experience in one of the poorest and dirtiest districts of London. Lately I have seldom seen the condition except in patients attending for the first time. The regular attenders, ambulant cases, do not show it, in all probability chiefly because the anticipation of an examination of the chest - stripped to the waist - has driven them to the wash tub and to the clean-linen press previous to their visits. Even in my bedridden dying patients it is only exceptionally present, and this is, to be attributed to the routine supervision and nursing in their own homes by the Dispensary and the District Nurses. It is the old parable of the Soil and the Seed - the soil is the badly nourished skin with its dirt, its epithelial debris and its accumulated secretions. Remove the soil and the seed falls on unprofitable ground.

Pityriasis Tabescentium, on the other hand, is not associated with any fungus. It is the name given to the dry, scaly, inelastic skin which is a local expression of any general wasting.

Melanoderma Cachecticorum is a pigmentation of varying depth of colour which has a predilection for the face and forehead of cachectics from any cause e.g. tuberculosis, syphilis, malignant disease, malaria, diabetes. The pigmentation may take the form of a general darkening of the face or it may appear as patches or as spots, and is well marked in many cases where the abdominal viscera are the seat of disease.

General pigmentation reaches its highest development in Addison's Disease, where a slatey bronzing of the entire skin surface is a feature of the disorder, and where the appearances shew, in the great majority of cases, a fibro-caseous degeneration of the suprarenal bodies or implication of the abdominal sympathetic system in a disease process.
The late Dr. George Gibson used to teach us in his wards, as he taught others in his writings, that in order to have the complete picture of this disease it is necessary that there be degenerative changes in the whole adrenal gland - that if cortex alone be affected then pigmentation is the prominent feature, if medulla alone then we have the vaso-motor and cardiac symptoms without any colour changes. And clinically one meets with such cases.

In many cases of tuberculosis slight symptoms compatible with adrenal insufficiency are often to be noted - a slight diffuse darkening of the skin, gastro-intestinal symptoms and a lowered blood pressure, and the name Addisonism has been given to the syndrome. At post mortem examinations inflammatory sclerosis of the adrenals has been found.

I have examined the organs of two such cases of Addisonism - one shewed caseous changes, while in the other a fibrous transformation without tuberculous architecture was all I found. The toxin of tuberculosis, it is well known, is capable of giving rise to simple chronic inflammation, and it may be that many of these Addisonisms are due to a toxaemia acting in this way. They cannot strictly be called tuberculides, for though the toxin may be primarily responsible for the pigmentation it acts through an intermediary.

In this connection I would draw attention to the condition known as Ephelis ab Igne - that reticular pigmentation on the fronts of the legs, seen for the most part in elderly women and sometimes in weakly children who have a habit of toasting their legs in front of a red fire. It is believed that repeated exposure to this temperature is necessary for its production, and that the pigmentation is due to the escape of red blood cells into the perivascular tissue consequent on a paralytic distension of the vessels of the cutis. These red cells then break down, and the colouring matter is deposited in the cutis in the lines of the vascular channels. If the cause be removed the pigmentation gradually fades, and in course of time may almost entirely disappear.

The case of J.M. as depicted in Fig. I. is of some little interest.
J. M. was a girl aged 12 - advanced pulmonary tuberculosis L3 S (Philip's Classification) - had been confined to bed for some months on account of systemic intoxication. On July 12th 1913 I visited her in her home, and acceded to her urgent request that she be allowed to sit up by the fire for a short time that evening. There was then no reticulation of the legs. Next day I found a well-marked ephelis on one leg, and learned that she had sat for 15 minutes at the right-hand side of the hearth, with her left foot resting on the fender. At the end of that time owing to weakness she was put back to bed and the photograph was taken one week afterwards. A few days later I happened to read the following notes on a clinical lecture by Dr. Shaw, Physician to Guy's Hospital:

"Diffuse pigmentation. A boy, aged 11, was admitted a month after an attack of tonsillitis for what appeared to be a slight attack of articular rheumatism with transient heart murmurs. The point of interest lies in his complexion, which is so dark as to raise the question of Addison's Disease. One might almost pass the condition as a mere congenital peculiarity, but for the mother's confident assertion that she has noticed a marked change in his colour in the last few years. There is no pigmentation of the mucous membranes and no marked increase of pigment over parts usually subjected to pressure.

A point which has prevented the mother's statement as to change being disregarded is the marked appearance of ephelis ab igne on the boy's shins. For a boy of 11 to scorch his shins by sitting in front of the fire indicates a prolonged period of ill-health. Dr. Shaw said he did not know how long it would take to cause the ephelis demonstrated in this boy, but could hardly believe it to be possible for it to be produced in the month's illness that had elapsed since the tonsillitis. The feeling of coldness which so commonly accompanied the low blood pressure of Addison's disease was of interest/
interest in this respect, as also was the question whether the pigmented condition of ephelis would be more easily and rapidly produced if the suprarenal capsules were diseased."

+ Guy's Hospital Gazette, July 5th, 1913.

J. M. died at the end of July but a P.M. was not allowed. At the time I thought it extremely probable that she had caseous changes in or around the adrenal bodies on account of a general darkening of the skin, most marked on the hinder parts of the body where she had lain in contact with the hard mattress, and in those situations where pigment is normally present. She had also a low blood pressure, abdominal symptoms, and signs of thickening and matting of omentum and intestines.

Erythema Pernio has been considered by some to be the peculiar birth right of tuberculosis. No one denies that the ordinary chilblains are very frequently seen in the tuberculous but even in this case there are an indirect result of the infection. Many tuberculous persons live their lives without showing any signs of pernio.

Any debilitating influence tends to produce them. The essential predisposing factor appears to be a loss of vascular tone, allowing of dilatation of the vessels with a stasis of the blood in the peripheral circulation. This diminished tone is pre-eminently characteristic of tuberculosis, the toxins of which show their presence in the body long before the bacilli give indication by tissue lesions. Add the exciting agent, cold, and the vitality of the tissues in further lowered, the stagnation becomes more complete, and the purple oedematos itching swellings make their appearance.

Alopecia - a loss of hair due to the atrophy of the hair-follicles from a diminished nutrition occurring in debilitated patients. It is said that complete loss of hair may be got in the last stages of phthisis. This, I believe, must be very rare. In only two cases out of many hundreds of pulmonary tuberculosis can I remember a loss of hair amounting to more than a general thinning. These two presented the appearance of an alopecia areata.

PIG

2

4A

6 inches.

FIG 2. Alopecia in a case of long-standing glandular tuberculosis.

Curvature of the Nails usually in association with a degree of clubbing of the Fingers is a common sign in cases of chronic heart and lung disease. The cause is believed to be the chronic/
chronic venous congestion that is present in these disorders. Fig. 3 shows the condition in a child of 10 years, the subject of hip and lung disease.

"Pimples" are frequently a source of discomfort. They frequently take the form of small papules or pustules set on a more or less indurated erythematous base, and are usually due to a mild staphylococcal inoculation. They occur on the face, back, chest and arms generally. Others may be of the type described as acne cachecticum, or they may be of the nature of tuberculides.

Group 3 comprises a number of conditions, the chief of which are arranged below in tabular form, with the evidence that has been put forward in support of a tuberculous origin by a very limited number of investigators.

The conditions are rare. Of exfoliative dermatitis I have seen only two cases, and neither of them shewed signs or symptoms of tuberculosis. Many of the atrophodermias are probably the scars left by necrotic tuberculides.

Calcareous deposit was present in one of my patients - a woman of 37 with old-standing lung disease. In this case the lesions were two in number and both were about the size of a pea - one on the inside of the upper arm and one on the inside of the thigh. An interesting feature was that the patient frequently coughed up broncholiths in the sputum. I was anxious to have a chemical comparison made between the broncholiths and the skin deposits, but as the latter were giving rise to no symptoms and were not enlarging, the patient declined to have them shelled out.
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Group I. Tuberculosis of the Skin:

Under this heading are included Lupus Vulgaris, Tuberculosis Cutis Orificialis, Miliary Tuberculosis of the skin, Scrofuloderma, Verruca Necrogenitana, Tuberculosis Verrucosa Cutis.

These all satisfy certain criteria which have been laid as essential before a skin affection is deemed tuberculous:

1. The presence of tubercle bacilli in the lesions.
2. The development of tuberculosis in a guinea-pig inoculated with the diseased tissue.
3. A local reaction following the injection of Tuberculin.

(System of Medicine by Allbutt and Rolleston Vol. IX. p. 467.)

As there is in tuberculous disease in general a scale of resistance and of virulence, so also in tuberculosis of the skin. And dependant on whichever of these two factors is in the ascendant, and to what extent, we have a different clinical and bacteriological picture.

Thus Miliary Tuberculosis of the skin represents a massive infection with virulent bacilli in a subject whose antibody formation is at a minimum. The duration of life is short, and numerous tubercle bacilli are found in the papules. Next comes Cutis Orificialis - a severe infection with scanty antibodies, duration short as a rule, depending on the extent of the visceral disease, and the lesion shewing many bacilli. In the Verrucous types greater resistance is evident, the course is of longer duration and at least a few bacilli can usually be found. Scrofuloderma takes the next place in the scale. Then we have Lupus Vulgaris running a very chronic course and shewing few, if any, tubercle bacilli in the lesions - so few that Darier, whose work on the subject had already become classical, acknowledged some years ago that he had never found them.

(Clinical Journal, Vol. 20 p. 304.)

Curiously enough this order corresponds also to the relative frequency with which these different manifestations of skin tuberculosis occur - miliary being the most rare and lupus vulgaris the most common.

Why tubercle bacilli should be so difficult of demonstration in lupus has long exercised many minds. To account for their sparsity it was suggested that the lesions are reactions to a toxin and not to bacilli actually present. Another theory is that most of the original bacilli are rapidly destroyed by the tissues, evidence in support of which is found in the attenuation of the remainder. Or it may well be, as Much points out, that there are typical forms of the tubercle bacillus which have lost their acid-fast properties and which therefore do not stain by Ziehl's method but which are still virulent./
virulent, or which are capable of regaining their virulence and staining characteristics by passage through a suitable animal; that these may take the shape of rods, rows of granules, or isolated granules and hence their detection and recognition in lesions may be very difficult.

Out of 20 cases of lupus reported on by two observers sections stained by the ordinary Ziehl-Neilsen method disclosed tubercle bacilli in only 20%. In these same cases Much's granula forms were detected in 100%.

(+ Bandelier and Roepke - System of Tuberculosis).

Another investigator reports, as the result of work done on tuberculous glands and spleens from guinea-pigs, that he observed no advantage whatever in the Much method over the ordinary as regards the discovery of tubercle bacilli in these organs. In this connection the conclusions drawn by Co-stan-tini are interesting. He points out that there exists a relation between the number of acid-fast bacilli and of granula forms in any given process. If that be very active the former are numerous while the latter are scanty, and the opposite holds in very chronic lesions.

x Dold. Arbeiten aus dem kaiserlichen Gesundheitsamte.

Opinion is still divided as to the significance of these Much bodies which are best shewn by the Gram-Much method and which have been found in cold abcesses, in sputum and in cultures of tubercle bacilli. They appear to be identical with the "Splitter" or "Sporoid" bodies of Spengler. By some they are considered to be a resting stage, by others an attenuation or degeneration form of the bacillus, and by others to be of no diagnostic importance whatever.

Personally I have not been able to recognise them in six cases of lupus where sections were stained in the manner recommended.

In practice, if acid-alcohol-fast bacilli are present in the lesion one need not go on to the second test. The identification of tubercle bacilli carries conviction that these organisms were responsible to some extent, if not entirely, for that lesion. Animal inoculation would be of service in determining whether the infection is human or bovine in source but nothing more. If on inoculation the animal does not develop tuberculosis that is far from proving that these bacilli were not alive when they first gained access to the human tissues.

But in the event of failure to find tubercle bacilli microscopically the second criterion may in cutaneous disease, as in other manifestations, give most valuable information. Thus the second criterion includes the first. It is a final court of appeal - only with this reservation - that the special conditions as/
as to size of the tissue and the site of inoculation be kept in mind. For in a tuberculosis or in a tuberculide we may be dealing with scanty bacilli which, though virulent at the time of infection, in all probability rapidly succumb, or which were more or less moribund from the time of their deposition in the tissues.

The value to be attached to the third standard is lower than that of the others. The specificity of tuberculin in the diagnosis of tuberculosis is upheld by many, doubted by some and denied by a few. For example such authorities as De Brunmann and Gougerot hold that tuberculin applied to lupus patches may give no reaction in that patch. Of the four reactions that may occur in response to a diagnostic injection, general, febrile, local and focal, the last mentioned is the only one of practical utility in the diagnosis of cutaneous tuberculosis, in-as-much as any tuberculous lesion, wherever situated in the body, will give rise to the other three. The terms "local" and "focal" as applied to reactions are often used rather loosely. This is unfortunate as they connote entirely different entities, and the use of them as interchangeable terms can only lead to confusion in many cases. "Local" we should limit to the changes seen at the site of injection, while by "focal" we signify these occurring round the focus of disease, which latter is presumably the purport of the third criterion.

Miliary Tuberculosis of the skin and Tuberculosis Cutis Orificialis are not universally regarded as two distinct manifestations. Sometimes the terms are used synonymously, sometimes the conditions are described as if the difference they shew is one in degree only and not in kind. But though there are certain points of similarity between them, there is good and sufficient reason for separating them, and in this country the distinction is almost always observed.

Miliary Tuberculosis of the Skin is very rarely seen, and then only as an external manifestation of a general miliary tuberculosis. It has thus been observed in young children almost exclusively, and the prognosis—that of the general condition—is a very bad one, though a very few cases have been reported where resolution has occurred, just as recovery from a tuberculous meningitis is very now and then, cited in the medical press. The bacilli are disseminated by the bloodstream, and it has long been supposed that the source is a caseous focus, very commonly in an intrathoracic gland, which erodes a blood-vessel. The eruption is commonly a sequel to measles or other fever in which we know these glands to become congested and swollen, and thus active caseation of a focus in their substance may be determined. Cornet, however, has recently suggested that the direct source of the infective material is tiny nodules of tuberculosis which develop in the vascular/
vascular walls. They are very difficult to detect, he says, and hence have escaped notice so far. But he has often found them post-mortem in miliary tuberculosis and in no other condition. These minute lesions caseate and rupture, pouring their contents into the blood, and he computes that an ulceration of 1/10 mm. can represent an escape of over 100,000 bacilli at one time. ("Acute Miliary Tuberculosis" translated by F.S. Tinker, London 1914).

The lesions are numerous, brownish-red or red papules which may in places shew a minute pustule or vesicle. Within ten days or a fortnight of their first appearance they may be wide-spread over the body. If the duration of life be long enough, small ulcers may form, but death from the associated meningitis usually occurs before ulceration is well developed.

Tubercle bacilli are found in the papules in large numbers and the structure is a typical tubercle.

Tuberculosis Cutis Orificialis (Syn. Tuberculous Ulcer, T.B. Miliaris Ulcerosa, T.B. Cutis Vera.)

As the name suggests the lesions in this type are found about the orifices of the body at the junction of the skin and mucous membrane in most instances. They develop as a complication of visceral disease and, in my experience, mainly of advanced phthisis. They are consequently found in adult life and are the result of a direct inoculation with the patient's own bacilli. Thus phthisical patients may shew them about the margins of the nose and mouth (but sometimes on the tongue, palate or pharynx) from contact with expectoration, or about the anus from infection with swallowed sputum. The faeces in intestinal tuberculosis may also give rise to ulceration in the latter situation, and bacilli-laden urine from some part of the genito-urinary tract may determine its site at the orifice of the urethra or upon the vulva.

The first evidence is the appearance of a cluster of tiny papules, miliary tubercles, light or reddish in colour. Softening soon shews itself and is followed by the picture of miliary ulceration. These small ulcers enlarge by extension and fusion till a rounded or irregular superficial area of the skin about the size of a sixpenny-piece is destroyed. The edge is ragged and friable and is sometimes undermined, while the floor shews pale unhealthy granulations and is often more or less irregular from the presence of minute tubercles. Its surface is moist as a rule, and during the night a scab may form which is often washed off during the morning toilet.

The prognosis of the ulceration is the prognosis of the primary focus - in my experience advanced visceral disease has been present in every case to which the patient has succumbed some months later.

Tubercle bacilli are present in the discharge and in the tissue and the structure is definitely tuberculous.
In the course of over 4 years' whole-time work among tuberculous patients I have notes of only 5 instances of labial, palatal and anal infection.

The diagram shows the sites of ulceration on the mouth. The soft palate was affected in 2 cases and the hard palate in one. In the anal case the anterior edge was the site.

Of these 5 cases, 3 were males. The average age was 33 and the patients when first seen by me came under the $L_3$ categories in Philip's Classification.

Scrofulodermia:
This term has been used by different dermatologists to include various conditions. Thus Morris embraces under it Strumous Ulcers and Lichen Scrofulosorum. Others consider the Tuberculides as a sub-section. Walker, following the teaching of Unna, limits the name to "those cases of tuberculosis of the skin where the infection proceeds from a tuberculous focus beneath" - a definition which is a simple one, and at the same time calls up before the mind a well defined clinical type. The focus beneath is commonly glandular, and scrofulodermia is typically seen about the neck, though it may occur in the region of lymph glands elsewhere. Figs 5-6 are photographs of the same patient, and shew multiple lesions of both sides of face, of neck and of both axillary regions. They had developed subsequent to suppuration of glands in the neck and axillae seven years previously. The left wrist shews well-marked osseous change with sinus formation.

† Introduction to Dermatology. p.
Or the focus may be osseous, in which case the fistulae lead down to the diseased bone, and the skin changes centre round the mouths of the sinuses. (FIG. 7.)

*Fig. 7 Scrofuloderma changes around sinuses*

A gland becomes infected with tubercle bacilli which it is unable to overcome. It enlarges for a time, feels hard, and the skin is moveable over it. Later this skin shows some slight reddening, is found to be adherent to the mass underneath and a boggy area can be detected by the finger. The redness increases in intensity and extent as caseation proceeds throughout, until finally one sees a roundish purple area of skin with points of impending breaking-down. The skin gives way at these points and the thin fluid contents escape, giving opportunity of access to the ordinary pyogenic organisms.

The intervening islets of purple, infiltrated and unsupported skin gradually necrose, and the surrounding integument is involved in a sluggish inflammatory process, so that an ulcer is formed with purple, undermined, eroded edges, and pale weak granulations covering its floor. Scabbing results, retaining purulent secretion which finds an exit at some corner every few days, and the whole scab loosens and comes off. And so the process goes on very slowly, it may be for years, more and more of the adjacent skin being destroyed and more and more patches arising from other subcutaneous foci. But spontaneous healing may occur. The cicatrix left is often smooth and pale with pink stellate capillaries coursing over it, or it may be more or less puckered as a result of fibrosis with the familiar tags and bridges of skin.

*Fig. 8 Scrofuloderma secondary to cervical adenitis, scraped about a dozen times in all with no benefit.*
Scrofulodermia is a disease of children and adolescents mainly. It is a chronic condition and when it is seen in older people a history of many years' duration is usually to be obtained.

The prophylaxis of scrofulodermia is efficient treatment of the focus before the skin has become involved; therefore the prognosis turns, as in all tuberculosis, on the early recognition of the cause, and the thoroughness and of the methods used to remove or annul that cause.

FIG. 9 shews scarring left after surgical operation for adenitis with associated skin infection. Two sinuses continued to discharge but healed during a course of tuberculin.

FIG. 10. Boy, aet. 6. Developed large cold abscess in neck. Aspirated just before skin gave way. Sinus discharged for 2 months and skin began to shew early scrofulodermia round orifice. Scraping and a course of tuberculin led to healing and no recurrence noted 3 years later.
FIG. 3. Female.  Aet. 25. Morbus Coxa developed 10 years before. Extension applied by weight and pulley fixed below knee with the result that knee-joint was dislocated as shown. The scars over the hip-joint are the seat of secondary tuberculous changes.

Closely allied to scrofulodermia as described are other cutaneous tuberculoses which used to be seen much more frequently than they are today. The more important are the following:

The Scrofulous Gummata of the older surgeons which have their origin in the subcutaneous tissue quite independent of underlying gland or bone disease. These first show themselves as hard nodules in the hypoderm, from the size of a large pea to that of a marble, usually situated on the back or the limbs, and they recall to the examiner the feeling of a hard chancre under the prepuce.

They are found almost always in children under the age of 10, and the skin changes as they soften and burst externally— which they may do in the course of a week—are very similar to those outlined above.

The prognosis is very good; spontaneous cure often occurs, a depressed white scar marking the site of ulceration. It has been suggested that some of these really belong to the Erythema Induratum of Bazin.

FIG. 11. Depressed dead-white scars following the healing of Scrofulous gummata. Ulceration had been present for about a year when I first saw her, and she was sent to me for tuberculin.

FIG. 12. Scrofulous Gumma developing on calf of girl aged 8, the subject of tuberculous glands in neck. No other lesion. Gumma excised. No recurrence.
culin treatment. After 2 months the ulcers healed, but tuberculous nodules were still present at the margins as seen in figure. These were excised, tuberculin maintained, and healthy scarring resulted.

FIG. 14 Section from marginal nodule shews tuberculous structure; peripheral zone of round cells and central area of epithelioids with giant cells.

FIG. 15 Section of Gumma: shews dense aggregation of round cells with epithelioid cells in places. No giant cells visible, process of much shorter duration than in Fig. 14.

Tuberculous Lymphangitis occurs in the limbs and is the result of a spread from a distal primary focus of infective tuberculous material along the lymph channels. The primary focus is very commonly a warty lesion on the hand or foot. At intervals in the course of its efferent lymphatics there develop nodules which undergo caseation and suppuration, aided in the latter by the action of the associated pyogenic organisms, and resulting in typical tuberculous ulcers. Sometimes the walls of the lymphatics themselves become infiltrated to such an extent as to be felt as hard cords running up the limb, and a pseudo-elephantiasis may be thereby produced.

Under "Warty" tuberculous lesions are grouped certain conditions in which papillary and epithelial hypertrophy are a conspicuous feature. Such overgrowth may be seen in chronic ulcerations and infiltrations from whatever cause. When it occurs in the course of lupus vulgaris the term lupus verrucosus is often applied. But by warty tuberculosis of the skin one usually refers to those lesions which go under the names of Verruca Necrogenita and Tuberculosis Verrucosa Cutis.

Whether these two conditions are one and the same opinion is divided. Some dermatologists make use of the titles as if they are synonymous, while others draw distinctions as regards size of the lesion, tendency to spread and liability of infection of glands and viscera secondarily. Their etiology is believed to be a common one - the direct introduction of tubercle bacilli into an abrasion of the skin. When first described the source of infection was supposed to be limited to animals and the products of animals, but this conception has/
has been widened, and we now recognise that the living tuberculous person is a frequent cause of the skin lesions, both in himself and in his fellows. The disease is in a sense a trades' disease - butchers and cooks contract it from meat, mortuary attendants from cadavers, laundresses from linen, doctors and nurses from patients' discharges, and patients from their own discharges. It is said to be common in miners who, as a class, are liable to slight injuries to their hands and we know that the mortality from phthisis among miners is a high one.

Again the early clinical course of the two conditions does not differ. A small flat red papule is first apparent. Later this becomes pustular and a scab forms on the surface, while the base begins to show some induration and the margins assume a violaceous tint. When the scab drops off it may be thought that the infection has been combated, and that fibrous overgrowth has been left behind. In some weeks however, the lesion begins to stand out more and more and the surface shows irregularities which continue to grow out, so that ultimately a projecting warty nodule develops, from the crypts of which, on pressure, droplets of pus exude in which tubercle bacilli can be detected.

That is the description of the BifcTV Wart in its simplest form. The name T.B. Verrucosa Cutis has been given to a more extensive condition where large areas of the skin, it may be from the fingers well up to the shoulder (plate 19. Dockrell's Atlas of Dermatology.) are the seat of elevated warty tumors with central scarring and a peripheral red halo.

It would simplify matters if we might consider these two as types of one disease, differing not in kind but in degree only, the development of the more advanced type depending on variable factors as regards resistance of skin, immunity of patient, virulence of germ and treatment of the lesion in its early stages.

In my Dispensary work I have met with the condition only 3 times, though I am assured by the local mortuary attendant that many of his colleagues in London are affected. My 3 cases all belonged to the early stage,

/. Subject of FIG. 16. Woman 42, Advanced P.T. Machinist. Frequently used to knock skin off knuckle at the same place in the course of manipulating her machine, and a raw surface was present for weeks at a time.

FIG. 16. P.M. Wart in case of phthisis.
The photograph was taken when I first saw patient. The character of the lesion can best be shewn diagrammatically thus:

![Diagram](image)

FIG. 1

Tubercle bacilli were present in the pus underlying the scab. The epicondylar and axillary glands were enlarged, hard and tender. Excision of the nodule in April 1915 was followed by a healthy scar; the glands subsided to a certain extent; last seen by me in June 1915. Sections of the lesion shewed typical giant-cell systems and bacilli scattered throughout.

![Diagram](image)

FIG. 17

2. Girl aet. 12. No signs of tuberculosis in other systems. Sister died of phthisis at home some months before. Lesion situated on front of wrist near radial margin and discovered on the routine examination of members of the household. History (given by parent) of child having been cut by a piece of glass at the site about 7 months previously, and suppuration followed for some weeks. No scar visible in corroborations. Tubercle bacilli in pus. Lesion excised and tuberculin administered. No recurrence at end of 5 months when she left district and was lost sight of.

![Diagram](image)

FIG. 18 P.M. Wart. Low power. FIG. 19 P.M. Wart. High power

3. Sailor, aet. 38. - subject of advanced pulmonary tuberculosis. Lesion situated as drawn, smoked "twist", and in cutting used to rest his roll against right thumb so that the knife often penetrated the skin and he had a more or less permanent crack in that situation, which later took on the characters of a warty tuberculous lesion. No active treatment. Patient died 2 months after I first saw him, caseation of a gland in the right axilla having in the meantime occurred.

![Diagram](image)

FIG. 20
Normal Walker refers to Verruca Necrogenita as the most benign form of cutaneous tuberculosis, but this opinion is not shared by some other authorities (e.g., Sequiera) who find visceral disease a not uncommon sequel.

Lupus Vulgaris is in most cases a primary tuberculosis of the skin. It is the commonest manifestation of the ravages which the tubercle bacillus makes in the cutaneous tissues, and is responsible for much of the facial disfigurement which we see in the streets of our large towns. The face is its favourite site and in most cases is its only site. But it may occur anywhere, and the face may shew similar lesions or be free from disease.

The frequency with which the junction of skin and mucous membrane (e.g., at nasal, buccal apertures and at orifice of the lachrymal duct) is involved coincidently with lupous changes in the respective chambers, it may be with a long history of slight symptoms of the latter, suggests that the process has extended outwards from the mucosa. But in many cases of lupus of the exterior no mucosal lesion can be detected, and in those where one can be discovered it is sometimes very difficult to say which is primary in origin. In the Finsen Institute at Copenhagen involvement of a mucosa is found in about 80% of lupus cases. At the London Hospital the figure is decidedly lower, 43% of a total of 964; but still it is high enough to warrant our first remark to every lupus patient - "open your mouth".

The next most frequent site is the neck. But here the condition is very often secondary to underlying foci, so that we might have expected to find a scrofulodermia instead. Often however, lupus vulgaris develops on the top of a scrofulodermia as occurred in the subject of FIG. 22. Apple jelly nodules gradually appeared at the margins of the ulcerations, and later the surface took on the thickened warty characteristics of a lupus verrucosus.
In his series of cases Jones found over 11% to have this origin.

System of Medicine by At&butt and Rolleston Vol. 9. p. 470.


Other parts of the body are affected in varying proportion buttocks, limbs (especially hands and feet) trunk and rarest of all the scalp.

In general, lupus is due to direct inoculation with tubercle bacilli which gain access to the tissues in all sorts of ways. Thus it has been suggested that an initial lesion of the nasal mucosa is due to the inhalation of bacilli on to a surface the vitality of which has been lowered by the nose-picking to which children are addicted. The face itself, the buttocks and other parts are then commonly inoculated by the scratching with these infected finger-nails. Other cases are recorded where tattooing, ear-piercing, vaccination, ritual circumcision, hypodermic puncture and other minor injuries are believed to have afforded a simultaneous lodgement to the tubercle bacillus.

One concedes the possibility of a lupus contracted during the actual operations of tattooing and circumcision, where the parts devitalised in the process come in contact with saliva from an "open" operator. But vaccination comes under a different category, and though lupus has several times been described as occurring in the scar of a small-pox vaccination and has thus been attributed to the latter, it would seem hard to invest that triumph of preventive medicine with a further terror on these grounds only. The likely explanation is that the ubiquitous tubercle bacillus becomes engrafted on a surface prepared for its reception by the scarification. One has only to observe the indifference to asepsis coupled with the misdirected zeal of a certain class of the South London community to realise how manifold are the opportunities for secondary inoculation.

A dirty rag or filthy shield or no dressing at all, an itching sore and five sharp nails, a bevy of relatives and neighbours each of whom admiringly inspects and palpates the pustules - and then come the "bad" arm, the vaccination that "takes", the hundred and one maladies that have their origin in vaccination and the "conscientious objector".

Notes of 4 cases from Dispensary practice.

1. S.W. aged 21 months. Mother has "open" P.T. Vaccination at age of 5 months; since when S.W. has been ailing more or less. Arm shows 3 vaccination scars, one of which shows tiny yellowish-brown spots suggestive of very early lupus. Other scars healthy, but at side of one a few more papules developing thus:

![Image]
Mother had not noticed the spots till I drew her attention to them, so no evidence as to duration was forthcoming. The symptoms on account of which the child was brought to me turned out to be those of a general tuberculosis to which she succumbed some six weeks later.

2. A.R. aged 18 months, Sister died of P.T. one year ago. Brother died of Meningitis 9 months ago. Father died of "pneumonia" at age of 35. Patient brought for treatment for cough and loss of weight. Rales evident all over chest, some cyanosis, marked languor and general flabbiness. Left arm shows 4 vaccination scars, two of which are the seat of small nodules (one in each) the size of a small bean, of the consistency of putty, while the overlying skin is assuming a purplish tint. Parent says these appeared soon after vaccination. In view of the bad prognosis given by me (and in the hope of obtaining better advice) patient was taken to a general hospital. The nodules were incised and patient was kept in hospital for one week. Thereafter she was sent home. Wounds refused to heal – no T.B. found in discharge. Died from an acute tuberculosis some weeks later.

In 2 instances I have observed an interesting phenomenon which has not to my knowledge, been recorded elsewhere. The patients were aged 6 and 8 respectively. On the first or second day following a V.P. tuberculin test (using undiluted Old Tuberculin) in these children the reaction at the site of scarification was positive, but one vaccination scar shewed a hyperaemia which was not present previously. This was slight, evidenced by a pinkish tinge and dilated venules running across the scar, and was confined to the scar area which before had appeared a typical white healthy one. The V.P. was repeated some weeks later and the same result obtained in both cases. Further, the scar reaction was obtained on the one arm when the test was applied to the other arm. To explain it one assumes lying latent in the scar tissue and the absorption of a small quantity of tuberculin into the circulation, thereby giving rise to a minimal focal reaction.

In addition to direct infection of the tissue, spread of the bacillus via the blood probably occurs, but much less frequently. It is suggested in those cases of disseminated lupus which are chiefly seen after one of the infections fevers, and the part/
part played by the fever is as discussed under Miliary of the skin.

The satellites which spring up in close proximity to the edge of a parent patch perhaps represent an extension along lymph channels or perivascular spaces.

The theory of Infection by Inheritance - that the are laid down in the skin of the foetus - finds few supporters. We believe that a child is very rarely, if ever, born already tuberculous.

The frequent association of lupus with tuberculosis of other tissues and with a family history of the same would lead one to suspect, even in the absence of proof, that the is the responsible agent. All are agreed that glandular and osseous disease is a common accompaniment. But wide difference of opinion exists as regards the relation of pulmonary tuberculosis to lupus. Thus to quote extremes: Leloir finds that nearly 60% of his lupus patients develop while Morris thinks such a complication is infrequent, and Hyde confesses that he has not yet observed it.

The majority believe that death from phthisis commonly occurs in the subjects of lupus. It is admittedly rare, however to find an active case of lung disease develop the skin condition. Personally I have never met with one such in some hundreds of cases of which I have followed up for periods varying up to 4½ years.

Lupus Vulgaris is, in its beginnings, a disease of childhood and adolescents - rarely revealing itself after the age of 30.

It is one of extreme chronicity, and this may be co-related with the sparsity and the attenuation of the bacilli in the diseased areas.

The essential lesion of lupus is the "apple-jelly" nodule which begins deep in the corium as a collection of tiny follicles. Gradually these grow up towards the surface. In their course they enlarge and take on a yellowish tint, so that a macular stage is reached. This passes on to a papular stage, and finally by continued growth the typical lupus nodule is seen as a small superficial infiltration, of a soft consistency, of a pale red to dark red colour, with a smooth surface and a translucency always compared to apple jelly.
By gradual fusion with other nodules and by peripheral extension, or by the development of fresh nodules in the vicinity the lupus area may very slowly, almost imperceptibly, increase in size for months or years, involuting and cicatrising in the centre perhaps, while still progressing at the margins. It is circumscribed, easily demarcated from the healthy skin and with a greater or less tendency to surface scaliness.

And all the time it is producing no pain, no itching, no symptoms whatever, and by the poor, to whom any lesion appears in proportion to its effect on the working capacity, in the early tractible stages it is viewed with the utmost indifference. That then is the Lupus Non-exedens type of the older writers.

Sooner or later, however, in the course of the vast majority of cases complications supervene, and Lupus Exulcerans is by far the commonest manifestation of such. The nodules appear to break down to form shallow ulcers, and the clinical picture is entirely changed. Purulent discharge and ugly dirty scabbing are now the predominant features, and the process is no longer one of dormancy but of angry and aggressive disease. It must have been this ulcerative type that suggested the term "lupus" before the causative agent was known. But the wolfish aspect of the disease is not to be attributed to the action of the per se, for we know how very insidious the activities of that organism may be — but rather to the superadding of pyogenic infection, the invasion of cocci and other bacteria, the beneful influence of which is manifested in all forms of tuberculosis.

Such nomenclature as "non-exedens" and "exulcerans" was, however, founded on faulty observation, for as Walker points out "... there is no ulceration in the true sense of the word. However ulcer-like the case may appear, careful examination/

+ Introduction to Dermatology p. 252.
examination will disclose the fact that the surface is still covered, imperfectly, it is true, with epithelium. The epithelium is swollen, distorted almost beyond recognition, but it is still there. The process is essentially one of catarrh. So it were well to give up the old and misleading and adopt a terminology in accordance with modern histological knowledge, and the substitution of the terms "simple" and "catarrhal" in place of the others, as suggested by Walker, will go far to prevent the misconceptions of the past in regard to treatment as well as to etiology.

Lupus vulgaris, perhaps more than any other skin condition has been burdened with a multitude of names which merely connote an undue prominence of certain clinical or histological features. Thus we have Hypertrophicus, Verrucosus, Serpiginosus, Exfoliatus and many others. There is a tendency in such structural refinements to lose sight of the foundation stone, for they own a constant origin—the tubercle bacillus—and under which form they will ultimately be classified depends on complex and varying factors.

FIG. 27 shews some of the secondary effects of a well-marked lupus affecting the skin of the face, all the mucosae in the vicinity, the neck and the hands. The disease was of some years' duration, and the history suggested that the nasal chambers were first involved. The patient is a sister of the boy represented in FIG. 49 A Sister died of at home a few years previously and another sister has also lupus vulgaris, though not so pronounced as this patient. The two last mentioned have always been bed-mates.

FIG. 27 Diffuse Lupus Vulgaris of face, neck and hands.

These effects include the atrophy of the cartilages of the nose from the pressure of contracting scar tissue, the thickening of the eye-lids from an infiltration in response to primary and secondary pyogenic infection, the retraction of the lips from the pull of fibrous tissue and the "drawn" appearance of the skin in this region, the loosening of the teeth from implication of the gum, so that they are about to fall out of their sockets. The sight of one eye was practically lost from disease of the cornea, and the nail of the small finger of the left/
left hand was destroyed. The tendency to central scarring in the circum-oral region and marginal spreading on the cheeks and neck are shewn, while the forehead was the seat of outpost-like apple-jelly nodules and other lesions of the nature of a papulo-necrotic tuberculide. Finsen light, X-rays and other methods of treatment had alike proved of no permanent benefit. Lupus Vulgaris affecting parts other than the face shews no special features. Any of the forms may be present. On the limbs and trunk the lesion is usually single, and there is a tendency for a larger area of surface to be involved. (Fig. 29)

![Image](image.png)

**FIG. 29** Section of Fig. 29. FIG. 29. Lupus of popliteal space.

The diseased tissue stands out more boldly owing to a greater development on the growing margin of an exfoliative or papillomatous element, while the scarring in the centre is usually much firmer and denser than it is elsewhere.

In Fig. 30 a large rounded area is seen on the lower thigh of a girl aged 12. When 6 years old she had a portion of the lower end of the fibula excised for tuberculosis, and a small lupus patch on the front of the ankle was removed at the same time. Some months later lupus appeared as a single patch on the thigh and gradually extended till it occupied the area represented by the small clearer circle in the centre. Thereafter it remained stationary for a time.

![Image](image.png)

**FIG. 30** Section of same. FIG. 30. Lupus of thigh.

but during the last 3 years the process has advanced rapidly so as to attain its present dimensions. A small subcutaneous nodule has developed within the last 3 months, internal to the upper end of the fibial scar, and early nodules have appeared.
appeared in the scar of the original lupus. (FIG. 32)

Recurrence in the scar of a former lupus area is not uncommon, and excision, by many considered the treatment par excellence, has been discarded by others, excepting in selected cases, on account of its liability to be followed by such recurrence.

My experience of the results obtained by others, for it is too early to cite my own results in a very limited number, has biased me in favour of the method. However, most of the evidence is based on the statements of the patients themselves and is not above suspicion as to exaggeration of the nature of the disease before operation. Not so, I believe, in the subject of FIG. 33. This woman, who showed a scar on her right cheek, brought her daughter to me for an opinion as to whether a certain spot on the child's face was lupus. Such enlightenment on her part led me to question her regarding her scar, and she gave this history: that 15 years ago she had had a lupus exedens removed from her cheek by Mr Annandale in the Edinburgh Royal Infirmary; that 3 years later (12 years ago) she had a recurrence at one corner; that this was excised by Mr Alexis Thomson, since when she has had no further trouble. The scar is now a perfectly healthy one, and the disfigurement is remarkably little.
The freckle-like spots are of the nature of a chloasma due to a uterine disorder.

The age at which these tuberculosas develop is determined by the accident of inoculation. Thus, scrofulodermia is most rife in those decades when the incidence of gland and bone disease is greatest. So also miliary tuberculosis of the skin is a manifestation of infancy and early childhood. Tuberculosis orificialis is seen oftenest at that period of life when the mortality from phthisis is highest.

Lupus vulgaris attacks the young poor - the young child because the tissues are delicate, and the floor is the playground for the first few years of life - the poor child because of all the penalties which poverty brings in its train; malnutrition, overcrowding, neglect and fatalism. Add to that an infectious father spitting in the doorway where the infant is likely to crawl, or a mother in an advanced stage smearing the child's face with tubercle bacilli every time she kisses him. The wonder is that any escape!

G.S. aged 12, whose mother had died of phthisis 10½ years before, was examined at a "March-past". She shewed no signs of active lung disease but walked with a slight limp, which she said was due to "corns". She had tried most of the plasters on the market, and had had free medical advice on various occasions. When the part was uncovered it shewed the appearance seen in FIG. 34. Warty lesions.

Pathology of Cutaneous Tuberculosis.

The discovery of the tubercle bacillus led to the identification of all these forms of external disease as essentially the same as tuberculous lesions in internal organs - a reaction on the part of the tissues against a specific bacillus, and degenerative and reparative changes, more or less pronounced, following in its wake. But that discovery merely confirmed a belief that already existed, born of the structural similarity noted/
noted between the miliary tubercle in a viscus and the apple-jelly

FIG. 36 Miliary Tubercle of FIG. 37. Lupus Vulgaris. Lung.

nodule of lupus vulgaris. And these are two extremes, for clinically a caseous miliary process is an actively progressing infection, while lupus may endure for the better part of a life-time.

So we may take the nodule of lupus as a type for consideration of the fundamental processes occurring in these external manifestations of tuberculosis. A typical section shews in the earlier stages in the deeper layers of the corium several small rounded areas, not necessarily situated, as pointed out by Unna in relation to a blood-vessel. These areas or "follicles" are composed of large cells with granular cytoplasm and large clear nuclei - the epithelioid or plasma cells of Unna - which lie in a very fine network of fibrillary tissue. The cells represent mainly an adventitial proliferation. At the periphery of the follicle, in the form of a band, is an infiltration of small round cells with scanty protoplasm and darkly-staining nuclei, while in the centre there may be one or more large multinuclear cells of the type known as giant-cells. An aggregation of these areas constitutes a "tubercle". If tubercle bacilli are to be seen they are often found congregated at one end of a giant cell, or they may be distributed.

FIG. 38 Giant-cell of miliary FIG. 39 Giant-cell in Lupus tuberculosis shewing T.B. at tissue. No. T.B. visible. one pole.
Sooner or later in most cases this proliferative stage is followed by a degenerative one, along with which reparative changes go hand in hand. As a result of the poisonous action of the tuberculous toxin on this newly-formed tissue, aided perhaps to a slight extent by the avascularity of the follicles for no blood or lymph vessels penetrate them - a homogeneous degeneration begins in the cells of the centre. There the epithelioids swell, their granulation becomes less apparent and the nuclei lose their power of taking up stains, while the supporting fibrillary tissue is gradually lost sight of. But all the time Nature is setting up a barrier. New connective tissue cells are being laid down from a proliferation of the peripheral cells of the plasmatic area, Unna thinks. This area by its central swelling compresses these cells, so that a capsule of fibrous tissue is ultimately formed which has for its object the protection of neighbouring parts from the effects of the bacilli or their toxins.

The results of this compression are seen too in an obstruction of the skin glands, resulting in their dilatation (FIGS. 40 & 41.) though later they are involved in the cell-growth.

FIG. 40 Shewing dilatation of skin glands. Low power. High power.

FIG. 41 Same. High power. skin glands. Low power.

The overlying epidermis shows changes sooner or later. As the process approaches the upper layers of the corium the papillae and the cells of the rete usually undergo atrophy, (FIG. 42) On the other hand they sometimes show a hypertrophy, the epidermis becoming thickened and sending prolongations downwards so that the histological picture may come to resemble that of a squamous epithelioma (FIG. 43.)

FIG. 42 Lupus shewing atrophy of papillae and of rete. Hypertrophy of epidermis.
A minor degree of this is often seen at the margins when the centre is occupied by an atrophied area.

That there is the developed tuberculous architecture, as exemplified by lupus vulgaris.

But just as different cases of pulmonary tuberculosis shew variations as to acuteness or chronicity, and just as lung disease in the same individual takes a different course under the influence of a catarrh, superadded infection or other complication so also do the tuberculoses of the skin — and all these clinical departures from the simple form are reflected in the structural findings.

The amount of degeneration is found to correspond closely to the number of bacilli present and this latter determines the acuteness of the process. Where these are plentiful, as in Miliary Tuberculosis and Tuberculosis Orificialis, the tubercles rapidly soften and give rise to a cheesy fluid, perforates the epidermis and leads to acute ulceration. This "caseation" is not found in the other varieties of cutaneous tuberculosis. A section of such a tubercle shews dense collections of small round cells scattered throughout the cutis with few epithelioids and very occasional giant-cells, but with tubercle bacilli present in large numbers. For giant-cells are not a feature of acute lesions. Their number varies inversely with the abundance of bacilli. Hence in lupus vulgaris, where scanty bacilli are found, these cells are seen more constantly than in the other forms.

Giant-cells are not peculiar to tuberculosis, being found in infective granulomata generally and around foreign bodies embedded in the tissues.

In the absence of tubercle bacilli it is the whole picture present, and not any of its separate elements, that warrants us saying that a given section shews a tuberculous structure.

But a tuberculous lesion may not reveal tubercles. Unna + with reference to diffuse lupus, says: "We see that this arrangement is exactly the same as that of the cells in all weaker poisons and shews nothing specific of tuberculosis"; and again, "we have nothing to suggest the familiar scheme of tubercle and yet we have before us a pure form of tubercular tissue". Another observer has found that the tubercle bacillus may produce chronic inflammatory changes alone, and that this is true not only for the nerves, veins, heart and kidneys but also for the skin. x.

—Histopathology of the Skin, translated by Normal Walker, p. 582, 583.

x System of Tuberculosis, Bandelier and Roepke.

If this be so, then such a definition of Tuberculosis as a disease characterised by the formation of tubercles is obviously of too limited application. As Poncelet and Ieriche point out: "To apply the term tuberculosis to processes in which there are no tubercles, is, for an Englishman, quite wrong. The French, on the other hand, may do so; for they speak, not of tubercles, but of follicles. So that, by the phrase 'tuberculose non-folliculaires'
folliculaire, a Frenchman means a disease process due to Koch's bacillus, and yet not characterised by what we call tubercles.

GROUP 2. Tuberculides.

In the majority of the lesions grouped under the common name tuberculide the evidence of a tuberculous origin is to a certain extent circumstantial - in some types stronger than in others. They are met with in persons who are the subjects of elsewhere. In about 90% of those which have come under my own observation the primary focus has been a gross, easily recognised one, lung and glands being affected in almost equal proportion. In some cases no tuberculous disease is evident on physical examination. In these the eruption is of some diagnostically value, as it signifies a latent lesion perhaps in a lung, or in the tracheo-bronchial or abdominal glands which, if untreated, may shew itself later. Hyde thinks that in some cases a hereditary tendency only may be present - a latent lesion account for these cases too, as the opportunity for infection has probably been offered.

Again, in some of these eruptions the histological structure which we associate with has been shewn from time to time by various observers.

The occasional co-existence, in the same patient, of some of these eruptions with other skin lesions that are definitely tuberculous leads us to suspect a like etiology, and their frequency after measles recalls to us how often tuberculosis of other organs first manifests itself as a sequel to that disorder.

Compliance of the tuberculides with the criteria which are considered essential in the case of the tuberculoses has not in most instances been proved finally, though individual observers have recorded positive findings.

The results of the various tuberculin tests vary as to value. The cutaneous, percutaneous and ophthalmic applications of the drug are very commonly positive, but so are they in the general population. Subcutaneous injection here, as in the diagnosis of in general, gives more valuable information. It is often followed by a general and a febrile reaction, and sometimes by inflammatory changes in the lesions themselves, focal reaction at the site of tuberculous disease which in the last analysis, is the motif of therapeutic vaccination.

The term tuberculide was coined by Darier in 1896 on the analogy of the eruptions seen in syphilis and named syphilides. But the analogy appears to be an unfortunate one. Under the latter we include all these lesions which we believe to be syphilitic in origin. The tuberculides, on the other hand, were so-called in contradistinction to the forms of true tuberculosis of the skin, inasmuch as the former were believed to be caused by tuberculous toxins coming from a distant focus, while the latter were shewn to be the reaction of the tissues to living tubercle bacilli actually present locally. Later various observers recorded the occasional finding of a few in some of these lesions which had hitherto been classified as tuberculides, and as a consequence a second theory as to their origin came into being - namely that they are the expression/
expression of a reaction due to the presence of $\beta_3$ in the lesions - a blood spread - but that the bacilli are in such sparse numbers, or in such a low state of vitality that the tissues are able to cope with the invaders, which fall a rapid prey to phagocytosis.

The supporters of the toxin theory argue that the introduction into the body-fluids of various substances, quite independent of bacteria, may give rise in susceptible persons, by virtue of toxic action, to different skin manifestations. Instances of this are found in the administration of anti-toxins, of sera and of drugs, and in the absorption of intestinal and other microbial and catabolic toxins.

The action of tuberculin in tuberculous subjects gives support to the theory. Old tuberculin which previously to the introduction of T.A.F. was the preparation universally employed when a diagnostic test was applied, is a mixture of soluble exotoxins with a small amount of endotoxin, but containing no bacilli or bacillary debris. So that the response of the tissues to old tuberculin is a response to a toxin, and hence a tuberculide in the original sense of the term. The well-marked Von Pirquet reaction shows a red blush for some distance round the central scarification, and one has seen on occasions the entire arm the seat of an acute erythema from this cause.

Diffuse erythematous simulating measles or scarlet fever sometimes appear a few hours or a few days subsequent to an injection of tuberculin, and have been known to lead to error in diagnosis. Further, tuberculin injections have been followed by exanthemata bearing clinical features identical with rashes observed in the tuberculous, to whom the drug had not been administered. Thus lupus-like changes, lichen scrofulosorum and papulo-necrotic lesions have been seen as a result of bacilli-free tuberculin, and even of dialyzed preparations from which ultra-microscopic bacillary particles had been eliminated.

The explanation given by the toxin school for the discovery of an occasional $\beta_3$ in a tuberculide raises a question that is a vexed one - that of the frequency with which $\beta_3$ are present in the circulating blood of the tuberculous. They argued that these skin lesions occurred in patients showing gross tuberculosis disease, from which the exciting toxins had been carried by the blood to the skin, and that an occasional $\beta_3$ might very easily find its way thither from the active primary focus. It is now some years since Rosenberger made what would seem to have been a somewhat extravagant statement that he had found $\beta_3$ in the blood in every one of 300 cases of all forms of tuberculosis (lupus included) examined by him. Kurashige also reported that 100% of his cases were positive. But other investigators put forward more modest claims and limited their successful findings to the vicinity of 30 to 40%. At the other end of the scale are McFarland's+ and Hewat and Sutherland's+ investigations. The former, working at the Henry Phipps Institute, failed to find $\beta_3$ in the blood of 50 patients, the latter, in this country, in 20 cases reported 100% negative.

Towards/

B. M. J. 22nd March, 1913.
Towards the end of 1913 at the Bermondsey Tuberculosis Dispensary I examined the deposit from 10 cc. of blood of 8 patients. The cases comprised 1 acute broncho-pneumonia, 6 chronic, and 1 scrofuloderma. With the exception of the broncho-pneumonia all these had been under treatment with tuberculin for periods varying from one month to one year. 24 to 48 hours previous to withdrawal of the blood 7 of them were given an injection of Beranec's tuberculin - a dose which was considered the optimum dose in each case, and which did not give any marked reaction.

Prof. Lydia Rabinowitsch had revived the theory of Virchow of a quarter of a century ago, that the administration of tuberculin liberated into the blood-stream bacilli from a tuberculous focus, or expressed more picturesquely "mobilised" the bacilli. She was able to show in the blood of guinea-pigs after inoculation of tuberculin where previously no such result had been got.

In my eight cases (one had been given no tuberculin) I was unable to detect them. Two other cases were investigated after death - girls of 18 and 21 - who had died of phthisis with thrombosis of the leg veins as a terminal complication. About 3 inches of the long saphena was dissected out in each case with the contained clot. Somewhere sections were stained in the usual manner. A prolonged and careful scrutiny of these failed to disclose any bacilli.

That there should be some divergence of opinion on the subject can easily be understood. That many observers have failed in their search is far from proving that the object searched for is not present. Those of us who have spent hours over a microscope in the endeavour to find them, in smears made from the deposit of a centrifugalised pleural effusion know well how fruitless is the harvest, even though the guinea-pig will later prove them to be present. And those who never yet have failed to find them in the direct examination of the plasma in any case and any form of tuberculosis - one is lost in admiration of the efficiency of their technique, or marvels at the boundlessness of their imagination.

It may be that the time of examination of the blood has some influence on the results obtained. The immunity of the patient may be so high or the virulence of the bacilli so low that they are rapidly destroyed in the blood. Rabinowitsch's findings have been mentioned. Wright and others have shown that during the negative phase following an injection of vaccine there is a diminution of the opsonic content of the blood and tissue fluids, and that the more the optimum dose is exceeded the greater and the more prolonged is this fall, and the less the subsequent positive phase, if not its total absence. Any bacilli which gain access to the circulation during this negative phase would thus have less to contend with in the way of opsonins and the associated agglutinins, bacteriotropins and bactericidal bodies; their survival in the blood would be encouraged, and their powers for evil intensified. And what applies to tuberculin manufactured in vitro applies also to that produced in vivo. We believe that the reaction of a patient...
patient in response to an anto-inoculation is the result of a washing out of toxins from his active focus into his general circulation. These toxins, if Virchow's theory be correct, "mobilise" some and the opportunity of finding them in the blood would be offered. The later saturation of the blood with immune bodies, coinciding with the positive phase after a well-graduated activity, would make these chances much more remote. In the determination of the absence or presence of in the blood, the final appeal must be made to the guinea-pig — the "Pathological Barometer" as it has been called. For the pitfalls and fallacies of other methods have resulted in confusion and mistrust. The acid-fast bacilli in tap-water, the acid-fast chips of cholesterol and of lecithin in the blood, the sheaths of disintegrated red cells, the artefacts due to a faulty technique — all these combine to make the recognition of a difficult and uncertain task. And looming over all is that which cannot lightly be set aside — the Personal Equation.

The attitude of the majority at the present time with regard to the question seems to be that are often present in the blood of tuberculous patients — more especially in those with that the more advanced the disease the more likely are they to be found. With what constancy they are present is as yet an undecided issue.

Such a conception brings tuberculosis more into line with other specific infections, and accounts for phenomena which we had explained a priori by the assumption of in the blood e.g. the relation of trauma to localised disease.

This much the discussion has done — it has helped to lead us from the misconception of tuberculosis as a local disease to a proper understanding of it as a general systemic infection, and it has taught us the true importance of the part played by the tissues, and how, while we do all that in us lies to limit the spread of the seed, the raising of the resistance of the soil is our first line of defence.

Histology of Tuberculides.
The earliest tissue changes seen at the site of lesion centre round the blood-vessels of the corium. An endophlebitis is apparently the initial manifestation, and suggests that the exciting agent, whether it be toxin or bacillus, has been carried along the blood stream. A perivascular infiltration of lymphocytes and fixed cells round the source of irritation naturally follows, and the blood capillaries and lymph-spaces in the neighbourhood dilate — Nature's early efforts to overcome the irritant. There is nothing in all this to suggest that these efforts are being made against any specified organism. The pathology of tuberculides may go no further than this — a mild simple inflammation which would arise in response to any irritant whatever — the toxins have been neutralised or the bacilli have been destroyed with a minimum of reaction, and a proliferation of fibrous tissue cells may be all that is left behind.
In other types the process may not be arrested so easily and a gradation of histological pictures may be seen, different features predominating in different specimens according to the depth or superficiality of the lesion, the absence or presence of necrosis or of suppuration as a result of pyogenic infection, the freedom from involvement of the glandular elements or their participation in the process.

That no tuberculous structure is found in a skin lesion has been put forward in support of a toxic origin for that lesion. But we have ample proof that can pass through a mucous membrane e.g. tonsil or intestine, without leaving traces of their passage. In some cases of undoubted lupus and scrofuloderma that have come under my own observation it was only after searching many sections that one showing the typical structure was obtained, or that structure might be seen in sections from one piece of tissue while in an adjacent piece it was absent, though to the eye both appeared equally likely.

In respect of other granulomata, too, difficulties are often encountered. Thus one observer reports 6 cases where glandular swellings were excised. On ordinary microscopic examination of these merely chronic inflammatory changes were to be found. It was only after a very careful and extensive search that he discovered the cause to be the Ray fungus. In one instance where serial sections of the entire gland were made, only one small focus of actinomycosis could be detected in all the preparations.

The likelihood would seem to be that the may lie practically dormant in the skin, attenuated and living a feeble existence, bereft of its acid-fast property perhaps, elaborating few or no toxins, and giving rise to only slight tissue changes of a selerotic or hyperplastic type, and these not typical of tuberculosis but such as we include under the name of chronic inflammation.

The following diagrams show the appearances on section of some tuberculides that have come under my notice.

![Diagram 1](image1.png)  
![Diagram 2](image2.png)
Upon what minimum of evidence can we include a skin lesion under the term tuberculide? And under what conditions as regards individual results of research are we justified in saying with certainty that any given tuberculide has ceased to be such, and has graduated into a tuberculosis of the skin? The answers to such questions are difficult to formulate, because the microscopic and experimental findings in these lesions differ so markedly at the hands of different observers.

Tuberculosis

Under the skin in the foregoing pages certain types have been described which are universally known to fulfill the requirements for inclusion under that category. But there are conditions which would appear to be on the borderland — in which there is no general consensus as to their bacillary or toxic origin, though each theory has its adherents, in which bulk for bulk, the negative findings in favour of the former outweigh the positive, but in which that positive evidence holds/
holds out hope that the balance will finally be turned by further careful and exhaustive investigation.

Such borderland cases are Lichen Scrofulosorum and Erythema Induratum.

The condition now known as Lichen Scrofulosorum was originally considered a disease of cachectics generally. Later its very frequent association with "scrofula" was noted and a name was given to it to signify that relationship. Then as the true nature of scrofula became apparent it was classed as a tuberculide, and now there are indications (and the same applies to erythema induratum) that it may soon find general acceptance as a true tuberculosis. It is significant that in some recent text-books (Morris, Walker) in this country this position is already adopted.

These indications are the reports by 3 observers of their discovery of in the tissue, and of the positive inoculation of guinea-pigs in a very limited number of cases. Others have obtained a focal reaction following the subcutaneous tuberculin test, and a tuberculous architecture has been recorded in several instances.

† Jacobi: Dermat. Congress, Leipzig 1891.
Haushalter: Ann. de D. et S. 1898;9;456
Pellizarri: Anne de D. et S. Paris 1884;51342.

x Lesseliers: Anne de D. et S. Paris 1906;7;397.

The earliest changes, according to these observations, consist of infiltrations round the blood-vessels, the sebaceous glands, hair follicles and in the papillae, while the developed papule shews the characteristic arrangement of giant cells, epithelioids and lymphocytes.

With these exceptions have not been discovered and inoculations have failed. The histology of typical cases at the hands of many observers has shewn only simple inflammatory changes.

Lichen Scrofulosorum is a disease of childhood and adolescents, and according to Sequiera is the commonest tuberculide. In over 90% the subjects of it shew signs of tuberculosis of glands, bones, joints or skin, though is considered an uncommon cause. It consists of a sudden eruption of flattish hard papules averaging about the size of a pin-head, of a pale yellow or brown colour, often topped by a tiny scale or a small pustule. The papules evolve symmetrically, and their seat of election is the lower part of the trunk, especially the sides over the lower ribs; but they may be distributed over the limbs. There is a tendency for them to come out in crops, and they often shew a characteristic arrangement in rings and crescents. The duration is long—months or years—and involution is slow with or without the development of minute scars. Throughout there is usually a total absence of symptoms.
FIG. 48 Scrofuloderma. Same patient as FIGS. 49, 50

FIGS. 48, 49, 50 relate to the case of a boy of 5 who had for over a year suffered from tuberculous glands in neck with scrofulodematous changes. It was not till after caseation and sinus formation had occurred that he came under medical care. He was then admitted to hospital where he underwent several scrapings, with little improvement, for within a few months his condition was as bad as before.

I gave him 6 injections of Beraneck's Tuberculin and then stopped this treatment as his attendance was most irregular and instructions were not being obeyed. About one month later he suddenly developed a lichen Scrofulosorum (FIGS. 49, 50)

FIG. 49. Lichen Scrofulosorum. FIG. 50

It will be seen that the papules on the front of the body are relatively sparse in comparison with those on the back, where they are especially thick in the lower dorsal region, that the upper part of the trunk shews fewer lesions than the lower, and that there is an extension from the trunk down the thighs and arms. A cluster of papules is evident on the left abdomen. When I saw him last in June 1915 the papules were six months old and were still in evidence, and he had developed large cold abscesses on his scalp and on both sides of his neck.
Erythema Induratum of Bazin stands in very much the same position as that last described. Thus T.E. have been found by very few observers, inoculation has sometimes succeeded, the structure has several times been shown to consist of a plasmae with giant cells + and a reaction to tuberculin has been observed. On the other hand the absence of these features after careful search has been very frequently recorded, and Whitfield thinks that under a common name two conditions are described; one tuberculous, and the other depending on vascular changes, mainly endophlebitic. Some see a close relationship between this and certain other conditions e.g. Erythema Nodosum, Gumma, Hypodermic Sarcoids of Boeck; and the co-existence of erythema induratum with other skin lesions, tuberculides and tuberculoses, has frequently been noted.

The typical subjects are anaemic, poorly-nourished girls from about puberty to the age of 20 or thereabouts, whose work entails much standing. Thus shop-assistants and servants are prone to it. There may be evidence of past or present T.E., but this is not such a constant feature as in lichen. The poor circulation of these patients is manifested by their liability to contract chilblains, and there is a connecting link between the two, for some cases of erythema have been observed to improve in summer, retrogressing again during the cold months of the year, and this we know is characteristic of chilblains. Such cases may be of the vascular type described by Whitfield.

In its earlier stage erythema induratum presents itself in the form of several hard pea-sized nodules embedded deeply in the skin tissues of the calves usually, though it may be of the thighs or arms. In the course of a few weeks they have enlarged to the size of a large marble, are less clearly defined and the overlying skin is purple. Softening spreads throughout and necrosis of the surface occurs resulting in the production of an ulcer. In the nodular stage the lesions were comparable with the nodules of a syphilitic gumma, now in the developed stage they show a marked similarity to the ulcerations of specific disease —"punched-out", circular or irregular with sloughing floor and indurated surroundings. The duration is months or years, and healing brings pigmented scars which after a time become white and atrophic.

Malcolm Morris refers to the group of tuberculides as being a "motley" one. And motley too is their nomenclature. Thus to conditions included under the general terms papular and nodular tuberculides over a score of names have been given, each particular name specifying some particular character, histological or clinical, which the lesion presents. The depth, the size, the course, the distribution, the implication.

implication of certain elements of the skin primarily or chiefly, the degree of necrosis and type of scarring left behind, and the naked-eye similarities to other cutaneous affections — such varying factors spell varying and complex appearances.

The gross similarity to acne pustules accounts for many of the names, a qualifying adjective being affixed to signify a predominant feature. Thus among others we have Acne Varioliformis, Necrotica, Agminata, Urticata, Ulcerans, Telangiectoides.

Hydradenitis destruens and Follicolis suggest that the process concentrates on the sweat glands and hair follicles respectively, while Impetigo odens gives expression to a destructive condition marked by the formation of crusts.

But underlying any superficial differences are certain characters which are common to the group, and which warrant them being grouped together. "The essential lesion" says Fox + "is a small very indolent granuloma tending to undergo softening and necrosis and thus leaving scars." The eruptions are bilateral and symmetrical, and for the most part the seat of election is the extremities, which commonly show evidence of a defective circulation in being cold and blue.

FIG. 56. Papulo-necrotic tuberculid in a girl aged 13 who shewed signs of early apical disease. The distribution is that of Follicolis type.

+ 4th Intern. Cong. of Dermatology.
This acro-asphyxia itself is in all probability the result of toxaemia, an expression of the poisoning of the walls of the blood-vessels, with stasis most marked in dependent parts such as the limbs. It may even be that the distribution of these tuberculides is influenced by the stagnation. Any toxin which may be circulating in the blood stream will have a greater chance of being deposited in these parts, and any toxin will be allowed to act on the one spot for a longer period before being neutralised by an adequate supply of antibody.

The papular and nodular tuberculides comprise two main types, Folliculitis and Acnitis. These develop as papules or small nodules which later break down, so that they are generally referred to as the papulo-necrotic tuberculides.

They occur in the young chiefly, but age is no barrier to their evolution, and their frequent association with tuberculosis of other organs suggests more than a casual relationship.

They give rise to very little discomfort, seldom amounting to more than a slight occasional itching.

Folliculitis is believed by most to be evidence of tuberculosis, but Acnitis does not meet with such general agreement as to its etiology. Thus Fox, Leredde, Sequiera, Stelwagon and others consider it a tuberculide. On the other hand Barthelemy, who described both these conditions and gave them these names, thought that an intestinal toxin was the cause, and a non-tuberculous origin is supported by many dermatologists. Walker mentions the possibility of syphilis being an occasional cause of Acnitis but entirely ignores the tubercle bacillus.

Apart from the rare finding of bacilli in the papulonecrotic lesions and the equally rare successful inoculations, a tuberculous structure with giant cells has frequently been observed in different conditions grouped under that category.
Folliclis represents the small necrotic type. Each lesion begins as a small colourless papule in the deeper skin. As it approaches the surface it grows so as to attain a size up to that of a lentil, at the same time taking on a deep purplish colour, while a brighter red areola develops round its base. Vesication occurs on the summit and a crust forms which, on removal, discloses a small sluggish ulcer. Healing occurs after 2 or 3 weeks, and a depressed scar is left, pigmented at first but later becoming paler.

Though an individual lesion usually goes through its cycle in a matter of weeks, the disease may last for years, owing to the evolution of crop after crop of papules. In one of Sequiera's + cases the patient had not been free from them for 7 years.


The common sites for the papules are hands, forearms, feet and legs, more especially the knees and elbows. The trunk is occasionally involved, but the face usually escapes.

![FIG. 53 Papulo-necrotic tuberculide affecting face, arms and legs in a boy of 6 who formerly had caseating glands in neck.](image)

Very different to the distribution of Folliclis is that of Acnitis, in which the lesions are rarely found on parts other than the face and scalp, and in which, even if they be present elsewhere, the face has its quota also. From the great frequency with which they select the forehead and temples it has been suggested that the pressure of dirty hatbands and cap bands may take a part in producing them.

Tiny brownish papules suddenly appear in the skin - grow to the size of a pea in about 10 days - soften in the centre and discharge scanty pus during the next few days, then crust over and healing follows in the course of the next 2 weeks, with the formation of scars showing pigmented margins and resembling in the pits they leave those of small-pox.
The combination of Acnitis and folliculitis in the same patient affecting their own particular regions has been recorded, and Sequiera at the Royal Society of Medicine showed a girl who presented the small type on the upper limbs and the large type on the lower limbs.

Scrofulous or Acneiform tuberculides arises in very much the same manner as those described, going through the stages of papule, pustule, ulceration, crusting and scarring. In this, however, the lesion is pierced by a hair corresponding to the hair follicle in the region of which the process has commenced. The limbs, especially their extensor surfaces are usually affected.

MacLeod and Omsby have described two cases occurring in the tuberculous where a tuberculous architecture was found with endo- and peri-phlebitis, and recently a positive reaction to tuberculin has been noted.

Tuberculin Eruptions. We must consider as true tuberculides those multiformal eruptions which are sometimes to be seen after the exhibition of tuberculin by any method. Some of these have been mentioned on p. The commonest type following subcutaneous injection is the papular but macular haemorrhagic, urticarial, nodular or psoriatic lesions may occur.
Fig. 56 shows a maculo-squamous eruption in a boy aged 6, who formerly suffered from caseating cervical glands. He had undergone a course of Beraneck's tuberculin lasting for 5 months, injections being given at intervals of 7 to 10 days and the last dose administered being given 14 months previously. By this time the lesions had entirely healed. Thereafter he was told to report in 2 months' time. He did so and the last dose was repeated. A few days later he was brought back to me with the eruption as seen in the photograph. The papules gradually involuted without any real necrosis, and at the end of two months only small reddish spots were left. On two subsequent occasions, 1 month and 4 months later, the same dose was again given and was followed by the same result.

Lupus erythematosus shows itself in 2 main types, discoid and disseminated.

The disseminated type as a rule is seen in young women as an acute widespread exacerbation of the other type, though it may occur independently of any previous disease. Numerous tiny reddish spots appear on the cheeks and by rapid extension form a "butterfly patch". Very soon similar small lesions develop on the ears, head and all over the body, and by their growth may cover large areas of the skin surface. There is usually severe systemic disturbance with symptoms of collapse and albuminuria which proves fatal in a number of cases, autopsy showing septicaemia, nephritic, pneumonic, or meningitic findings.

The discoid type is the one commonly seen. It is "localised" to the face, ears, and scalp as a rule, but may be met with on the trunk and limbs. The earliest manifestation is a pinhead, reddish, slightly elevated spot which loses its colour on diascopy. Several of these spots may appear simultaneously on the cheeks or nose. The usual course is for a single lesion to develop on each cheek. These spots enlarge so as to form patches in the course, it may be, of many years, the centre becoming paler and sunken, often covered with scanty, thin, lightly - attached scales or coarser scales with a cone of horny material on their lower surface which anchors them in position, while the advancing margin is red, elevated and firm. The patches extend towards the bridge of the nose where they fuse, thus giving the typical butterfly distribution, and healing in the central parts with the production of a superficial white atrophic scar moveable over the underlying tissues.

The fixed type is a very chronic one, lasting, perhaps, 20 or 30 years, giving rise to no symptoms, either systemic or local, and developing, not as lupus vulgaris in the earlier years of life, but at the age at which lupus vulgaris only exceptionally begins - the third decade.

Lupus erythematosus of the extremities presents certain clinical differences from the appearances described above.
FIG. 56. Lupus Erythematosus affecting fronts of legs. Patient had a bad family history of tuberculosis. Injection of tuberculin gave a focal reaction with intense itching. Itching of the fingers was also present at the same time though clinically there was no evidence of disease in that situation.

The lesions are much less well-defined and are more superficial. The colour is livid rather than erythematous, and the scaly character is less in evidence. On the hands and feet they commonly begin as chilblains and the condition known as lupus pernio is more properly included under this disease than under ordinary lupus. After several attacks of chilblains it may be noted that the tendency to cure with the return of the warmer months is gradually passing off. In the course of years a depressed atrophic scarring with more or less scaliness may be seen in the centre of the chilblain area, more marked in cold weather, when the peripheral parts become swollen and oedematous.

Perhaps around the etiology of no other skin condition has so fierce a struggle raged as that of the relationship of the tubercle bacillus to lupus erythematosus. Sir Jonathan Hutchinson set the ball rolling by his observation that evidence of past infection, or of potential infection or predisposition in the form of a family history, was shewn in the subjects of lupus erythematosus to a greater extent than in those of lupus vulgaris. And ever since then the contest has been in progress—many series of statistics have been culled, many experiments performed, many theories evolved—and the issue is still undecided. Thus Sequiera+ got a family history of tuberculosis in 33% of his discoid and in 80% of his disseminated cases. Of 60 discoid cases 18 showed evidence of T.B. Of 15 disseminated cases 7 suffered from T.B. On the other hand Jadassohn found T.B. to be the cause of death in only 2 out of 22 fatal cases, and others find no signs of constitutional disease in the great majority of their cases.

The French dermatologists noted this frequent association and have long believed in a T.B. origin. But the repeated failure to find T.B. and to inoculate animals, together with the non-specific histology, which is that of any slow mild inflammation/ + System of Medicine. Allbutt & Rolleston Vol.9 p.496.
inflammation, and the inconclusive tuberculin reactions led them to consider it of the nature of a toxi-tuberculide.

To the British mind, however, while a toxic origin is generally conceded, the evidence appears to most too conflicting to warrant acceptance of the toxin as the sole or usual cause, resting as it does on these 3 considerations:

1. The frequency of lupus erythematosus in persons, or in those predisposed to tuberculosis.

2. Its occasional association with tuberculosis of the skin or with tuberculides.

3. Its occasional resemblance clinically to vulgaris, and cases reported of the latter developing on top of an erythematous.

Some there are who go further, who hold it as proved that the disseminated type is a tuberculide in most cases, if not in all, and that in the case of the discoid lesions, where the operating toxins are many and various, the tuberculous toxin plays no inconsiderable part.

More recently, however, successful findings have been reported. Gougerot of Paris inoculated a guinea-pig with material from a typical scalp lesion of discoid type and the animal died of tuberculosis. Soon after the same result was reported by two other observers who planted the material in the peritoneal cavity, and in 4 instances developed. Previous to this they had by using extract of lupus erythematosus tissue, been able to produce by injection into subjects, small papular tuberculides which subsequently gave a positive reaction to tuberculin. Further, Arndt has reported his discovery of and of giant cells in a lesion, and Gaucher alleges that the serum of erythematous patients agglutinates the tubercle bacillus.


The evidence is accumulating, and opinion has already shown signs of veering round, as witness the view given at a recent dermatological discussion "some cases, especially younger patients, are due to infection. I look on them as representing the maximum of protective reaction on the part of the tissues. We find in the lungs e.g. cases of fibroid phthisis which were long thought to be non-tuberculous, and I consider that in this group of cases of lupus erythematosus a local infection is completely cured by interstitial reaction, even before the typical architecture of a tubercle is produced". +

Erythema Nodosum: A new light has during the past few years been thrown on the etiology of some cases at least of this disorder - the oval red or dusky swellings on the skin which, from their association with joint pains, fever and sore throat, have long been classed as a rheumatic manifestation.

The pioneer work of Landowzy led the way, and experimental
and clinical observation by others have supported his theory of a relationship between Nodosum and tuberculosis.

Three chief relationships have been described.

1. That nodosum may be prodromal of acute Septicaemia. An article in an American Journal, in which details of such a case were given, aroused interest in this country, and soon such evidence of similar cases was forthcoming in our medical press as suggested that the combination was more than a coincidence.

2. That nodosum may be a toxi-tuberculide secondary to chronic visceral disease, in-as-much as the lesions have been found on several occasions to follow the injection of tuberculin.

3. That nodosum may be a true eruption of the skin. In support of such a revolutionary view one cites the finding by various observers of giant cells surrounded by an epithelioid structure, and the recorded cases of Landouzy where he excised a node which on section showed in the tissue and on inoculation gave a positive result.

In view of such evidence we must give up the tradition of the past that erythema nodosum is essentially an expression of rheumatism, just as we have abandoned the idea that rheumatism itself is always an infection with the diplococcus of Poynton and Payne. For some years ago Poncet pointed out that many of the dry and serous rheumatisms are in origin, may be bacillary, more probably toxic; and later work has proved Poncet's observations to be correct.

The subjects of Nodosum are often weaklings or have a family history of struma. Many present evidence of a "strumous diathesis". 38% of children presenting the lesions have been found to be suffering from phlyctenular conjunctivitis or keratitis. The results of skin tests with tuberculin are at variance. Some record universally negative results, and others 87% (Moroc) and even 100% (Pollack).

Figure 59 shows the lesions on the shins of a girl of 8 years.

FIG. 59. Erythema Nodosum.
Mother suffered from lupus, while the child had palpable abdominal glands. This child had 3 attacks within 13 months, and each was ushered in by the classical symptoms and ran the ordinary course.

The V.F. reaction in all 7 cases that have come under my notice recently has been positive, but these children all shewed stigmata of tuberculosis before the appearance of the eruption. To my knowledge none of these developed general tuberculosis, but one died some months later of an acute tuberculous broncho-pneumonia.

Herpes Zoster: The association of Zona with chest disease has often been noted, particularly intercostal herpes with pulmonary tuberculosis. An irritative or destructive lesion of the posterior spinal ganglia by such gross lesions as malignant disease, phthisis, pleural effusion, pneumonic consolidation will account for some eruptions but there are many cases according to Pieret and Boquillon.

Echo méd. du Nord. 60, 1912.

Where a zona is the first sign of where the lung signs and symptoms followed at a longer or shorter interval afterwards. Accordingly they consider the rash to be of some value as putting one on his guard against such an eventuality. These authors, reviewing the literature on the subject find that in most a degree of meningitis exists, as proved by a lymphocytosis of the C.S.F. and successful inoculation of the fluid into guinea-pigs; and that the meningeal complications are commonest in boys of 4 to 5 years of age.

But it would appear that a lymphocytosis + is an invariable accompaniment of herpes due to any cause.

Walker: Introduction to Dermatology p.97.

Head was led to the conclusion that herpes is a distinct clinical entity analogous to the infective fevers, and the counterpart in the nervous ganglia of what poliomyelitis is in the anterior-horn cells.

It seems quite feasible that in those cases of latent pulmonary tuberculosis where a zona develops the degeneration in the ganglion cells may be caused, not necessarily by a nervous localisation of the tuberculosis, as suggested by Bernardeau, but by that tuberculo-toxaemia which gives manifestations of its action on every system of the body, and that at a very early stage in the tuberculisation process.

La Province médicale, Nov. 2., 1912

The subject of FIG. 60 was a man aged 45 shewing extensive disease over the whole of the left lung and consolidation of the upper lobe of the right lung. L3 S. (Philip's Classification).
He had a somewhat scanty tuberculide of the papulo-necrotic type scattered over the back and legs, and on the right side of his chest, corresponding to the area supplied by the 3rd and 4th dorsal segments, a patch of zona. This patch had been present for nearly 3 weeks when I saw him, thus bearing out the observation that the tuberculous zona is of longer duration than the average. In its greater part the patch was resolving in the normal manner, but at the right lower corner the lesions had begun to take on the characters of the tuberculide. Patient died three weeks later under the care of his own medical man, and I had not the opportunity of again seeing him. His doctor, however, informed me that the upper part of his herpes had entirely subsided, but the lower was represented by an aggregation of raised violet papules with a central depression, and that these were going through the same changes as the tuberculide lesions.

Echo méd. de Nord. Loc. cit.

Scrofula:

The nature of scrofula has long been debated. This term was first used to indicate a diathesis, the most outstanding features of which were enlargement of the cervical glands with abnormal irritability of the skin. But the advance of bacteriology has shewn that most of the scrofulosis of the past is the tuberculosis of the present.

The theory is widely supported that the scrofulous state is a distinct entity - a constitution which favours infection with all pathogenic bacteria, among others the tubercle bacillus.

Morris/
Morris has expressed this view tritely that "scrofula is the soil, the tubercle bacillus the seed and tuberculosis the harvest" and Morris that scrofula is "the tuberculosis of lymphatic children".

Others hold that it is the result of hereditary transmission of the bacillus (Baumgarten) or of its toxin (Soltmann). Sahl thinks that the affection may be related to the tuberculosis, the result of an abortive dissemination of the tubercle bacillus.

Two types have been described. In all the well-marked erythistic cases that have come under my observation I have satisfied myself that tuberculosis was already present. The torpid type is depicted in FIGS. 61 & 62, where palpable glands were outlined in blacklead before photographing. This boy had a bad family history of pulmonary tuberculosis, a sister having died of that disease and his father being an "open" case. He followed in every detail the classical description - chains of enlarged glands.


under the jaw and running down both sides of the neck associated with tonsillar hypertrophy and congestion of the fauces and pharynx, cartographic tongue with circular caries of the teeth, thick upper lip, broad nose and general pasty look, heavy build with pendulous belly and winged scapulae.

The left eye was the seat of opacities from recurrent phlyctenular ulcers, while the eyelids shewed thickening and reddening, and there was a long-standing discharge from both ears.

Whether tuberculosis be primary or secondary in these children, the effect of tuberculin treatment is very striking. Discussion has arisen whether the phlyctenular ulceration and the thick red upper lip are not reactions to the tuberculin content of irritating discharges, the body having been rendered sensitive/
In the case of the ulcers the objection has been raised to a tuberculous origin that under simple treatment they clear up in a very short time. That too has been my experience, but how often do these children return to us a month or two later with the condition in full bloom again. On the other hand, I find that under tuberculin these ulcers not only disappear rapidly but their tendency to recur is lost. And coincidently the glandular swellings diminish, the red inflamed skin regains its normal colour and, a feature which has impressed above all, the lethargic "lie-about-all-day" aspect of the child gives place to an alert mental state, a brighter disposition and a romping spirit that before was foreign to his nature.

It may well be that the scrofulous diathesis is a tuberculous toxaemia.

**Tuberculin.**

In these pages I have refrained from making much reference to treatment. Many of the cases seen in Dispensary practice are best suited to therapeutic methods which are not available at a Dispensary and these are drafted to the skin wards of a general hospital. For one of the functions of a Tuberculosis Dispensary is that it should act as a "Clearing-house."

But a fair number have received tuberculin treatment; It is yet much too early to quote results, but the immediate effects convince me, as the ultimate effects convince many others, that in the drug we have a valuable adjuvant to treatment of external tuberculosis. The choice of a tuberculin may matter little.

I have come to employ Beraneck's in most cases, because I fancy that I have more hopeful and fewer disappointing results from that preparation.

Early in my study I had repeatedly noted that in tuberculosis of the skin, and in some tuberculides, after excision of a small piece of growth or of a few papules for the purpose of pathological investigation, the immediate surroundings cleared up in a remarkable manner.

I have made use of this procedure, combined with tuberculin in over a dozen cases, and believe this to succeed in many instances where tuberculin, of itself, is not giving very favourable results.

The method employed will be best shown by reference to FIG. 26. This boy came to me with a rounded patch of lupus on the nape of his neck. He was given tuberculin for 2 months without much improvement. Then two small pieces were snipped out of the lower border. By the end of the next 3 months the lesion had attained the horse-shoe shape as depicted. Tuberculin still being maintained, a piece was excised from each pole and from the centre. Five months later an apparently healthy scar was present, and six months later, when I last saw him, there was no change.
The excision of even a piece the size of a dry pea seems to give a fillip to the resolution of the patch. I have on more than one occasion seen malaise and slight fever following manifestations on a larger area, and reactions have been observed after scarifications. It may be that the excision liberates into the blood and tissues a small amount of auto-toxin, and that the antibodies formed in response combine with the exogenous vaccine, which thus approaches nearer to an auto-tuberculin without being a pure auto-tuberculin. For there are indications that the ideal tuberculin is one which is a happy combination of these two.

FIG. 63. Tuberculosis of Skin during negative phase after injection of tuberculin
CONCLUSION.

Such then are the External Manifestations of Tuberculosis, varied in form and differing in degree, as is all tuberculosis, but with an etiology that is common to all.

I quote from an Address in Medicine "Tuberculosis, however various its aspects is one indivisible entity, dependent essentially on the presence and activity of one organism. Behind the changing pathological and clinical appearances the tubercle bacillus remains single and constant".

And deepest are its ramifications among the poor, the dirty and the ignorant. For tuberculosis is essentially a house-disease. In proportion as its roots are dug out of the homes of the poor, in proportion as the light of hygiene penetrates where the sunlight and the pure winds of Heaven have been vigorously excluded - it is in proportion to these that the death-knell of tuberculosis will be sounded.

The Dispensary System, originally founded to combat lung disease, has gradually absorbed all forms of tuberculosis as its prey. And that prey, if it is to be caught must be hunted in its quarry. The homes must be visited and the "contacts" of every case of tuberculosis must be searched minutely and repeatedly for any sign of the disease in every system. The gospel of cleanliness and of aerotherapy must be preached unremittingly. The infectious nature of the disease must be instilled, and the home reconstituted so that it is no longer a veritable death-trap.

The "march-past" especially of the children, the early recognition of the disease in any form, the "sorting-out" for appropriate treatment in a chest institution, a general hospital, a skin department, a dispensary or elsewhere, and the constant supervision of "returned" cases - these combine the keynote of success. And these find expression in the activity of the Tuberculosis Dispensary.

But no half measures can be allowed - the policy must be one of "thorough". The assault must be made on all fronts simultaneously - against tuberculosis whether this be external or internal.

Only thus will the aim of the Dispensary System be attained that no single case of tuberculosis is uncared for. Only thus will the curtain be rung down for ever on the great "White Plague".

ON EXTERNAL TUBERCULOSIS

- that is to say -

the manifestations of Tuberculosis which present themselves superficially on the human body.

Thesis for the Degree of M.D. 1916.

by

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While the literature of medicine is rich in contributions regarding tuberculosis, there is a relative paucity in respect of that part of the subject embraced under the term External Tuberculosis. This is the more remarkable because of the evident character of superficial lesions. We are only beginning to realise the variety and frequency of these tuberculous manifestations. On this account it seemed worthwhile to devote special attention to such lesions, in so far as they were presented in the large clientele of a Tuberculosis Dispensary.

The observations which follow are based on cases seen during four and a half years in the practice of a London Tuberculosis Dispensary, situated "across the Bridges" in the home of dirt, poverty, ignorance and tuberculosis.
When we consider the amount of infective tuberculosis that exists around us, we may well be astonished at the relative infrequency of tuberculous manifestations in the skin. Not that this latter is by any means a rare condition, for it occurs with much greater frequency than is generally supposed.

Contrary to the belief of some its development is not peculiar to youth. Cases have been described where the onset was observed in the 6th, 7th and even 8th decades of life. Certainly we meet with it much oftener in earlier life, but it is in these also that we commonly find manifestations of tuberculosis in general.

But with an annual mortality from tuberculosis amounting to 50,000 or 60,000 in the British Isles its relative rarity will be conceded by all. One would imagine that the opportunities for its development as a result of anto-inoculation in these cases are ideal - a constitution undermined by months or years of wasting disease, a progressive toxaemia, a broken-down immunity that has failed to afford protection from the primary infection, and the presence in enormous numbers of live tubercle bacilli in the excretions.

In the case of lupus vulgaris, where the inoculum/
inoculum is in many cases exogenous, the marvel is that we do not find affected one member at least of every household in the slums and poor localities which harbours an open case of tuberculosis.

And again, consider the instances of blood-spread from a primary focus. The great prevalence of tuberculosis, even among apparently healthy persons, has been brought home to us in recent years as the result of post-mortem examinations, clinical refinements and tuberculin tests. It is unnecessary to go into details. No exception will nowadays be taken to these statements: that in large towns, by the time puberty is reached, about 90% of the population has been tuberculised, and that tuberculous lesions are found in something like 75% of autopsies on adults who have died from causes other than tuberculosis.

And yet, in spite of all these potential sources, how very seldom do we recognise cutaneous tuberculosis as a consequence of a blood infection. If it be one of the grosser manifestations we are probably alive to the fact, but remembering the essentially protean character of tuberculosis in other systems we must assume that there are lesser degrees which show atypical appearances. If we suspect a tuberculous origin, perhaps from the association of disease elsewhere, perhaps from some outstanding clinical feature, we/
we may label it a tuberculide till we have more definite proof; and, if we be in a state of diagnostic destitution about any skin lesion it is well to turn over in one's mind the possibility of tuberculosis as an etiological factor, ere we fly to such cloaks as "heat-rash" and "porridge-rash" behind which we may take refuge.

To account for this relative infrequency various theories have been adduced. Thus it has been said that the skin is resistant to the tubercle bacillus, and that since in child-hood the tissues are more delicate and this resisting property is less than in later life, so we have the determination of onset of lupus vulgaris at this period.

Again, it is assumed that the skin is a poor nidus for the growth of the bacilli, one reason for this being the low temperature to which they are exposed, or the sudden changes of temperature with consequent loss of vitality.

We may take it as proved that tubercle bacilli can be absorbed from mucous surfaces, and find their way into subjacent lymph channels without showing even microscopic traces of their passage, and it has been claimed that they can likewise traverse the intact skin without giving rise to any apparent lesion.

The/
The problem is a complex one and probably no one factor can solve it. Different strains of tubercle bacilli show differing virulence, massive infection may succeed where a slight one fails, repeated inoculation may bring forth a harvest where a single one does not take root. And the skin of one individual reacts to various stimuli in different fashion from that of another. And the resistance of one skin is greater than that of another skin. But it seems to me that most important points in connection with the soil are the influence of trauma, and the sensitiveness of the body fluids to any entering bacilli. In exogenous tuberculosis of the skin how often we are given a history of a break in the continuity of the skin previous to the onset. Not only do the bacilli gain a direct entrance, but they thus lodge in a weakened tissue.

That there is a relative defence of the body against super-infection in tuberculosis is well recognised. Koch found that, by injecting living tubercle bacilli into the skin of guinea-pigs which were already tuberculous, necrotic changes and ulceration developed at the site of inoculation, but that this ulceration very quickly healed. On the other hand, a similar inoculation into healthy animals resulted in a progressive disease with no tendency to spontaneous cure. In the former case the tissue changes/
changes showed themselves immediately; in the latter only after an interval of many days. These phenomena, and countless experiments on other animals give the same results, show that a primary infection is able to protect the tissues from a second one, in virtue of a sensitiveness to the bacilli which has been evoked by the first infection.

Thus sensitiveness is shown to go hand in hand with immunity, and it may help to explain many facts, e.g. why we seldom see the cutaneous tuberculoses developing in the subjects of active pulmonary tuberculosis. Lupus vulgaris develops so rarely in the course of progressive lung disease that few have met with more than an odd case where this complication supervened. When we do see acute tuberculous ulceration it is in the later stages, when the body is saturated with toxin and no adequate reaction of the tissues is possible. In four cases in which I did a V.P. there was a minimal or negative reaction, thus proving a failure of sensitiveness. Post-mortem warts are found in "open" tuberculous patient much less frequently than in butchers and mortuary attendants - yet the number of phthisics is infinitely greater than the number of those others, and the opportunities of the former for infection of the skin are offered continuously.

Again, were it not for some such protection we should/
should expect to find laryngeal, abdominal and cervic­
al glandular disease as a complication of all our
infectious lung cases.

It may be objected, however, that we commonly
find these skin affections in those suffering from
the so-called "surgical" forms of tuberculosis. It
may be that the two infections have developed simul­
taneously, or it may be that the localised forms do
not manufacture, or sent into the general circulation,
sufficient anto-tuberculin to lead to the formation
of a continuous supply of antibodies adequate to cope
with an infection of another tissue by virulent bacil­
li. This would explain why pulmonary disease common­ly supervenes in the course of localised tuberculosis.
The insufficiency of antibody content is also shown
by the persistently low opsonic index which is obtain­
ed in the local forms.

In lung disease it is otherwise. Here we have
an auto-toxic disease. Bacillary products are con­
stantly being absorbed in greater or less quantity
into the blood. If this absorption be satisfactory
as to dosage the immunising response to each provides
the body fluids with immune bodies enough and to
spare.

Many years ago Jonathan Hutchinson made the
observation/

observation, regarding lupus vulgaris, that when multiple the multiplicity was attained at the very onset. After lupus is well established, excepting satellites no new patches are produced.

Such antibodies as are developed in the tissues of a case of chronic tubercle of the skin may, short of leading to spontaneous cure of the condition, be able to devitalise the bacilli and hold them in check. That some such influence is at work is shown by the sparsity of the bacilli, and by the findings of the Royal Commission that these were attenuated in the series of cases investigated by them.

A view that is widely held in France and is gaining ground in this country is that there is in tuberculous infections a scale of virulence and a scale of specificity. The two factors that determine the issue, once the bacillus has gained entrance into the body, are the number and degree of virulence of the micro-organisms, and the amount of resistance the tissues are able to set up. As these factors vary so enormously so the resultant clinical manifestations are of the utmost diversity.

The top rung of the tuberculosis ladder would be characterised by a massive infection of intense virulence occurring in a subject of intensely low immunity, and/
and this is represented by the acute tuberculous septicaemia that has recently been described - Landouzy's typho-bacillus infection. Here the process is so acute that tubercle formation appears to be inhibited and death rapidly ensues. At an autopsy on such a case no tissue reactions suggestive of tubercles were to be found, but the lesions were merely those of congestion and degeneration. Slightly lower in the scale would be placed general miliary spread - less virulence and greater resistance (and a longer duration) allowing of an attempt on the part of the tissues to react.

Down more steps and one finds in order acute pulmonary tuberculosis, chronic tuberculosis, "surgical tubercle", true tuberculosis of the skin, scrofulosis and the tuberculides. At the very bottom of the ladder a place would be found for certain "banal" conditions where the virulence of the bacillus is almost nil while the resistance is intense - the antithesis of the septicaemic type - referred to by Poncet and Leriche as the "Tubercular Inflammations".

2. La Tuberculose Inflammatoire, by Poncet and Leriche, Lyons.
The various affections of the skin and annexae which we find in the tuberculous may be divided into four groups:-

1. Those which we can prove conclusively to be manifestations of the reaction of the tissues to tubercle bacilli in situ - Tuberculoses of the skin.

2. Those which are incapable of such definite proof, but in which we have reasonable grounds for presuming a tuberculous origin, in some instances at least, either directly or indirectly - Tuberculides.

3. Those which have been at one time or another credited with a relation to tubercle, but on insufficient evidence, or which are so rare as to be of little importance.

4. Those which are admittedly non-tuberculous, but which are more or less frequently found in association with tuberculosis.

But the boundaries demarcating these groups from one another are by no means hard and fast - they are ever changing. Modern improvements in histological and bacteriological technique, and an ever-widening conception of the activities and of the possibilities of the tubercle bacillus, are enabling us to relegate to each manifestation its proper place in the group-system.

The non-tuberculous lesion of yesterday is the tuberculide of to-day, the tuberculide of to-day may well be the tuberculosis of to-morrow.
The conditions included under group 4 are of little interest. They are not peculiar to tuberculosis but are found also in many other wasting diseases. It is most in the advanced stages of tuberculosis, and more especially in pulmonary disease, that they are seen. The skin shares in the general toxaemia, its nutrition is impaired and its functions are perverted. The lowering of vitality allows of the easy penetration of micro-organisms into its substance, and of the deposition of fungi in its superficial layers.

Of the latter Microsporon Furfur has long been associated with phthisis. It had even been alleged that the fungus plays some part in the etiology of the disease.

Walker has seen pityriasis versicolor much less frequently in Edinburgh of late years than he did formerly. This is beyond doubt the result of the education of the people in physiological living, more particularly as regards the wearing of clean undergarments and the regular application of soap and water to the body.

Such too has been my experience in one of the poorest and dirtiest districts of London. Lately I have/

1. Introduction to Dermatology, 5th Ed. p.332.
have seldom seen the condition except in patients attending for the first time. The regular attenders, ambulant cases, do not show it, in all probability chiefly because the anticipation of an examination of the chest - stripped to the waist - has driven them to the wash tub and to the clean-linen press previous to their visits. Even in my bed-ridden dying patients it is only exceptionally present, and this is to be attributed to the routine supervision and nursing in their own homes by the Dispensary and the District Nurses. It is the old parable of the Soil and the Seed - the soil is the badly nourished skin with its dirt, its epithelial debris and its accumulated secretions. Remove the soil and the seed falls on unprofitable ground.

Pityriasis Tabescentium, on the other hand, is not associated with any fungus. It is the name given to the dry scaly inelastic skin which is a local expression of any general wasting.

Melanoderma Cachecticorum is a pigmentation of varying depth of colour which has a predilection for the face and forehead of cachectics from any cause, e.g. tuberculosis, syphilis, malignant disease, malaria, diabetes. The pigmentation may take the form of a general darkening of the face or it may appear as patches or as spots, and is well marked in many cases where/
where the abdominal viscera are the seat of disease.

General pigmentation reaches its highest development in Addison's Disease, where a slatey bronzing of the entire skin surface is a feature of the disorder, and where the post-mortem appearances show, in the great majority of cases, a fibro-caseous degeneration of the suprarenal bodies or implication of the abdominal sympathetic system in a disease process.

The late Dr. George Gibson used to teach us in his wards, as he taught others in his writings, that in order to have the complete picture of this disease it is necessary that there be degenerative changes in the whole adrenal gland - that if cortex alone be affected then pigmentation is the prominent feature, if medulla alone then we have the vaso-motor and cardiac symptoms without any colour changes. And clinically one meets with such cases.

In many cases of tuberculosis minor symptoms compatible with adrenal insufficiency are often to be noted - a slight diffuse darkening of the skin, gastrointestinal symptoms and a lowered blood pressure, and the name Addisonism has been given to the syndrome. At post-mortem examinations inflammatory sclerosis of the adrenals has been found.

I have examined the organs of two such cases of Addisonism - one showed caseous changes, while in the other a fibrous transformation without tuberculous architecture/
architecture was all I found. The toxin of tuberculosis, it is well known, is capable of giving rise to simple chronic inflammation, and it may be that many of these Addisonisms are due to a toxaemia acting in this way. They cannot strictly be called tuberculides, for though the toxin may be primarily responsible for the pigmentation it acts through an intermediary.

In this connection I would draw attention to the condition known as Ephelis ab Igne - that reticular pigmentation on the fronts of the legs, seen for the most part in elderly women and sometimes in weakly children who have a habit of toasting their legs in front of a red fire. It is believed that repeated exposure to this temperature is necessary for its production, and that the pigmentation is due to the escape of red blood cells into the perivascular tissue consequent on a paralytic distension of the vessels of the cutis. These red cells then break down, and the colouring matter is deposited in the cutis in the lines of the vascular channels. If the cause be removed the pigmentation gradually fades, and in course of time may almost entirely disappear.

The case of J.M. as depicted in Fig. 1 is of some little interest.
Fig. 1.

Ephelis ab Igne.

Osteo-arthropathy of left knee present.

J. M. was a girl aged 12 - advanced pulmonary tuberculosis L₃S (Philip's Classification) - had been confined to bed for some months on account of systemic intoxication. On July 12th 1913 I visited her in her home, and acceded to her urgent request that she be allowed to sit up by the fire for a short time that/
that evening. There was then no reticulation of the legs. Next day I found a well-marked ephelis on one leg, and learned that she had sat for 15 minutes at the right-hand side of the hearth, with her left foot resting on the fender. At the end of that time owing to weakness she was put back to bed and the photograph was taken one week afterwards. A few days later I happened to read the following notes on a clinical lecture delivered by Dr Shaw, Physician to Guy's Hospital.

"Diffuse pigmentation. A boy, aged 11, was admitted a month after an attack of tonsillitis for what appeared to be a slight attack of articular rheumatism with transient heart murmurs. The point of interest lies in his complexion, which is so dark as to raise the question of Addison's Disease. One might almost pass the condition as a mere congenital peculiarity, but for the mother's confident assertion that she has noticed a marked change in his colour in the last few years. There is no pigmentation of the mucous membranes and no marked increase of pigment over parts usually subjected to pressure.

A point which has prevented the mother's statement as to change being disregarded is the marked appearance of ephelis ab igne on the boy's shins. For a boy of eleven to scorched his shins by sitting in/
in front of the fire indicates a prolonged period of ill-health. Dr Shaw said he did not know how long it would take to cause the ephelis demonstrated in this boy, but could hardly believe it to be possible for it to be produced in the month's illness that had elapsed since the tonsillitis. The feeling of coldness which so commonly accompanied the low blood pressure of Addison's disease was of interest in this respect, so also was the question whether the pigmented condition of ephelis would be more easily and rapidly produced if the suprarenal capsules were diseased."

J. M. died at the end of July but a post-mortem was not allowed. At the time I thought it extremely probable that she had caseous changes in or around the adrenal bodies on account of a general darkening of the skin, most marked on the hinder parts of the body where she had lain in contact with the hard mattress, and in those situations where pigment is normally present. She had also a low blood pressure, abdominal symptoms, and signs of thickening and matted omentum and intestines.

Alopecia - a loss of hair due to the atrophy of the hair-follicles from a diminished nutrition occurring/

1. Guy's Hospital Gazette, July 5th, 1913.
occurring in debilitated patients. It is said that complete loss of hair may be got in the last stages of phthisis. This, I believe, must be very rare. In only two cases out of many hundreds of pulmonary tuberculosis can I remember a loss of hair amounting to more than a general thinning. These two presented the appearance of an alopecia areata.

Fig. 2.

Alopecia in a case of longstanding glandular tuberculosis.

Erythema Pernio has been considered by some to be the peculiar birth-right of tuberculosis. No one denies that the ordinary chilblains are very frequent-
frequently seen in the tuberculous but even in this case these are an indirect result of the infection. Many tuberculous persons live their lives without showing any signs of pernio.

Any debilitating influence tends to produce them. The essential predisposing factor appears to be a loss of vascular tone, allowing of dilatation of the vessels with a stasis of the blood in the peripheral circulation. This diminished tone is pre-eminently characteristic of tuberculosis, the toxins of which show their presence in the body long before the bacilli give indication by tissue lesions. Add the exciting agent, cold, and the vitality of the tissues is further lowered, the stagnation becomes more complete, and the purple oedematous itching swellings make their appearance.

Curvature of the Nails usually in association with a degree of Clubbing of the Fingers is a common sign in cases of chronic heart and lung disease. The cause is believed to be the chronic venous congestion that is present in these disorders. Fig. 3 shows the condition in a child of 10 years, the subject of hip and lung disease.
"Pimples" are frequently a source of discomfort. They take the form of small papules or pustules set on a more or less indurated erythematous base, and are usually due to a mild staphylococcal inoculation. They occur on the face, back, chest and arms generally. Others may be of the type described as acne cachecticorum, or they may be of the nature of tuberculides.
Group 3 comprises a number of conditions, the chief of which are arranged below in tabular form, with the evidence that has been put forward in support of a tuberculous origin by a very limited number of investigators.

The conditions are rare. Of exfoliative dermatitis I have seen only two cases, and neither of them showed signs or symptoms of tuberculosis. Many of the atrophodermias are probably the scars left by necrotic tuberculides.

Calcereous deposit was present in one of my patients - a woman of 37 with old-standing lung disease. In this case the lesions were two in number and both were about the size of a pea - one on the inside of the upper arm and one on the inside of the thigh. An interesting feature was that the patient frequently coughed up broncholiths in the sputum. I was anxious to have a chemical comparison made between the broncholiths and the skin deposits, but as the latter were giving rise to no symptoms and were not enlarging, the patient declined to have them shelled out.
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Group 1. Tuberculosis of the Skin.

Under this heading are included Lupus Vulgaris, Tuberculosis Cutis Orificialis, Miliary Tuberculosis of the skin, Scrofuloderma, Verruca Necrogenita, Tuberculosis Verrucosa Cutis.

These all satisfy certain criteria which have been laid down as essential before a skin affection is deemed tuberculous:

1. The presence of tubercle bacilli in the lesions.
2. The development of tuberculosis in a guinea-pig inoculated with the diseased tissue.
3. A local reaction following the injection of Tuberculin.

As there is in tuberculous disease in general a scale of resistance and of virulence, so also in tuberculosis of the skin. And dependant on whichever of these two factors is in the ascendant, and to what extent, we have a different clinical and bacteriological picture.

Thus Miliary Tuberculosis of the skin represents a massive infection with virulent bacilli in a subject whose antibody formation is at a minimum. The duration of life is short, and numerous tubercle bacilli are found in the papules. Next comes Cutis Orificialis/

Orificialis - a severe infection with scanty antibodies, duration short as a rule, depending on the extent of the visceral disease, and the lesions showing many bacilli. In the Verrucous types greater resistance is evident, the course if of longer duration and at least a few bacilli can usually be found.

Scrofulodermia takes the next place in the scale. Then we have Lupus Vulgaris running a very chronic course and showing, few, if any, tubercle bacilli in the lesions - so few that Darier, whose work on the subject had already become classical, acknowledged some years ago that he had never found them.

Curiously enough this order corresponds also to the relative frequency with which these different manifestations of skin tuberculosis occur - miliary being the most rare and lupus vulgaris the most common.

Why tubercle bacilli should be so difficult of demonstration in lupus has long exercised many minds. To account for their sparsity it was suggested that the lesions are reactions to a toxin and not to bacilli actually present. Another theory is that most of the original bacilli are rapidly destroyed by the tissues, evidence in support of which is found in the attenuation of the remainder. Or it may well be, as

2. Berlin. klin. Wochenschr. 1908; 45, 691.
Much points out, that there are atypical forms of the tubercle bacillus which have lost their acid-fast properties and which therefore do not stain by Ziehl's method, but which are still virulent, or which are capable of regaining their virulence and staining characteristics by passage through a suitable animal; that these may take the shape of rods, rows of granules, or isolated granules and hence their detection and recognition in lesions may be very difficult.

Out of 20 cases of lupus reported on by two observers sections stained by the ordinary Ziehl-Neilsen method disclosed tubercle bacilli in only 20%. In these same cases Much's granula forms were detected in 100%.

Another investigator reports, as the result of work done on tuberculous glands and spleens from guinea-pigs, that he observed no advantage whatever in the Much method over the ordinary as regards the discovery of tubercle bacilli in these organs. In this connection the conclusions drawn by Costantini are interesting. He points out that there exists a relation between the number of acid-fast bacilli and granula forms in any given process. If that be very/

1. Bandelier and Roepke - System of Tuberculosis.
very active the former are numerous while the latter are scanty, and the opposite holds in very chronic lesions.

Opinion is still divided as to the significance of these Much bodies which are best shown by the Gram-Much method and which have been found in cold abscesses, in sputum and in cultures of tubercle bacilli. They appear to be identical with the "Splitter" or "Sporoid" bodies of Spengler. By some they are considered to be a resting stage, by others an attenuation or degeneration form of the bacillus, and by others to be of no diagnostic importance whatever.

Personally I have not been able to recognise them in six cases of lupus where sections were stained in the matter recommended.

In practice, if acid-alcohol-fast bacilli are present in the lesion one need not go on to the second test. The identification of tubercle bacilli carries conviction that these organisms were responsible to some extent, if not entirely, for that lesion. Animal inoculation would be of service in determining whether the infection is human or bovine in source but nothing more. If on inoculation the animal does not develop tuberculosis that is far from proving that these bacilli were not alive when they first gained access to the human tissues.

But/
But in the event of failure to find tubercle bacilli microscopically the second criterion may in cutaneous disease, as in other manifestations, give most valuable information. Thus the second criterion includes the first. It is a final court of appeal — only with this reservation — that the special conditions as to size of the tissue and the site of inoculation be kept in mind. For in a tuberculosis or in a tuberculide we may be dealing with scanty bacilli which, though virulent at the time of infection, in all probability rapidly succumb, or which were more or less moribund from the time of their deposition in the tissues.

The value to be attached to the third standard is lower than that of the others. The specificity of tuberculin in the diagnosis of tuberculosis is upheld by many, doubted by some and denied by a few. For example such authorities as De Brunmann and Gougerot hold that tuberculin applied to lupus patches may give no reaction in that patch. Of the four reactions that may occur in response to a diagnostic injection, general, febrile, local and focal, the last mentioned/

1. Fox. B.M.J. 7th October, 1911.
mentioned is the only one of practical utility in the diagnosis of cutaneous tuberculosis, inasmuch as any tuberculous lesion, wherever situated in the body, will give rise to the other three. The terms "local" and "focal" as applied to reactions are often used rather loosely. This is unfortunate as they connote entirely different entities, and the use of them as interchangeable terms can only lead to confusion in many cases. "Local" we should limit to the changes seen at the site of injection, while by "focal" we signify these occurring round the focus of disease, which latter is presumably the purport of the third criterion.
Miliary Tuberculosis of the skin and Tuberculosis Cutis Orificialis are not universally regarded as two distinct manifestations. Sometimes the terms are used synonymously, sometimes the conditions are described as if the difference they show is one in degree only and not in kind. But though there are certain points of similarity between them, there is good and sufficient reason for separating them, and in this country the distinction is almost always observed.

Miliary Tuberculosis of the Skin is very rarely seen, and then only as an external manifestation of a general miliary tuberculosis. It has thus been observed in young children almost exclusively, and the prognosis - that of the general condition - is a very bad one, though a very few cases have been reported where resolution has occurred, just as recovery from a tuberculous meningitis is, every now and then, cited in the medical press.

The bacilli are disseminated by the blood-stream, and it has long been supposed that the source is a caseous focus, very commonly in an intrathoracic gland, which erodes a blood-vessel. The eruption is commonly a sequel to measles or other fever in which we know these glands to become congested and swollen, and/
and thus active caseation of a focus in their sub-
stance may be determined. Cornet, however, has
recently suggested that the direct source of the in-
fective material is tiny nodules of tuberculosis which
develop in the vascular walls. They are very dif-
ficult to detect, he says, and hence have escaped
notice so far. But he has often found them post-
mortem in miliary tuberculosis and in no other con-
dition. These minute lesions caseate and rupture,
pouring their contents into the blood, and he com-
putes that an ulceration of 1/10 mm. can represent
an escape of over 100,000 bacilli at one time.
("Acute Miliary Tuberculosis" translated by F.S. Tinker,
London 1914).

The lesions are numerous, brownish-red or red
papules which may in places show a minute pustule or
vesicle. Within ten days or a fortnight of their
first appearance they may be wide-spread over the
body. If the duration of life be long enough, small
ulcers may form, but death from the associated menin-
gitis usually occurs before ulceration is well de-
veloped.

Tubercle bacilli are found in the papules in
large numbers and the structure is a typical tubercle.

Tuberculosis Cutis Orificialis (Syn. Tuberculous
Ulcer,/)
Ulcer, TB. Miliaris Ulcerosa, TB. Cutis Vera.)

As the name suggests the lesions in this type are found about the orifices of the body at the junction of the skin and mucous membrane in most instances. They develop as a complication of visceral disease and, in my experience, mainly of advanced phthisis. They are consequently found in adult life and are the result of a direct inoculation with the patient's own bacilli. Thus phthisical patients may show them about the margins of the nose and mouth (but sometimes on the tongue, palate or pharynx) from contact with expectoration, or about the anus from infection with swallowed sputum. The faeces in intestinal tuberculosis may also give rise to ulceration in the latter situation, and bacilli-laden urine from some part of the genito-urinary tract may determine its site at the orifice of the urethra or upon the vulva.

The first evidence is the appearance of a cluster of tiny papules, miliary tubercles, light or reddish in colour. Softening soon shows itself and is followed by the picture of miliary ulceration. These small ulcers enlarge by extension and fusion till a rounded or irregular superficial area of the skin about the size of a sixpenny-piece is destroyed. The edge is ragged and friable and is sometimes undermined, while the floor shows pale unhealthy granulations and is often more/
more or less irregular from the presence of minute tubercles. Its surface is moist as a rule, and during the night a scab may form which is often washed off during the morning toilet.

The prognosis of the ulceration is the prognosis of the primary focus — in my experience advanced visceral disease has been present in every case, to which the patient has succumbed some months later.

Tubercle bacilli are present in the discharge and in the tissue and the structure is definitely tuberculous.

Fig. 4.

In the course of over four years' whole-time work among tuberculous patients I have notes of only five instances of labial, three of palatal and one of anal infection.

The diagram shows the sites of ulceration on the mouth. The soft palate was affected in two cases and/
and the hard palate in one. In the anal case the anterior edge was the site.

Of these nine cases, six were males. The average age was 33 and the patients when first seen by me came under the L₅S; L₅S categories in Philip's Classification.

Scrofulodermia.

This term has been used by different dermatologists to include various conditions. Thus Morris embraces under it Strumous Ulcers and Lichen Scrofulosorum. Others consider the Tuberculides as a subsection. Walker, following the teaching of Unna, limits the name to "those cases of tuberculosis of the skin where the infection proceeds from a tuberculous focus beneath" - a definition which is a simple one, and at the same time calls up before the mind a well defined clinical type. The focus beneath is commonly glandular, and scrofulodermia is typically seen about the neck, though it may occur in the region of lymph glands elsewhere. Figs. 5 and 6 are photographs of the same patient, and show multiple lesions of both sides of face, of neck and of both axillary regions. They had developed subsequent to suppuration of glands in the neck and axillae seven years previously.

1. Introduction to Dermatology. p. 269.
Section of Scrofulodermia.
previously. The left wrist shows well-marked osseous change with sinus formation.
Or the focus may be osseous, in which case the fistulae lead down to the diseased bone, and the skin changes centre round the mouths of the sinuses.
(Fig. 7.)

Fig. 7.

Scrofulodermatous changes around sinuses.

A gland becomes infected with tubercle bacilli which it is unable to overcome. It enlarges for a time, feels hard, and the skin is moveable over it. Later this skin shows some slight reddening, is found to/
to be adherent to the mass underneath and a boggy area can be detected by the finger. The redness increases in intensity and extent as caseation proceeds throughout, until finally one sees a roundish purple area of skin with points of impending breaking-down. The skin gives way at these points and the thin fluid contents escape, giving opportunity of access to the ordinary pyogenic organisms.

The intervening islets of purple, infiltrated and unsupported skin gradually necrose, and the surrounding integument is involved in a sluggish inflammatory process, so that an ulcer is formed with purple, undermined, eroded edges, and pale weak granulations covering its floor. Scabbing results, retaining purulent secretion which finds an exit at some corner every few days, and the whole scab loosens and comes off. And so the process goes on very slowly, it may be for years, more and more of the adjacent skin being destroyed and more and more patches arising from other subcutaneous foci. But spontaneous healing may occur. The cicatrix left is often smooth and pale with pink stellate capillaries coursing over it, or it may be more or less puckered as a result of fibrosis with the familiar tags and bridges of skin.
Fig. 8.

Scrofulodermia secondary to cervical adenitis. The lesions were scraped about a dozen times in all with no benefit.

Scrofulodermia is a disease of children and adolescents mainly. It is a chronic condition and when it is seen in older people a history of many years' duration is usually to be obtained.

The prophylaxis of the disease is efficient treatment of the focus before the skin has become involved; therefore the prognosis turns, as in all tuberculosis,
tuberculosis, on the early recognition of the cause, and the thoroughness of the methods used to remove or annul that cause.

Fig. 9 shows scarring left after surgical operation for adenitis with associated skin infection. Two sinuses continued to discharge but healed during a course of tuberculin.
Fig. 10.

Boy, aet. 6. Developed large cold abscess in neck. Aspirated just before skin gave way. Sinus discharged for 2 months and skin began to show early scrofulodermia round orifice. Scraping and a course of tuberculin led to healing and no recurrence noted three years later.
Fig. 11.

Female. Aet. 25. Morbus Coxae developed ten years before. Extension applied by weight and pulley fixed below knee with the result that knee-joint was dislocated as shown. The scars over the hip-joint are the seat of secondary tuberculous changes.

Closely allied to scrofuloderma as described are other cutaneous tuberculoses which used to be seen much/
much more frequently than they are to-day. The more important are the following:

The *Scrofulous Gummata* of the older surgeons which have their origin in the subcutaneous tissue quite independent of underlying gland or bone disease. These first show themselves as hard nodules in the hypoderm, from the size of a large pea to that of a marble, usually situated on the back or the limbs, and they recall to the examiner the feeling of a hard chancre under the prepuce.

They are found almost always in children under the age of ten, and the skin changes as they soften and burst externally - which they may do in the course of a week - are very similar to those outlined above.

The prognosis is very good; spontaneous cure often occurs, a depressed white scar marking the site of ulceration. It has been suggested that some of these really belong to the Erythema Induratum of Bazin.
Fig. 12. Depressed dead-white scars following the healing of Scrofulous gummata. Ulceration had been present for about a year when I first saw her, and she was sent to me for tuberculin treatment. After 2 months the ulcers healed, but tuberculous nodules were still present at the margins as seen in Fig. These were excised, tuberculin maintained, and healthy scarring resulted.

Fig. 13. Scrofulous Guma developing on calf of girl aged 8, the subject of tuberculous glands in neck. No other lesion. Guma excised. No recurrence.
Tuberculous Lymphangitis occurs in the limbs and is the result of a spread from a distal primary focus of infective tuberculous material along the lymph channels. The primary focus is very commonly a warty lesion on the hand or foot. At intervals in the course of its efferent lymphatics there develop nodules which undergo caseation and suppuration, aided in the latter by the action of the associated pyogenic organisms, and resulting in typical tuberculous ulcers.
ulcers. Sometimes the walls of the lymphatics themselves become infiltrated to such an extent as to be felt as hard cords running up the limb, and a pseudo-elephantiasis may be thereby produced.

Under "Warty" tuberculous lesions are grouped certain conditions in which papillary and epithelial hypertrophy are a conspicuous feature. Such overgrowth may be seen in chronic ulcerations and infiltrations from whatever cause. When it occurs in the course of lupus vulgaris the term lupus verrucosus is often applied. But by warty tuberculosis of the skin one usually refers to those lesions which go under the names of Verruca Necrogenita and Tuberculosis Verrucosa Cutis.

Whether these two conditions are one and the same opinion is divided. Some dermatologists make use of the titles as if they are synonymous, while others draw distinctions as regards size of the lesions, tendency to spread and liability of infection of glands and viscera secondarily. Their etiology is believed to be a common one - the direct introduction of tubercle bacilli into an abrasion of the skin. When first described the source of infection was supposed to be limited to animals and the products of animals, but this conception has been widened, and we now recognise that/
that the living tuberculous person is a frequent cause of the skin lesions, both in himself and in his fellows. The disease is in a sense a trades' disease - butchers and cooks contract it from meat, mortuary attendants from cadavera, laundresses from linen, doctors and nurses from patients' discharges, and patients from their own discharges. It is said to be common in miners who, as a class, are liable to slight injuries to their hands, and we know that the mortality from phthisis among miners is a high one.

Again the early clinical course of the two conditions does not differ. A small flat red papule is first apparent. Later this becomes pustular and a scab forms on the surface, while the base begins to show some induration and the margins assume a violaceous tint. When the scab drops off it may be thought that the infection has been combated, and that fibrous overgrowth has been left behind. In some weeks, however, the lesion begins to stand out more and more and the surface shows irregularities which continue to grow out, so that ultimately a projecting warty nodule develops, from the crypts of which, on pressure, droplets of pus exude in which tubercle bacilli can be detected.

That is the description of the Post-mortem Wart in its simplest form. The name Tuberculosis Verrucosa Cutis has been given to a more extensive condition/
condition where large areas of the skin, it may be from the fingers well up to the shoulder, are the seat of elevated warty tumours with central scarring and a peripheral red halo.

It would simplify matters if we might consider these two as types of one disease, differing not in kind but in degree only, the development of the more advanced type depending on variable factors as regards resistance of skin, immunity of patient, virulence of germ and treatment of the lesion in its early stages.

In my Dispensary work I have met with the condition only three times, though I am assured by the local mortuary attendant that many of his colleagues in London are affected. My three cases all belonged to the early stage:-

1. Subject of Fig. 16. Woman 42, Advanced P.T. Machinist. Frequently used to knock skin off knuckle at the same place in the course of manipulating her machine, and a raw surface was present for weeks at a time.

Fig. 16.

P.M. Wart in case of phthisis.

The photograph was taken when I first saw patient. The character of the lesion can best be shown diagrammatically thus:
Tubercle bacilli were present in the pus underlying the scab. The epicondylar and axillary glands were enlarged, hard and tender. Excision of the nodule in April 1915 was followed by a healthy scar; the glands subsided to a certain extent; last seen by me in June 1915. Sections of the lesions showed typical giant-cells systems and bacilli scattered throughout.

Fig. 18. P.M.
Wart. Low power.

Fig. 19. P.M.
Wart. High power

2. Girl aet. 12. No signs of tuberculosis in other systems. Sister died of phthisis at home some months before. Lesion situated on front of wrist near radial margin.
margin and discovered on the routine examination of members of the household. History (given by parent) of child having been cut by a piece of glass at the site about seven months previously, and suppuration followed for some weeks. No scar visible in corroboration. Tubercle bacilli in pus. Lesion excised and tuberculin administered. No recurrence at end of 5 months when she left district and was lost sight of.

3. Sailor, aet. 38 - subject of advanced P.T. Lesions situated as drawn. Smoked "twist", and in cutting used to rest his roll against right thumb so that the knife often penetrated the skin and he had a more or less permanent crack in that situation, which later took on the characteristics of a warty tuberculous lesion. No active treatment. Patient died two months after I first saw him, caseation of a gland in the right axilla having in the meantime occurred.
Fig. 21.

Pus from P.M. Wart.

Norman Walker refers to Verruca Necrogenita as the most benign form of cutaneous tuberculosis, but this opinion is not shared by some other authorities (e.g. Sequiera) who find visceral disease a not uncommon sequel.

1. Introduction to Dermatology. p. 254.
Lupus Vulgaris is in most cases a primary tuberculous of the skin. It is the commonest manifestation of the ravages which the tubercle bacillus makes in the cutaneous tissues, and is responsible for much of the facial disfigurement which we see in the streets of our large towns. The face is its favourite site and in most cases is its only site. But it may occur anywhere, and the face may show similar lesions or be free from disease.

The frequency with which the junction of skin and mucous membrane (e.g. at nasal & buccal apertures and at orifice of the lachrymal duct) is involved coincidently with lupous changes in the respective chambers, it may be with a long history of slight symptoms of the latter, suggests that the process has extended outwards from the mucosa. But in many cases of lupus of the exterior no mucosal lesion can be detected, and in those where one can be discovered it is sometimes very difficult to say which is primary in origin. In the Finsen Institute at Copenhagen involvement of a mucosa is found in about 30% of lupus cases.\(^1\) At the London Hospital the figure is decidedly lower, 43% of a total of 964; but still it is high enough to warrant our first remark to every lupus patient - "open your mouth".

1. Allbutt & Rolleston, System of Medicine, Vol.9, p. 470.
The next most frequent site is the neck. But here the condition is very often secondary to underlying foci, so that we might have expected to find a scrofulodermia instead. Often however, lupus vulgaris develops on the top of a scrofulodermia as occurred in the subject of Fig. 22. Apple jelly nodules gradually appeared at the margins of the ulcerations, and later the surface took on the thickened warty characteristics of a lupus verrucosus.
Lupus Verrucosus developing on a scrofulodermia.

In his series of cases Jones\(^1\) found over 11% to have this origin.

Other/

Other parts of the body are affected in varying proportion, buttocks, limbs (especially hands and feet), trunk and rarest of all the scalp.

In general, lupus is due to direct inoculation with tubercle bacilli which gain access to the tissues in all sorts of ways. Thus it has been suggested than an initial lesion of the nasal mucosa is due to the inhalation of bacilli on to a surface the vitality of which has been lowered by the nose-picking to which children are addicted. The face itself, the buttocks and other parts are then commonly inoculated by the scratching with these infected finger-nails. Other cases are recorded where tattooing, ear-piercing, vaccination, ritual circumcision, hypodermic puncture and other minor injuries are believed to have afforded a simultaneous lodgement to the tubercle bacillus.

One concedes the possibility of a lupus contracted during the actual operations of tattooing and circumcision, where the parts devitalised in the process come in contact with saliva from an "open" operator.

But vaccination comes under a different category, and though lupus has several times been described as occurring in the scar of a small-pox vaccination and

1. B. M. J. March 1901.
hard to invest that triumph of preventive medicine with a further terror on these grounds only. The likely explanation is that the ubiquitous tubercle bacillus becomes engrafted on a surface prepared for its reception by the scarification. One has only to observe the indifference to asepsis coupled with the misdirected zeal of a certain class of the South London community to realise how manifold are the opportunities for secondary inoculation. A dirty rag or filthy shield or no dressing at all, an itching sore and five sharp nails, a bevy of relatives and neighbours each of whom admiringly inspects and palpates the pustules - and then comes the "bad" arm, the vaccination that "takes", the hundred and one maladies that have their origin in vaccination and the "conscientious objector".

Notes of 4 cases from Dispensary practice.

1. S.W. aged 21 months. Mother has "open" P.T. Vaccination at age of 5 months, since when S.W. has been ailing more or less. Arm has three vaccination scars, one of which shows tiny yellowish-brown spots suggestive of very early lupus. Other scars healthy, but at side of one a few more papules developing thus:

Fig. 23.
Mother had not noticed the spots till I drew her attention to them, so no evidence as to duration was forthcoming. The symptoms on account of which the child was brought to me turned out to be those of a general tuberculosis to which she succumbed some six weeks later.

2. A.R. aged 18 months, sister died of P.T. one year ago. Brother died of Meningitis nine months ago. Father died of "pneumonia" at age of 35. Patient brought for treatment for cough and loss of weight. Râles evident all over chest, some cyanosis, marked langour and general flabbiness. Left arm shows four vaccination scars, two of which are the seat of small nodules (one in each) the size of a small bean, of the consistence of putty, while the overlying skin is assuming a purplish tint. Parent says these appeared soon after vaccination. In view of the bad prognosis given by me (and in the hope of obtaining better advice) patient was taken to a general hospital. The nodules were incised and patient was kept in hospital for one week. Thereafter she was sent home. Wounds refused to heal - no T.B. found in discharge. Died from an acute tuberculosis some weeks later.

In two instances I have observed an interesting phenomenon which has not to my knowledge, been record-
recorded elsewhere. The patients were aged six and eight respectively. On the first or second day following a V.P. tuberculin test (using undiluted Old Tuberculin) in these children the reaction at the site of scarification was positive, but one vaccination scar showed a hyperaemia which was not present previously. This was slight, evidenced by a pinkish tinge and dilated venules running across the scar, and was confined to the scar area which before had appeared a typical white healthy one. The V.P. was repeated some weeks later and the same result obtained in both cases. Further, the scar reaction was obtained on the one arm when the test was applied to the other arm. To explain it one assumes tubercle bacilli lying latent in the scar tissue and the absorption of a small quantity of tuberculin into the circulation, thereby giving rise to a minimal focal reaction.

In addition to direct infection of the tissue, spread of the bacillus via the blood probably occurs, but much less frequently. It is suggested in those cases of disseminated lupus which are chiefly seen after one of the infectious fevers, and the part played by the fever is as discussed under Miliary Tuberculosis of the skin.

The satellites which spring up in close proximity to/
to the edge of a parent patch perhaps represent an extension along lymph channels or perivascular spaces.

The theory of Infection by Inheritance - that the tubercle bacilli are laid down in the skin of the foetus - finds few supporters. We believe that a child is very rarely, if ever, born already tuberculous.

The frequent association of lupus with tuberculosis of other tissues and with a family history of the same would lead one to suspect, even in the absence of proof, that the tubercle bacillus is the responsible agent. All are agreed that glandular and osseous disease is a common accompaniment. But wide difference of opinion exists as regards the relation of pulmonary tuberculosis to lupus. Thus to quote extremes: Leloir finds that nearly 60% of his lupus patients develop pulmonary tuberculosis while Morris thinks such a complication is infrequent, and Hyde confesses that he has not yet observed it.

The majority believe that death from phthisis commonly occurs in the subjects of lupus. It is admittedly rare, however, to find an active case of lung disease develop the skin condition. Personally I have never met with one such in some hundreds of cases of pulmonary tuberculosis which I have followed up for periods varying up to 4½ years.

Lupus/

Lupus Vulgaris is, in its beginnings, a disease of childhood and adolescence - rarely revealing itself after the age of 30. It is one of extreme chronicity, and this may be co-related with the sparsity and the attenuation of the bacilli in the diseased areas.

The essential lesion of lupus is the "apple-jelly" nodule which begins deep in the corium as a collection of tiny follicles. Gradually these grow up towards the surface. In their course they enlarge and take on a yellowish tint, so that a macular stage is reached. This passes on to a papular stage, and finally by continued growth the typical lupus nodule is seen as a small superficial infiltration, of a soft consistency, of a pale red to dark red colour, with a smooth surface and a translucency always compared to apple jelly.
Early Lupus Vulgaris.

By gradual fusion with other nodules and by peripheral extension, or by the development of fresh nodules in the vicinity the lupus area may very slowly, almost imperceptibly, increase in size for months or years, involuting and cicatrising in the centre perhaps.
perhaps, while still progressing at the margins. It is circumscribed, easily demarcated from the healthy skin and with a greater or less tendency to surface scaliness.

Fig. 25. Section of Neck Lesion showing giant-cell systems.

Fig. 26. Circumscribed Lupus.
And all the time it is producing no pain, no itching, no symptoms whatever, and by the poor, to whom any lesion appeals in proportion to its effect on the working capacity, in the early tractible stages it is viewed with the utmost indifference. That then is the Lupus Non-exedens type of the older writers.

Sooner or later, however, in the course of the vast majority of cases complications supervene, and Lupus Exulcerans is by far the commonest manifestation of such. The nodules appear to break down to form shallow ulcers, and the clinical picture is entirely changed. Purulent discharge and ugly dirty scabbing are now the predominant features, and the process is no longer one of dormancy but of angry and aggressive disease. It must have been this ulcerative type that suggested the term "lupus" before the causative agent was known. But the wolfish aspect of the disease is not to be attributed to the action of the tubercle bacillus per se, - for we know how very insidious the activities of that organism may be - but rather to the superadding of pyogenic infection, the invasion of cocci and other bacteria, the baneful influence of which is manifested in all forms of tuberculosis.

Such nomenclature as "non-exedens" and "exulcerans" was, however, founded on faulty observation, for as/
as Walker points out "....... there is no ulceration in the true sense of the word. However ulcer-like the case may appear, careful examination will disclose the fact that the surface is still covered, imperfectly, it is true, with epithelium. The epithelium is swollen, distorted almost beyond recognition, but it is still there. The process is essentially one of catarrh."

So it were well to give up the old and misleading and adopt a terminology in accordance with modern histological knowledge, and the substitution of the terms "simple" and "catarrhal" in place of the others, as suggested by Walker, will go far to prevent the misconceptions of the past in regard to treatment as well as to etiology.

Lupus vulgaris, perhaps more than any other skin condition, has been burdened with a multitude of names which merely connote an undue prominence of certain clinical or histological features. Thus we have Hypertrophicus, Verrucosus, Serpiginosus, Exfoliativus and many others. There is a tendency in such structural refinements to lose sight of the foundation-stone, for they own a constant origin - the tubercle bacillus - and under which form they will ultimately be classified depends on complex and varying factors.

Fig. 1. Introduction to Dermatology, p. 252.
Fig. 27 shows some of the secondary effects of a well-marked lupus affecting the skin of the face, all the mucosae in the vicinity, the neck and the hands. The disease was of some years' duration, and the history suggested that the nasal chambers were first involved. The patient is a sister of the boy represented in Fig. 49. A sister died of tuberculosis at home a few years previously and another sister has also lupus vulgaris, though not so pronounced as this patient. The two last mentioned have always been bed-mates.
Fig. 27.

Diffuse Lupus Vulgaris of face, neck and hands.

These effects include the atrophy of the cartilages of the nose from the pressure of contracting scar tissue, the thickening of the eye-lids from an infiltration/
infiltration in response to primary tuberculous and secondary pyogenic infection, the retraction of the lips from the pull of fibrous tissue and the "drawn" appearance of the skin in this region, the loosening of the teeth from implication of the gum, so that they are about to fall out of their sockets. The sight of one eye was practically lost from disease of the cornea, and the nail of the small finger of the left hand was destroyed. The tendency to central scarring in the circum-oral region and marginal spreading on the cheeks and neck are shown, while the forehead was the seat of outpost-like apple-jelly nodules and other lesions of the nature of a papulo-necrotic tuberculide. Finsen light, X-rays and other methods of treatment had alike proved of no permanent benefit.

Lupus Vulgaris affecting parts other than the face shows no special features. Any of the forms may be present. On the limbs and trunk the lesion is usually single, and there is a tendency for a larger area of surface to be involved. (Fig. 29)
The diseased tissue stands out more boldly owing to a greater development on the growing margin of an exfoliative or papillomatous element, while the scarring in the centre is usually much firmer and denser than it is elsewhere.

In Fig. 30 a large rounded area is seen on the lower thigh of a girl aged 12. When 6 years old she
had a portion of the lower end of the fibula excised for tuberculosis, and a small lupus patch on the front of the ankle was removed at the same time. Some months later lupus appeared as a single patch on the thigh and gradually extended till it occupied the area represented by the small clearer circle in the centre. Thereafter it remained stationary for a time,
but during the last two years the process has advanced rapidly so as to attain its present dimensions. A small subcutaneous nodule has developed within the last three months, internal to the upper end of the fibial scar, and four early nodules have appeared in the scar of the original lupus. (Fig. 32)

Fig. 32.
Nodules in a lupus scar.

Recurrence in the scar of a former lupus area is not uncommon, and excision, by many considered the treatment par excellence, has been discarded by others, excepting/
excepting in selected cases, on account of its liability to be followed by such recurrence.

My experience of the results obtained by others, for it is too early to cite my own results in a very limited number, has biassed me in favour of the method. However, most of the evidence is based on the statements of the patients themselves and is not above suspicion as to exaggeration of the nature of the disease before operation. Not so, I believe, in the subject of Fig.33. This woman, who showed a scar on her right cheek, brought her daughter to me for an opinion as to whether a certain spot on the child's face was lupus. Such enlightenment on her part led me to question her regarding her scar, and she gave this history: that 15 years ago she had had a lupus exedens removed from her cheek by Mr Annandale in the Edinburgh Royal Infirmary: that three years later (12 years ago) she had a recurrence at one corner: that this was excised by Mr Alexis Thomson, since when she has had no further trouble. The scar is now a perfectly healthy one, and the disfigurement is remarkably little.
Fig. 33.

Lupus - Excision Scar.

The freckle-like spots are of the nature of a chloasma due to uterine disorder.

The age at which these tuberculoses develop is determined by the accident of inoculation. Thus, scrofulodermia/
scrofuloderma is most rife in those decades when the incidence of gland and bone disease is greatest. So also miliary tuberculosis of the skin is a manifestation of infancy and early childhood. Tuberculosis orificialis is seen oftenest at that period of life when the mortality from phthisis is highest.

Lupus vulgaris attacks the young poor - the young child because the tissues are delicate, and the floor is the play-ground for the first few years of life - the poor child because of all the penalties which poverty brings in its train; mal-nutrition, overcrowding, neglect and fatalism. Add to that an infectious father spitting in the doorway where the infant is likely to crawl, or a mother in an advanced stage smearing the child's face with tubercle bacilli every time she kisses him. The wonder is that any escape!

G.S. aged 12, whose mother had died of phthisis 10½ years before, was examined at a "March-past". She showed no signs of active lung disease but walked with a slight limp, which she said was due to "corns". She had tried most of the plasters on the market, and had had free medical advice on various occasions. When the part was uncovered it showed the appearance seen in Fig.34. Warty lesions were evident on the outer edge of the foot and of the small toe and typical apple-jelly nodules on the dorsum. A dying
Fig. 34. Lupus of foot.  Fig. 35. Section of same.

Phthisical mother, an infant 18 months old, a single room and very little attention - and the seed took root!
Pathology of Cutaneous Tuberculosis.

The discovery of the tubercle bacillus led to the identification of all these forms of external disease as essentially the same as tuberculous lesions in internal organs - a reaction on the part of the tissues against a specific bacillus, and degenerative and reparative changes, more or less pronounced, following in its wake. But that discovery merely confirmed a belief that already existed, born of the structural similarity noted between the miliary tubercle in a viscus and the apple-jelly nodule of lupus vulgaris. And these are two extremes, for clinically a caseous miliary process is an/
Section of Tuberculosis of the Skin.
an actively progressing infection, while lupus may endure for the better part of a life-time.

So we may take the nodule of lupus as a type for consideration of the fundamental processes occurring in these external manifestations of tuberculosis. A typical section shows in the earlier stages in the deeper layers of the corium several small rounded areas, not necessarily situated, as pointed out by Unna, in relation to a blood-vessel. These areas or "follicles" are composed of large cells with granular cytoplasm and large clear nuclei - the epithelioid or plasma cells of Unna - which lie in a very fine network of fibrillary tissue. The cells represent mainly an adventitial proliferation. At the periphery of the follicle, in the form of a band, is an infiltration of small round cells with scanty protoplasm and darkly-staining nuclei, while in the centre there may be one or more large multinuclear cells of the type known as giant-cells. An aggregation of these areas constitutes a "tubercle". If tubercle bacilli are to be seen they are often found congregated at one end of a giant cell, or they may be distributed

Sooner or later in most cases this proliferative stage is followed by a degenerative one, along with which reparative changes go hand in hand. As a result of the poisonous action of the tuberculous toxin on this newly-formed tissue, aided perhaps to a slight extent by the avascularity of the follicles - for no blood or lymph vessels penetrate them - a homogeneous degeneration begins in the cells of the centre. There the epithelioids swell, their granulation becomes less apparent and the nuclei lose their power of taking up stains,
stains, while the supporting fibrillar tissue is gradually lost sight of. But all the time Nature is setting up a barrier. New connective tissue cells are being laid down, from a proliferation of the peripheral cells of the plasmatic area, Unna thinks. This area by its central swelling compresses these cells, so that a capsule of fibrous tissue is ultimately formed which has for its object the protection of neighbouring parts from the effects of the bacilli or their toxins.

The results of this compression are seen too in an obstruction of the skin glands, resulting in their dilatation (Figs. 40 and 41.) though later they are involved in the cell-growth.

Fig. 40. Showing dilation of skin glands. Low power.

Fig. 41. Same. High power.
The overlying epidermis shows changes sooner or later. As the process approaches the upper layers of the corium the papillae and the cells of the rete usually undergo atrophy, (Fig. 42). On the other hand they sometimes show a hypertrophy, the epidermis becoming thickened and sending prolongations downwards so that the histological picture may come to resemble that of a squamous epithelioma (Fig. 43.)

A minor degree of this is often seen at the margins when the centre is occupied by an atrophied area.

That then is the developed tuberculous architecture, as exemplified by lupus vulgaris.

But/
But just as different cases of pulmonary tuberculosis show variations as to acuteness or chronicity, and just as lung disease in the same individual takes a different course under the influence of a catarrh, superadded infection or other complication, so also do the tuberculoses of the skin — and all these clinical departures from the simple form are reflected in the structural findings.

The amount of degeneration is found to correspond closely to the number of bacilli present and this latter determines the acuteness of the process. Where these are plentiful, as in Miliary Tuberculosis and Tuberculosis Orificialis, the tubercles rapidly soften and give rise to a cheesy fluid which perforates the epidermis and leads to acute ulceration. This "caseation" is not found in the other varieties of cutaneous tuberculosis. A section of such a tubercle shows dense collections of small round cells scattered throughout the cutis with few epithelioids and very occasional giant-cells, but with tubercle bacilli present in large numbers. For giant-cells are not a feature of acute lesions. Their number varies inversely with the abundance of bacilli. Hence in lupus vulgaris, where scanty bacilli are found, these cells are seen more constantly than in the other forms. Giant-cells are not peculiar to tuberculosis, being found/
found in infective granulomata generally and around foreign bodies embedded in the tissues.

In the absence of tubercle bacilli it is the whole picture present, and not any of its separate elements, that warrants us saying that a given section shows a tuberculous structure.

But a tuberculous lesion may not reveal tubercles. Unna with reference to diffuse lupus, says: "We see that this arrangement is exactly the same as that of the cells in all weaker poisons and shows nothing specific of tuberculosis"; and again, "we have nothing to suggest the familiar scheme of tubercle and yet we have before us a pure form of tubercular tissue". Another observer has found that the tubercle bacillus may produce chronic inflammatory changes alone, and that this is true not only for the nerves, veins, heart and kidneys but also for the skin.

If this be so, then such a definition of Tuberculosis as a disease characterised by the formation of tubercles is obviously too limited application. As Poncet and Leriche point out "To apply the term tuberculosis to processes in which there are no tubercles, is, for an Englishman, quite wrong. The French, on the other hand, may do so; for they speak, not of tubercles,

2. System of Tuberculosis, Bandelier and Roepke.
tubercles, but of follicles. So that, by the phrase "tuberculose non-folliculaire" a Frenchman means a disease process due to Koch's bacillus, and yet not characterised by what we call tubercles."
Group 2. Tuberculides.

In the majority of the lesions grouped under the common name tuberculide the evidence of a tuberculous origin is to a certain extent circumstantial - in some types stronger than in others. They are met with in persons who are the subjects of tuberculosis elsewhere. In about 90% of those which have come under my own observation the primary focus has been a gross, easily recognised one, lung and glands being affected in almost equal proportion. In some cases no tuberculous disease is evident on physical examination. In these the eruption is of some diagnostic value, as it signifies a latent lesion perhaps in a lung, or in the tracheo-bronchial or abdominal glands which, if untreated, may show itself later. Hyde thinks that in some cases a hereditary tendency only may be present - a latent lesion might account for these cases too, as the opportunity for infection has probably been offered.

Again, in some of these eruptions the histological structure which we associate with tuberculosis has been shown from time to time by various observers.

The occasional co-existence, in the same patient, of some of these eruptions with other skin lesions that are definitely tuberculous leads us to suspect a/
a like etiology, and their frequency after measles recalls to us how often tuberculosis of other organs first manifests itself as a sequel to that disorder.

Compliance of the tuberculides with the criteria which are considered essential in the case of the tuberculoses has not in most instances been proved finally, though individual observers have recorded positive findings.

The results of the various tuberculin tests vary as to value. The cutaneous, percutaneous and ophthalmic applications of the drug are very commonly positive, but so are they in the general population. Subcutaneous injection here, as in the diagnosis of tuberculosis in general, gives more valuable information. It is often followed by a general and a febrile reaction, and sometimes by inflammatory changes in the lesions themselves, - that focal reaction at the site of tuberculous disease which, in the last analysis, is the motif of therapeutic vaccination.

The term tuberculide was coined by Darier in 1896 on the analogy of the eruptions seen in syphilis and named syphilides. But the analogy appears to be an unfortunate one. Under the latter we include all these lesions which we believe to be syphilitic in origin. The tuberculides, on the other hand, were so-called in contradistinction to the forms of true tuberculosis/
tuberculosis of the skin, inasmuch as the former were believed to be caused by tuberculous toxins coming from a distant focus, while the latter were shown to be the reaction of the tissues to living tubercle bacilli actually present locally. Later various observers recorded the occasional finding of a few tubercle bacilli in some of these lesions which had and hitherto been classified as tuberculides, as a consequence a second theory as to their origin came into being - namely that they are the expression of a reaction due to the presence of tubercle bacilli in the lesions - a blood spread - but that the bacilli are in such sparse numbers, or in such a low state of vitality that the tissues are able to cope with the invaders, which fall a rapid prey to phagocytosis.

The supporters of the toxin theory argue that the introduction into the body-fluids of various substances, quite independent of bacteria, may give rise in susceptible persons, by virtue of toxic action, to different skin manifestations. Instances of this are found in the administration of anti-toxin, of sera and of drugs, and in the absorption of intestinal and other microbic and catabolic toxins.

The action of tuberculin in tuberculous subjects gives support to the theory. Old tuberculin which previously to the introduction of T.A.F. was the pre-
preparation universally employed when a diagnostic test was applied, is a mixture of soluble exotoxins with a small amount of endotoxin, but containing no bacilli or bacillary debris. So that the response of the tissues to old tuberculin is a response to a toxin, and hence a tuberculide in the original sense of the term. The well-marked Von Pirquet reaction shows a red blush for some distance round the central scarification, and one has seen on occasions the entire arm the seat of an acute erythema from this cause.

Diffuse erythemata simulating measles or scarlet fever sometimes appear a few hours or a few days subsequent to an injection of tuberculin, and have been known to lead to error in diagnosis. Further, tuberculin injections have been followed by exanthemata bearing clinical features identical with rashes observed in the tuberculous, to whom the drug had not been administered. Thus lupus-like changes, lichen scrofulosorum and papulo-necrotic lesions have been seen as a result of bacilli-free tuberculin, and even of dialysed preparations from which ultra-microscopic bacillary particles had been eliminated.

The explanation given by the toxin school for the discovery of an occasional tubercle bacillus in a tuberculide raises a question that is a vexed one—that of the frequency with which the bacilli are present/
present in the circulating blood of the tuberculous. They argued that these skin lesions occurred in patients showing gross disease, from which the exciting toxins had been carried by the blood to the skin, and that an occasional tubercle bacillus might very easily find its way thither from the active primary focus. It is now some years since Rosenberger made what would seem to have been a somewhat extravagant statement - that he had found bacilli in the blood in every one of 300 cases of all forms of tuberculosis (lupus included) examined by him. Kurashige also reported that 100% of his cases were positive. But other investigators put forward more modest claims and limited their successful findings to the vicinity of 30 to 40%. At the other end of the scale are McFarland’s and Hewat and Sutherland’s investigations. The former, working at the Henry Phipps Institute, failed to find tubercle bacilli in the blood of 50 patients, the latter, in this country, in 20 cases reported 100% negative.

Towards the end of 1913 at the Bermondsey Tuberculosis Dispensary I examined the deposit from 10 cc. of blood of eight patients. The cases comprised one acute/

1. Amer. Jour. of Medical Sciences 1909; 137, 267.
3 & 4. B. M. J. 22nd March, 1913.
acute tuberculous broncho-pneumonia, six chronic phthises, and one scrofulodermia. With the exception of the broncho-pneumonia all these had been under treatment with tuberculin for periods varying from one month to one year. Twenty-four to forty-eight hours previous to withdrawal of the blood seven of them were given an injection of Beraneck's tuberculin — a dose which was considered the optimum dose in each case, and which did not give any marked reaction.

Professor Lydia Rabinowitsch had revived the theory of Virchow of a quarter of a century ago, that the administration of tuberculin liberated into the blood-stream bacilli from a tuberculous focus, or expressed more picturesquely "mobilised" the bacilli. She was able to show them in the blood of guinea-pigs after inoculation of tuberculin where previously no such result had been got.

In my eight cases (one had been given no tuberculin) I was unable to detect bacilli. Two other cases were investigated after death - girls of 18 and 21 - who had died of phthisis with thrombosis of the leg veins as a terminal complication. About 3 inches of the long saphena was dissected out in each case with the contained clot. Some dozens of sections were stained in the usual manner. A prolonged and careful scrutiny of these failed to disclose/

disclose any bacilli.

That there should be some divergence of opinion on the subject can easily be understood. That many observers have failed in their search is far from proving that the object searched for is not present. Those of us who have spent hours over a microscope in the endeavour to find the bacilli in smears made from the deposit of a centrifugalised pleural effusion know well how fruitless is the harvest, even though the guinea-pig will later prove them to have been present. And those who never yet have failed to find them in the direct examination of the plasma in any case and any form of tuberculosis - one is lost in admiration of the efficiency of their technique, or marvels at the boundlessness of their imagination.

It may be that the time of examination of the blood has some influence on the results obtained. The immunity of the patient may be so high, or the virulence of the bacilli so low, that they are rapidly destroyed in the blood. Rabinowitsch's findings have been mentioned. Wright and others have shown that during the negative phase following an injection of vaccine there is a diminution of the opsonic content of the blood and tissue fluids, and that the more the optimum dose is exceeded the greater and the more prolonged is this fall, and the less the subsequent positive/
positive phase, if not its total absence. Any bac-
illi which gain access to the circulation during this
negative phase would thus have less to contend with
in the way of opsonins and the associated agglutinins,
bacterictropins and bactericidal bodies; their sur-
vival in the blood would be encouraged, and their
powers for evil intensified. And what applies to
tuberculin manufactured in vitro applies also to that
produced in-vivo. We believe that the reaction of
a patient in response to an anto-inoculation is the
result of a washing out of toxins from his active
focus into his general circulation. These toxins,
if Virchow's theory be correct, "mobilise" some tuber-
cle bacilli and the opportunity of finding them in
the blood would be offered. The later saturation of
the blood with immune bodies, coinciding with the
positive phase after a well-graduated activity, would
make these chances much more remote.

In the determination of the absence or presence
of tubercle bacilli in the blood, the final appeal
must be made to the guinea-pig - the "Pathological
barometer" as it has been called. For the pitfalls
and fallacies of other methods have resulted in con-
fusion and mistrust. The acid-fast bacilli in
tap-water, the acid-fast chips of cholesterin and
of lecithin in the blood, the sheaths of disintegrated
red/
red cells, the artefacts due to a faulty technique - all these combine to make the recognition of the bacilli a difficult and uncertain task. And looming over all is that which cannot lightly be set aside - the Personal Equation.

The attitude of the majority at the present time with regard to the question seems to be that bacilli are often present in the blood of tuberculous patients - more especially in those with pulmonary tuberculosis, and that the more advanced the disease the more likely are they to be found. With what constancy they are present is as yet an undecided issue.

Such a conception brings tuberculosis more into line with other specific infections, and accounts for phenomena which we had explained a priori by the assumption of bacilli in the blood, e.g. the relation of trauma to localised disease.

This much the discussion has done - it has helped to lead us from the misconception of tuberculosis as a local disease to a proper understanding of it as a general systemic infection, and it has taught us the true importance of the part played by the tissues, and how, while we do all that in us lies to limit the spread of the seed, the raising of the resistance of the soil is our first line of defence.
Histology of Tuberculides.

The earliest tissue changes seen at the site of lesion centre round the blood-vessels of the corium. An endophlebitis is apparently the initial manifestation, and suggests that the exciting agent, whether it be toxin or bacillus, has been carried along the blood stream. A perivascular infiltration of lymphocytes and fixed cells round the source of irritation naturally follows, and the blood capillaries and lymph spaces in the neighbourhood dilate - Nature's early efforts to overcome the irritant. There is nothing in all this to suggest that these efforts are being made against any specified organism. The pathology of tuberculides may go no further than this - a mild simple inflammation which would arise in response to any irritant whatever - the toxins have been neutralised or the bacilli have been destroyed with a minimum of reaction, and a proliferation of fibrous tissue cells may be all that is left behind.

In other types the process may not be arrested so easily and a gradation of histological pictures may be seen, different features predominating in different specimens according to the depth or superficiality of the lesion, the absence or presence of necrosis or of suppuration as a result of pyogenic infection, the/

   Philippson: La Presse med., Paris, 1902, 10; 214.
the freedom from involvement of the glandular elements or their participation in the process.

That no tuberculous structure is found in a skin lesion has been put forward in support of a toxic origin for that lesion. But we have ample proof that tubercle bacilli can pass through a mucous membrane, e.g. tonsil or intestine, without leaving traces of their passage. In some cases of undoubted lupus and scrofulodermia that have come under my own observation it was only after searching many sections that one showing the typical structure was obtained, or that structure might be seen in sections from one piece of tissue while in an adjacent piece it was absent, though to the eye both appeared equally likely.

In respect of other granulomata, too, difficulties are often encountered. Thus one observer reports six cases where glandular swellings were excised. On ordinary microscopic examination of these merely chronic inflammatory changes were to be found. It was only after a very careful and extensive search that he discovered the cause to be the Kay fungus. In one instance where serial sections of the entire gland were made, only one small focus of actinomycosis could be detected in all the preparations.

The likelihood would seem to be that the bacilli may lie practically dormant in the skin, attenuated and/

and living a feeble existence, bereft of its acid-fast property perhaps, elaborating few or no toxins, and giving rise to only slight tissue changes of a sclerotic or hyperplastic type, and these not typical of tuberculosis but such as we include under the name of chronic inflammation.

The following diagrams show the appearances on section of some tuberculides that have come under my notice.

Fig. 44.
Showing small-cell infiltration around the blood-vessels, and dilatation of lymph spaces.

A few larger epithelioid-like cells are present in places in both sections.

Fig. 45.
Showing dilatation of blood-channels and aggregations of small round cells.

No giant-cells visible.
Fig. 46. In left-hand lower corner there is a suggestion of early tubercle-formation.

Fig. 47: shows dense round-cell infiltration in places, especially marked in the vicinity of the hair-follicles.
Upon what minimum of evidence can we include a skin lesion under the term tuberculide? And under what conditions as regards individual results of research are we justified in saying with certainty that any given tuberculide has ceased to be such, and has graduated into a tuberculosis of the skin? The answers to such questions are difficult to formulate, because the microscopic and experimental findings in these lesions differ so markedly at the hands of different observers.

Under tuberculosis of the skin in the foregoing pages certain types have been described which are universally known to fulfil the requirements for inclusion under that category. But there are conditions which would appear to be on the borderland—in which there is no general consensus as to their bacillary or toxic origin, though each theory has its adherents, in which, bulk for bulk, the negative findings in favour of the former outweigh the positive, but in which that positive evidence holds out hope that the balance will finally be turned by further careful and exhaustive investigation.

Such borderland cases are Lichen Scrofulosorum and Erythema Induratum.
The condition now known as *Lichen Scrofulosorum* was originally considered a disease of cachectics generally. Later its very frequent association with "scrofula" was noted and a name was given to it to signify that relationship. Then as the true nature of scrofula became apparent it was classed as a tuberculide, and now there are indications (and the same applies to erythema induratum) that it may soon find general acceptance as a true tuberculosis. It is significant that in some recent text-books (Morris, Walker) in this country this position is already adopted.

These indications are the reports by three observers of their discovery of tubercle bacilli in the tissue, and of the positive inoculation of guinea-pigs in a very limited number of cases¹. Others have obtained a focal reaction following the subcutaneous tuberculin test, and a tuberculous architecture has been recorded in several instances.

The earliest changes, according to these observations, consist of infiltrations round the blood-vessels, the sebaceous glands, hair follicles and in the papillae,

   Haushalter: Ann. de D. et S. 1898;9;456.

papillae, while the developed papule shows the characteristic arrangement of giant cells, epithelioids and lymphocytes.

With these exceptions the bacilli have not been discovered and inoculations have failed. The histology of typical cases at the hands of many observers has shown only simple inflammatory changes.

Lichen Scrofulosorum is a disease of childhood and adolescence, and according to Sequiera is the commonest tuberculide. In over 90% the subjects of it show signs of tuberculosis of glands, bones, joints or skin, though pulmonary tuberculosis is considered an uncommon cause. It consists of a sudden eruption of flattish hard papules averaging about the size of a pin-head, of a pale yellow or brown colour, often topped by a tiny scale or a small pustule. The papules evolve symmetrically, and their seat of election is the lower part of the trunk, especially the sides over the lower ribs; but they may be distributed over the limbs. There is a tendency for them to come out in crops, and they often show a characteristic arrangement in rings and crescents. The duration is long - months or years - and involution is slow with or without the development of minute scars. Throughout there is usually a total absence of symptoms.
Fig. 48.

Scrofulodermia. Same patient as Figs. 49 and 50.

Figs. 48, 49 and 50 relate to the case of a boy of five who had for over a year suffered from tuberculous glands in neck with scrofulodermatous changes. It was not till after caseation and sinus formation had occurred that he came under medical care. He was then admitted to hospital where he underwent several scrapings, with little improvement, for within a few months his condition was as bad as before.

I gave him six injections of Beraneck's Tuberculin and then stopped this treatment as his attendance was most irregular and instructions were not being obeyed.
obeyed. About one month later he suddenly developed a lichen scrofulosorum (Figs. 49 and 50.)

Fig. 49. Lichen Scrofulosorum. Front.
Fig. 50.
Lichen Scrofulosorum. Back.
It will be seen that the papules on the front of the body are relatively sparse in comparison with those on the back, where they are especially thick in the lower dorsal region, that the upper part of the trunk shows fewer lesions than the lower, and that there is an extension from the trunk down the thighs and arms. A cluster of papules is evident on the left abdomen. When I saw him last in June 1915 the papules were six months old and were still in evidence, and he had developed large cold abscesses on his scalp and on both sides of his neck.

Erythema Induratum of Bazin stands in very much the same position as that last described. Thus tubercle bacilli have been found by very few observers, inoculation\(^1\) has sometimes succeeded, the structure has several times been shown to consist of a plasmoma with giant cells\(^2\) and a reaction to tuberculin has been observed. On the other hand the absence of these features after careful search has been very frequently recorded, and Whitfield thinks that under a common name two conditions are described; one tuberculous, and the other dependant on vascular changes, mainly endophlebitic. Some see a close relationship between this and certain other conditions, e.g. Erythema Nodosum, Tuberculous Gumma, Hypodermic Sarcoïds of Boeck; and the co-existence of erythema induratum/  

induratum with other skin lesions, tuberculides and tuberculoses, has frequently been noted.

The typical subjects are anaemic, poorly-nourished girls from about puberty to the age of 20 or thereabouts, whose work entails much standing. Thus shop-assistants and servants are prone to it. There may be evidence of past or present tuberculosis, but this is not such a constant feature as in lichen. The poor circulation of these patients is manifested by their liability to contract chilblains, and there is a connecting link between the two, for some cases of erythema have been observed to improve in summer, retrogressing again during the cold months of the year; and this we know is characteristic of chilblains. Such cases may be of the vascular type described by Whitfield.

In its earlier stage erythema induratum presents itself in the form of several hard, pea-sized nodules embedded deeply in the skin tissues of the calves usually, though it may be of the thighs or arms. In the course of a few weeks they have enlarged to the size of a large marble, are less clearly defined and the overlying skin is purple. Softening spreads throughout and necrosis of the surface occurs resulting in the production of an ulcer. In the nodular stage the lesions were comparable with the nodules of a syphilitic gumma, now in the developed stage they show/1.

show a marked similarity to the ulcerations of specific disease -- "punched-out", circular or irregular with sloughing floor and indurated surroundings. The duration is months or years, and healing brings pigmented scars which after a time become white and atrophic.

Malcolm Morris refers to the group of tuberculides as being a "motley" one. And motley too is their nomenclature. Thus to conditions included under the general terms papular and nodular tuberculides over a score of names have been given, each particular name specifying some particular character, histological or clinical, which the lesion presents. The depth, the size, the course, the distribution, the implication of certain elements of the skin primarily or chiefly, the degree of necrosis and type of scarring left behind, and the naked-eye similarities to other cutaneous affections - such varying factors spell varying and complex appearances.

The gross similarity to acne pustules accounts for many of the names, a qualifying adjective being affixed to signify a predominant feature. Thus among others we have Acne Varioliformis, Necrotica, Agminata, Urticata, Ulcerans, Telangiectoides.

Hydradenitis destruens and Follicolis suggest that the/
the process concentrates on the sweat glands and hair follicles respectively, while Impetigo rodens gives expression to a destructive condition marked by the formation of crusts.

But underlying any superficial differences are certain characters which are common to the group, and which warrant them being grouped together. "The essential lesion" says Fox⁴ "is a small very indolent granuloma tending to undergo softening and necrosis and thus leaving scars." The eruptions are bilateral and symmetrical, and for the most part the seat of election is the extremities, which commonly show evidence of a defective circulation in being cold and blue.

1. 4th Intern. Cong. of Dermatology.
Fig. 51.

Papulo-necrotic tuberculide in a girl aged 13 who showed signs of early apical disease. The distribution is that of Folliclis type.
This acro-asphyxia itself is in all probability the result of toxaemia, an expression of the poisoning of the walls of the blood-vessels, with stasis most marked in dependent parts such as the limbs. It may even be that the distribution of these tuberculides is influenced by the stagnation. Any bacilli which may be circulating in the blood stream will have a greater chance/
chance of being deposited in these parts, and any toxin will be allowed to act on the one spot for a longer period before being neutralised by an adequate supply of antibody.

The papular and nodular tuberculides comprise two main types, Folliclis and Acnitis. These develop as papules or small nodules which later break down, so that they are generally referred to as the papulonecrotic tuberculides.

They occur in the young chiefly, but age is no barrier to their evolution, and their frequent association with tuberculosis of other organs suggests more than a casual relationship. They give rise to very little discomfort, seldom amounting to more than a slight occasional itching.

 Folliclis is believed by most to be evidence of tuberculosis, but Acnitis does not meet with such general agreement as to its etiology. Thus Fox, Leredde, Sequiera, Stelwagon and others consider it a tuberculide. On the other hand Barthélemuy, who described both these conditions and gave them their names, thought that an intestinal toxin was the cause, and a non-tuberculous origin is supported by many dermatologists. Walker mentions the possibility of syphilis being an occasional cause of Acnitis but entirely ignores the tubercle bacillus.

Apart/
Apart from the rare finding of bacilli in the papulonecrotic lesions and the equally rare successful inoculations, a tuberculous structure with giant cells has frequently been observed in different conditions grouped under that category. *Pilliculis* represents the small necrotic type. Each lesion begins as a small colourless papule in the deeper skin. As it approaches the surface it grows so as to attain a size up to that of a lentil, at the same time taking on a deep purplish colour, while a brighter red areola develops round its base. Vesiculation occurs on the summit and a crust forms which, on removal, discloses a small sluggish ulcer. Healing occurs after two or three weeks, and a depressed scar is left, pigmented at first but later becoming paler.

Though an individual lesion usually goes through its cycle in a matter of weeks, the disease may last for years, owing to the evolution of crop after crop of papules. In one of Sequiera's cases the patient had not been free from them for seven years.

The common sites for the papules are hands, forearms, feet and legs, more especially the knees and elbows. The trunk is occasionally involved, but the face usually escapes.

Fig. 53. Papulo-necrotic tuberculide affecting face, arms and legs in a boy of six who formerly had caseating glands in neck.

Very different to the distribution of Folliculitis is that of Acnitis, in which the lesions are rarely found.
found on parts other than the face and scalp, and in which, even if they be present elsewhere, the face has its quota also. From the great frequency with which they select the forehead and temples it has been suggested that the pressure of dirty hatbands and cap bands may take a part in producing them.

Tiny brownish papules suddenly appear in the skin - grow to the size of a pea in about ten days - soften in the centre and discharge scanty pus during the next few days, then crusting over and healing follows in the course of the next two weeks, with the formation of scars showing pigmented margins and resembling in the pits they leave those of small-pox.
Acnitis lesions on back of man aged 45 with advanced P.T. The forehead was covered with the papules. Reference is made later to his patch of herpes.

The combination of Acnitis and folliclis in the same patient affecting their own particular regions has been recorded, and Sequiera\textsuperscript{1} at the Royal Society

\textsuperscript{1} B.M.J. 6th Dec. 1913.
of Medicine showed a girl who presented the small type on the upper limbs and the large type on the lower limbs.

Scrofulous or Acneiform tuberculide arises in very much the same manner as those described, going through the stages of papule, pustule, ulceration, crusting and scarring. In this, however, the lesion is pierced by a hair corresponding to the hair follicle in the region of which the process has commenced. The limbs, especially their extensor surfaces are usually affected.

MacLeod and Ormsby have described two cases occurring in the tuberculous where a tuberculous architecture was found with endo- and peri-phlebitis, and recently a positive reaction to tuberculin has been noted.

Tuberculin Eruptions. We must consider as true tuberculides those multiform eruptions which are sometimes to be seen after the exhibition of tuberculin by any method. Some of these have been mentioned on p. 84. The commonest type following subcutaneous injection is the papular but macular, haemorrhagic, urticarial, nodular or psoriatic lesions may occur.

1. Quoted by Morris: Diseases of the Skin. p. 444.
Fig. 56. Tuberculin Eruption.

Fig. 56 shows a maculo-squamous eruption in a boy aged six, who formerly suffered from caseating cervical glands. He had undergone a course of Beraneck's/
Beraneck's tuberculin lasting for nine months, injections being given at intervals of 7 to 10 days and the last dose administered being \( \frac{9}{10} \) TBK. By this time the lesions had entirely healed. Thereafter he was told to report in two months' time. He did so and the last dose was repeated. A few days later he was brought back to me with the eruption as seen in the photograph. The papules gradually involuted without any real necrosis, and at the end of two months only small reddish spots were left. On two subsequent occasions, one month and four months later, the same dose was again given and was followed by the same result.
Lupus Erythematosus shows itself in two main types, discoid and disseminated.

The disseminated type as a rule is seen in young women as an acute widespread exacerbation of the other type, though it may occur independently of any previous disease. Numerous tiny reddish spots appear on the cheeks and by rapid extension form a "butterfly patch". Very soon similar small lesions develop on the ears, head and all over the body, and by their growth may cover large areas of the skin surface. There is usually severe systemic disturbance with symptoms of collapse and albuminuria which proves fatal in a number of cases, autopsy showing septic-aemic, nephritic, pneumatic, or meningitic findings.

The discoid type is the one commonly seen. It is "localised" to the face, ears, and scalp as a rule, but may be met with on the trunk and limbs. The earliest manifestation is a pinhead, reddish, slightly elevated spot which loses its colour on diascopy. Several of these spots may appear simultaneously on the cheeks or nose. The usual course is for a single lesion to develop on each cheek. These spots enlarge so as to form patches, in the course, it may be, of many years, the centre becoming paler and sunken, often covered with scanty, thin, lightly-attached scales or coarser scales with a cone of horny material/
material on their lower surface which anchors them in position, while the advancing margin is red, elevated and firm. The patches extend towards the bridge of the nose where they fuse, thus giving the typical butterfly distribution, and healing in the central parts with the production of a superficial white atrophic scar moveable over the underlying tissues.

The fixed type is a very chronic one, lasting, perhaps, 20 or 30 years, giving rise to no symptoms, either systemic or local, and developing, not as lupus vulgaris in the earlier years of life, but at the age at which lupus vulgaris only exceptionally begins - the third decade.

Lupus erythematosus of the extremities presents certain clinical differences from the appearances described above.
Lupus Erythematosus affecting fronts of legs. Patient had a bad family history of tuberculosis. Injection of tuberculin gave a focal reaction with intense itching. Itching of the fingers was also present at the same time though clinically there was no evidence of disease in that situation.

The lesions are much less well-defined and are more/
more superficial. The colour is livid rather than erythematous, and the scaly character is less in evidence. On the hands and feet they commonly begin as chilblains and the condition known as lupus pernio is more properly included under this disease than under ordinary lupus. After several attacks of chilblains it may be noted that the tendency to cure with the return of the warmer months is gradually passing off. In the course of years a depressed atrophic scarring with more or less scaliness may be seen in the centre of the chilblain area, more marked in cold weather, when the peripheral parts become swollen and oedematous.

Perhaps around the etiology of no other skin condition has so fierce a struggle raged as that of the relationship of the tubercle bacillus to lupus erythematosus. Sir Jonathan Hutchison set the ball rolling by his observation that evidence of past infection, or of potential infection or predisposition in the form of a family history, was shown in the subjects of lupus erythematosus to a greater extent than in those of lupus vulgaris. And ever since then the contest has been in progress - many series of statistics have been culled, many experiments performed, many theories evolved - and the issue is still undecided. Thus Sequiera got a family history of tuberculosis/

tuberculosis in 33% of his discoid and in 80% of his disseminated cases. Of 60 discoid cases 18 showed evidence of tuberculosis. Of 15 disseminated cases seven suffered from pulmonary disease. On the other hand Jadassohn found tuberculosis to be the cause of death in only two out of 22 fatal cases, and others find no signs of constitutional disease in the great majority of their cases.

The French dermatologists noted this frequent association and have long believed in a tuberculous origin. But the repeated failure to find bacilli and to inoculate animals, together with the non-specific histology, which is that of any slow mild inflammation, and the inconclusive tuberculin reactions led them to consider it of the nature of a toxituberculide.

To the British mind, however, while a toxic origin is generally conceded, the evidence appears too conflicting to warrant acceptance of the tuberculous toxin as the sole or usual cause, resting as it does on these three considerations:-

1. The frequency of lupus erythematosus in tuberculous persons, or in those predisposed to tuberculosis.

2. Its occasional association with tuberculosis of the skin or with tuberculides.

3. Its occasional resemblance clinically to vulgaris, and cases reported of the latter developing on top of an erythematous.

Some/

1. Virchow's Arch. 1890; 121; 210.
Some there are who go further, who hold it as proved that the disseminated type is a tuberculide in most cases, if not in all; and that in the case of the discoid lesions, where the operating toxins are many and various, the tuberculous toxin plays no inconsiderable part.

More recently, however, successful findings have been reported. Gougerot of Paris inoculated a guinea-pig with material from a typical scalp lesion of discoid type and the animal died of tuberculosis. Soon after the same result was reported by two other observers who planted the material in the peritoneal cavity, and in four instances tuberculosis developed. Previous to this they had by using extract of lupus erythematosus tissue, been able to produce by injection into sensitive subjects, small papular tuberculides which subsequently gave a positive reaction to tuberculin. Further, Arndt has reported his discovery of tubercle bacilli and of giant cells in a lesion, and Gaucher alleges that the serum of erythematosus patients agglutinates the tubercle bacillus.

The evidence is accumulating, and opinion has already shown signs of veering round, as witness the view/

1. Revue de la Tuberculose, Paris, 1908, 2, s, 5, 444,446.
view given at a recent dermatological discussion "some cases, especially younger patients, are due to tuberculous infection. I look on them as representing the maximum of protective reaction on the part of the tissues. We find in the lungs, e.g. cases of fibroid phthisis which were long thought to be non-tuberculous, and I consider that in this group of cases of lupus erythematosus a local infection is completely cured by interstitial reaction, even before the typical architecture of a tubercle is produced".

Erythema Nodosum: A new light has during the past few years been thrown on the etiology of some cases at least of this disorder - the oval red or dusky swellings on the shins which, from their association with joint-pains, fever and sore throat, have long been classed as a rheumatic manifestation.

The pioneer work of Landouzy\(^2\) led the way, and experimental and clinical observation by others have supported his theory of a relationship between Nodosum and tuberculosis.

Three chief relationships have been described.

1. That nodosum may be prodromal of acute Tuberculous Septicaemia. An article in an American Journal\(^1\), in which details of such a case were given, aroused interest in this country, and soon such evidence of similar cases was forthcoming in our medical press\(^2\) as suggested that the combination was more than a coincidence.

2. That nodosum may be a toxiti-tuberculide secondary to chronic visceral disease, in-as-much as the lesions have been found on several occasions to follow the injection of tuberculin.

3. That nodosum may be a true tuberculosis of the skin. In support of such a revolutionary view one cites the finding by various observers of giant cells surrounded by an epithelioid structure, and the recorded cases of Landouzy\(^3\) where he excised a node which on section showed tubercle bacilli in the tissue, and on inoculation gave a positive result.

In view of such evidence we must give up the tradition of the past that erythema nodosum is essentially an expression of rheumatism, just as we have abandoned the idea that rheumatism itself is always an infection with the diplococcus of Poynton and Payne./

1. Amer. Jour. of Medical Sciences, March 1912.
2. B.M.J. April, July, August, 1912.
3. La Presse Médicale, Nov. 19th 1913.
Payne. For some years ago Poncet pointed out that many of the dry and serous rheumatisms are tuberculous in origin, may be bacillary, more probably toxic; and later work has proved Poncet's observations to be correct.

The subjects of Nodosum are often weaklings or have a family history of tuberculosis. Many present evidence of a "strumous diathesis". 38% of children presenting the lesions have been found to be suffering from phlyctenular conjunctivitis or keratitis. The results of skin tests with tuberculin are at variance. Some record universally negative results, and others 87% (Moro1) & even 100% (Pollack).

Figure 59 shows the lesions on the shins of a girl of eight years.

Fig. 59.

Erythema Nodosum.

Mother suffered from lupus, while the child had palpable /
palpable abdominal glands. This child had three attacks within 13 months, and each was ushered in by the classical symptoms and ran the ordinary course.

The V.P. reaction in all seven cases that have come under my notice recently has been positive, but these children all showed stigmata of tuberculosis before the appearance of the eruption. To my knowledge none of these developed general tuberculosis, but one died some months later of an acute tuberculous broncho-pneumonia.

**Herpes Zoster:** The association of Zona with chest disease has often been noted, particularly intercostal herpes with Pulmonary Tuberculosis. An irritative or destructive lesion of the posterior spinal ganglia by such gross lesions as malignant disease, phthisis, and pleural effusion, pneumonic consolidation will account for some eruptions but there are many cases according to Pieriet and Boquillon where a zona is the first sign of pulmonary tuberculosis; where the lung signs and symptoms followed at a longer or shorter interval afterwards. Accordingly they consider the rash to be of some value as putting one on his guard against such an eventuality. These authors, reviewing the literature on the subject find that in most a degree of/

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of meningitis exists, as proved by a lymphocytosis of the C.S.F. and successful inoculation of the fluid into guinea-pigs; and that the meningeal complications are commonest in boys of four to five years of age.

But it would appear that a lymphocytosis is an invariable accompaniment of herpes due to any cause. Head was led to the conclusion that herpes is a distinct clinical entity analogous to the infective fevers, and the counterpart in the nervous ganglia of what poliomyelitis is in the anterior-horn cells.

It seems quite feasible that in those cases of latent pulmonary tuberculosis where a zona develops the degeneration in the ganglion cells may be caused, not necessarily by a nervous localisation of the tuberculosis, as suggested by Bernardeau, but by that tuberculo-toxaemia which gives manifestations of its action on every system of the body, and that at a very early stage in the tuberculisation process.

The subject of Fig. 60 was a man aged 45 showing extensive disease over the whole of the left lung and consolidation of the upper lobe of the right lung. LgS. (Philip's Classification).

2. La Province médicale, Nov. 2., 1912.
Fig. 60.

Herpes Zoster and necrotic tuberculide in a case of phthisis.

He had a somewhat scanty tuberculide of the papulo-necrotic type scattered over the back and legs, and on the right side of his chest, corresponding.
corresponding to the area supplied by the 3rd and 4th dorsal segments, a patch of zona. This patch had been present for nearly three weeks when I saw him, thus bearing out the observation that the tuberculous zona is of longer duration than the average. In its greater part the patch was resolving in the normal manner, but at the right lower corner the lesions had begun to take on the characters of the tuberculide. Patient died three weeks later under the care of his own medical man, and I had not the opportunity of again seeing him. His doctor, however, informed me that the upper part of his herpes had entirely subsided, but the lower was represented by an aggregation of raised violet papules with a central depression, and that these were going through the same changes as the tuberculide lesions.

Scrofula:

The nature of scrofula has long been debated. This term was first used to indicate a diathesis, the most outstanding features of which were enlargement of the cervical glands with abnormal irritability of the skin. But the advance of bacteriology has shown that most of the scrofulosis of the past is the tuberculosis of the present.

The theory is widely supported that the scrofulous state is a distinct entity - a constitution which favours infection with all pathogenic bacteria, among others the tubercle bacillus.

Morris has expressed this view tritely that "scrofula is the soil, the tubercle bacillus the seed and tuberculosis the harvest" and Moro that scrofula is "the tuberculosis of lymphatic children".

Others hold that it is the result of hereditary transmission of the bacillus (Baumgarten) or of its toxin (Soltmann). Sahli thinks that the affection may be related to the tuberculides, the result of an abortive dissemination of the tubercle bacillus.

Two types have been described. In all the well-marked erythistic cases that have come under my observation I have satisfied myself that tuberculosis was already present. The torpid type is depicted in Figs. 61 and 62, where palpable glands were outlined in blacklead before photographing. This boy had a bad family history of pulmonary tuberculosis, a sister having died of that disease and his father being an "open" case. He followed in every detail the classical description - chains of enlarged glands.

Figs. 61 and 62. Scrofulosis.
under the jaw and running down both sides of the neck associated with tonsillar hypertrophy and congestion of the fauces and pharynx, cartographic tongue with circular caries of the teeth, thick upper lip, broad nose and general pasty look, heavy build with pendulous belly and winged scapulae. The left eye was the seat of opacities from recurrent phlyctenular ulcers, while the eyelids showed thickening and reddening, and there was a long-standing discharge from both ears.

Whether tuberculosis be primary or secondary in these children, the effect of tuberculin treatment is very striking. Discussion has arisen whether the phlyctenular ulceration and the thick red upper lip are not reactions to the tuberculin content of irritating discharges, the body having been rendered sensitive by a previous tuberculisation. In the case of the ulcers the objection has been raised to a tuberculous origin that under simple treatment they clear up in a very short time. That too has been my experience, but how often do these children return to us a month or two later with the condition in full bloom again. On the other hand, I find that under tuberculin these ulcers not only disappear rapidly but their tendency to recur is lost. And coincidently the glandular swellings diminish, the red inflamed skin/
skin regains its normal colour and, a feature which has impressed me above all, the lethargic "lie-about-all-day" aspect of the child gives place to an alert mental state, a brighter disposition and a romping spirit that before was foreign to his nature.

It may well be that the scrofulous diathesis is a tuberculous toxaemia.
In these pages I have refrained from making much reference to treatment. Many of the cases seen in Dispensary practice are best suited to therapeutic methods which are not available at a Dispensary and these are drafted to the skin wards of a general hospital. For one of the functions of a Tuberculosis Dispensary is that it should act as a "Clearing-house."

But a fair number have received tuberculin treatment. It is yet much too early to quote results, but the immediate effects convince me, as the ultimate effects convince many others, that in the drug we have a valuable adjuvant to treatment of external tuberculosis. The choice of a tuberculin may matter little. I have come to employ Beraneck's in most cases, because I fancy that I have more hopeful and fewer disappointing results from that preparation.

Early in my study I had repeatedly noted that in tuberculosis of the skin, and in some tuberculides, after excision of a small piece of growth or of a few papules for the purpose of pathological investigation, the immediate surroundings cleared up in a remarkable manner. I have made use of this procedure, combined with tuberculin in over a dozen cases, and believe/
believe this to succeed in many instances where tuberculin, of itself, is not giving very favourable results.

The method employed will be best shown by reference to Fig. 26. This boy came to me with a rounded patch of lupus on the nape of his neck. He was given tuberculin for two months without much improvement. Then two small pieces were snipped out of the lower border. By the end of the next three months the lesion had attained the horse-shoe shape as depicted. Tuberculin still being maintained, a piece was excised from each pole and from the centre. Five months later an apparently healthy scar was present, and six months later, when I last saw him, there was no change.

The excision of even a piece the size of a dry pea seems to give a fillip to the resolution of the patch. I have on more than one occasion seen malaise and slight fever following manipulations on a larger area, and reactions have been observed after scarifications. It may be that the excision liberates into the blood and tissues a small amount of auto-toxin, and that the antibodies formed in response combine with the exogenous vaccine, which thus approaches nearer to an auto-tuberculin without being a pure auto-tuberculin. For there are indications that the ideal/
ideal tuberculin is one which is a happy combination of these two.
CONCLUSION.

Such then are the External Manifestations of Tuberculosis, varied in form and differing in degree, as in all tuberculosis, but with an etiology that is common to all.

I quote from an Address in Medicine: "Tuberculosis, however various its aspects is one indivisible entity, dependent essentially on the presence and activity of one organism. Behind the changing pathological and clinical appearances the tubercle bacillus remains single and constant".

And deepest are its ramifications among the poor, the dirty and the ignorant. For tuberculosis is essentially a house-disease. In proportion as its roots are dug out of the homes of the poor, in proportion as the light of hygiene penetrates where the sunlight and the pure winds of Heaven have been vigorously excluded - it is in proportion to these that the death-knell of tuberculosis will be sounded.

The Dispensary System, originally founded to combat lung disease, has gradually absorbed all forms of tuberculosis as its prey. And that prey, if it is to be caught must be hunted in its quarry. The homes must be visited and the "contacts" of every case of tuberculosis must be searched minutely and repeatedly/

1. 77th Annual Meeting of B.M.A. R. W. Philip.
repeatedly for any sign of the disease in every system. The gospel of cleanliness and of aerotherapy must be preached unremittingly. The infectious nature of the disease must be instilled, and the home reconstituted so that it is no longer a veritable death-trap.

The "march-past" especially of the children, the early recognition of the disease in any form, the "sorting-out" for appropriate treatment in a chest institution, a general hospital, a skin department, a dispensary or elsewhere, and the constant supervision of "returned" cases - these combine the keynote of success. And these find expression in the activity of the Tuberculosis Dispensary.

But no half measures can be allowed - the policy must be one of "thorough". The assault must be made on all fronts simultaneously - against tuberculosis whether this be external or internal.

Only thus will the aim of the Dispensary System be attained that no single case of tuberculosis is uncared for. Only thus will the curtain be rung down for ever on the great "White Plague".