cease to be "fashionable" or reliable if they did not give due weight to those facts of climate which the intelligent and educated portion of the public are quite capable of ascertaining for themselves; and that, by setting up pretentious claims which are inconsistent with observed facts, we run the risk of incurring suspicion and mistrust. We surely cannot desire in this matter to deceive ourselves or to mislead others.

THE CURABILITY OF PHTHISIS.¹

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CONSIDERING the frequency of the occurrence of pulmonary phthisis, and the large number of deaths among the young adults of our population which it occasions, there are few questions which are of greater importance to medical men than the question of the curability of the disease.

We possess many observations by reliable physicians on cases of recovery from tubercular phthisis, and in not a few instances such observations have been confirmed by subsequent *post-mortem* examination. In addition to the observations at the bedside, however, we possess another and valuable means of forming an opinion as to the curability of pulmonary tuberculosis. Pathologists have repeatedly noticed, and called attention to, the frequency with which signs of involuted tubercle, in the shape of fibrous cicatrices, old dry caseous spots and calcareous deposits, are found in the apices of the lungs of persons who have died from various forms of disease, or from injuries. During the period I was Pathological Registrar to the Manchester Royal Infirmary, my attention was repeatedly arrested by the frequency with which such relics of former tuberculosis were present in the bodies of persons dying from different diseases. It was not, however, until I had been engaged in the pathological work for about three years that I became specially interested in the question of the involution of tubercle to pay particular attention to the subject. At the end of that time, however, I became anxious to ascertain the exact frequency with which, in the *post-mortem* examinations, such cicatrices, or caseous or calcareous formations, were present. I therefore decided that, during the subsequent twelve months, I would carefully examine the lungs of all the bodies on which a complete necropsy was made for the presence or absence of such lesions. This was done, and a record made of the presence or absence of cicatrices, caseous or calcareous formations, together with the position, size, and character of each lesion. These observations were made from October 1st, 1887, to September 30th, 1888, and some of the lesions were subsequently submitted to microscopical examination.

During the period mentioned about 200 examinations were made. The number, however, available for a statistical inquiry as to the frequency with which signs of involuted tubercle were found had to be reduced for three reasons. First, in some cases only a partial examination was allowed to be made, and the lungs could not be examined. Secondly, in the majority of the cases where death had ensued from pulmonary phthisis, the changes in the lungs were so extensive and advanced that no opinion could be expressed as to the presence or absence of involuted tubercle at some former time before the fatal illness developed. Such cases were, therefore, excluded, and only four cases of phthisis were retained, since in those only was it felt that an opinion could be expressed as to the presence or absence of obsolete tubercle. And, thirdly, all cases were excluded where the body was that of a person under 20 years of age. This was done because it was felt that, as tuberculosis is commonly a disease of young adult life, we could not expect to find involuted tubercle in children or youths, at any rate so frequently as in persons more advanced in life. The opportunities also of examining the bodies of children at the infirmary are few, since but a very small number are admitted every year. The exclusions from the above three causes reduced the number of necropsies available for our inquiry to 139. In these 139 cases, there were 54 cases where relics of former active tuberculosis—a description is subsequently given of what was regarded as a relic of former tuberculosis—was present, and in the remaining 85 cases no signs of involuted tubercle were present. It is important to note that this was the result of the

naked eye examination; as we shall learn directly, the microscopical examinations of some of the cases revealed that the process was not entirely quiescent, and that consequently some of the 54 cases would have to be excluded from the list of cases of involuted tubercle or healed phthisis. But, as the result of macroscopic examination, we found that 54 cases, or 38.84 per cent. of the cases above 20 years of age presented signs of involuted tubercle.

This number is remarkable. I was prepared to find a large number of cases in which signs of obsolete tubercle would be recognised, but I was surprised, when the cases were abstracted from the pathological registers, to find the number so high. This number means that tuberculosis of lungs is not only very common but that it frequently becomes quiescent.

It is interesting to consider the ages of the bodies which were examined, and the ages of the bodies in which signs of involuted tubercle were found. The following table shows this:—

Age of body examined.	Involuted tubercle found in:	No signs of former tuberculosis in:	Total number of examinations.
20-29 years ...	7 cases	19 cases	26
30-39 " ...	11 "	24 "	35
40-49 " ...	17 "	19 "	36
50-59 " ...	11 "	15 "	26
60-69 " ...	7 "	7 "	14
70 years and upwards ...	1 "	1 "	2
	54	85	139

From this table it will be seen that the greatest number of cases of involuted tubercle were found in bodies between 40 and 50 years of age, and that the proportion of cases in which such signs were found to those cases where no such indications were present was higher in this fifth decade than in any previous decade.

The number of cases above 50 years of age which were examined is not sufficiently large, and I should not have been surprised if we had found, had the number of examinations been larger, that the proportion of cases presenting signs of involuted tubercle to those where such signs were absent, gradually increased in each decade, even beyond 50 years of age. This gradual increase in the number of cases of involuted tubercle with the age of the body examined is what we should expect, because it is probable that it is slowly progressing chronic tuberculosis where much fibrous tissue is formed, which most commonly is arrested, and the experience of the majority of observers is that phthisis does more commonly run a prolonged course in old than young adults. It is quite possible that many of the cases of involuted tubercle included in the above list did not develop in early adult life, but at a later period, at an age when phthisis tends to run a chronic course and when arrest may be hoped for.

The appearances presented by the involuted tubercle in the fifty-four cases above-mentioned varied considerably. In some cases we had only a fibrous cicatrix, which puckered the apex of a lung, the surrounding pulmonary tissue being sometimes more or less markedly emphysematous. In the majority of cases, however, we had not only a fibrous cicatrix, but a caseous or caseo-calcareous focus, of greater or less dimensions. These caseous foci were well and sharply circumscribed from the surrounding pulmonary tissue, and often had a distinct capsule of fibrous tissue. It is not common for fibrous tissue to be the sole remains of former tuberculosis of the lung; usually there can be found at some part of the cicatricial tissue small caseous foci. In our fifty-four cases of involuted tubercle, the cases where caseous or caseo-calcareous foci were present far exceeded those where only fibrous tissue remained. In thirty-two instances it is recorded that caseous or caseo-calcareous foci were present, whilst in the remaining twenty-two cases no mention is made of any caseous foci, only fibrous tissue being mentioned as being present.

Few pathologists at the present day will be inclined to deny that the caseous and caseo-calcareous foci did really represent former active tubercular disease. It may, however, be otherwise with regard to the cases where only fibrous cicatrices were present without any caseous material. Before we regard a fibrous cicatrix in the lung as representing involuted tubercle, we must consider, first, its position; secondly, what are the other causes besides tubercle which may have given rise to cicatricial tissue. In all the cases above recorded, the cicatrices, as well as the caseous foci, were found in the apices of the lungs. In some cases there were several such foci, one or more of which was present in other parts of the lung than the apex. But it is important to state that no cicatrix or even caseous deposit was regarded as an instance of involuted tubercle when it was only found in some part remote from the apex. In all the fifty-four cases the involuted tubercle was found in the apex; cases were excluded from that list when

¹ Read before the Autumn Meeting of the Lancashire and Cheshire Branch of the British Medical Association.

it was felt that they might have arisen from causes other than tubercle. There are rare cases where we get limited fibrous change, which might be mistaken for the remains of former tuberculosis. Such cases, however, with one exception, which will be described immediately, are rare, and, with care, very little doubt will remain in the mind of the pathologist as to whether they are or are not of tubercular origin. The rare instances of fibroid induration resulting from changes in an infarct, the healing of an abscess or localised patch of gangrene, or induration ensuing round encapsuled parasites or foreign bodies, are not likely to be mistaken for healed phthisis. The cases also of apex cirrhosis, resulting from unresolved acute croupous pneumonia, are also rare, and do not give rise to isolated circumscribed foci of induration such as we meet with in healed phthisis. Of syphilitic induration we know very little, but it does not give rise, as a rule, to circumscribed foci limited to a lung apex, and hence it is not likely to give any trouble to distinguish it from involuted tubercle. Anthracosis is a more common lesion, and may give rise to a nodular or a more diffuse induration of the lung apex. The changes, however, elsewhere found in the lung, will prevent any mistake being made as to the exact nature of these cases.

There is one condition, however, which is not infrequently found over one or both lung apices, which probably has been included by some writers on healed phthisis as a representative of involuted tubercle, but which ought to be excluded, at any rate until our knowledge of its pathology is more perfect. This condition consists in a slight thickening of the visceral pleura over one and very commonly over both apices. The thickening, which is seen over the extreme apex, extends over a spherical area half an inch to two inches in diameter. The surface of the pleura is smooth, often of an opaque white colour, and, as a rule, not adherent to the chest wall. The pleura is thickened to the extent of about one-eighth to one-fourth of an inch; it is very firm, and occasionally calcareous. On microscopical examination, we find simply fibrous tissue causing the thickening of the pleura, and this induration extends a very short distance into the lung among the alveoli, which lie immediately below the pleura. The condition appears to be a chronic pleurogenic very superficial interstitial pneumonia, but what is the exciting cause I do not know. I have never seen it in the bodies of children, and it is very infrequently met with in young adults. In persons of middle age and in old people it is not at all infrequently found. As I cannot regard this as undoubtedly a tubercular lesion, I have excluded it from my cases of healed phthisis. But I think it is probable that some observers must have included it among their cases, since I am unable otherwise to satisfactorily account for the great discrepancy which exists between authors as to the frequency with which signs of obsolete tubercle are found in the lungs on *post-mortem* examination.

This discrepancy as to the frequency with which signs of healed phthisis are found in the lungs is very remarkable.

Cruveilhier² states that we rarely make a *post-mortem* examination on adults, and especially on old people, without finding in the apices of the lungs changes which indicate the healing of previous tuberculosis.

Rogée³ found 51 cases of caseous or calcareous formations in the bodies of 100 old people who had died of diseases other than phthisis.

Déjerine⁴ gives the same numbers.

Boyer⁵ states that he found in 160 cases where death had not ensued from phthisis a cicatricial shrinking of the lung apex in not less than 157 cases. (There must be some mistake in these numbers.)

Bollinger⁶ examined 400 bodies in reference to this point; excluding 144 cases of phthisis from that number, he found 69 cases, or 27 per cent., which indicated the curability of phthisis.

Staudacher⁷ placed the number at 26 per cent. He found in 787 cases not less than 202 cases of apex cirrhosis, which he regarded as healed phthisis or phthisis in the process of healing.

Massini⁸ found in 228 bodies, where death had not ensued from

phthisis, 89 cases (or 39 per cent.) which he regarded as healed phthisis.

Heitler,⁹ from an examination of the records of the Vienna Pathological Institute from 1867 to 1879, found that among the cases (16,562) there were 780 instances of obsolete tubercular nodules. He did not include the cases where death had ensued from phthisis or from general tuberculosis, and he excluded cases where there was only fibrous shrinking of the lung apex. He therefore found that 4.7 per cent. of the cases presented the remains of former tuberculosis in the shape of caseous or calcareous nodules. In considering this very small figure (4.7 per cent.) it is very necessary to bear in mind the fact that cases of simply fibrous change, without calcareous or caseous foci, were excluded. An interesting fact in connection with this analysis is that Heitler found that the proportion of cases of obsolete tubercle at different ages went on regularly increasing for each decennial period up to 60 years of age. Unfortunately, we want information as to the proportion of necropsies where no such lesions were found, as compared with the number where they were discovered in bodies of the corresponding age.

It will be thus seen that if we exclude Boyer's figures, about which there must be some mistake, we have authorities differing from 51 to 4.7 per cent. in their estimation of the frequency with which signs of healed phthisis are found in the lungs.

This discrepancy can be in great part explained. In the first place, we are not yet all agreed as to what is to be called healed phthisis and what is not. Heitler, for instance, in his statistics, excludes all cases of simple fibrous cicatrices in the lung apices, unless he also finds a record of caseous or calcareous foci being present, whereas all the other authors above cited would regard, and as I think quite justly, many of the cases of simple fibrous cicatrices in the lung apex as the remains of former active tuberculosis. The ages also of the bodies which were examined by the different observers varied considerably. In some cases the bodies were almost exclusively those of old people, whereas in others, as notably in Heitler's cases, the necropsies embraced children, and young and old adults. In young persons, and especially in children, we should expect signs of healed phthisis to be comparatively rarely found, since they have not reached an age at which phthisis is most common, and as my own and Heitler's statistics tend to show, cases of obsolescent tubercle are found more frequently at all events in middle-aged than in young adults.

And lastly, it makes all the difference in statistics, whether the observations, from which the statistics are collected, are made with the object of clearing up the point under consideration, or whether the observations were only directed to elucidate that among many other points. This is especially the case when the one point is one which, unless special care be taken, is likely to escape detection or to escape being recorded. Small caseous foci in lung apices are extremely easily overlooked, and, if seen, they are very liable to escape being recorded in the *post-mortem* register, unless the pathologist happens to be interested in the question of the involution of tubercle. It is this point which renders my own *post-mortem* records, made during the first years when I had opportunities of performing a number of necropsies, of so little value to me in reference to the present subject. During those years I was not specially interested in the curability of phthisis, and I did not examine with anything like the care which I subsequently did, the apices of lungs for signs of obsolete tubercle, so that I have no doubt that I not only overlooked many cases, but failed to record others which I observed, and which I unfortunately considered of no special importance. When, however, I became interested in the subject, both the examination and the records of the condition of the lung apices were much more careful, and allowed me to arrive at the 38.84 per cent. as the number of cases of healed phthisis met with in the bodies of persons over 20 years of age. Exactly the same remark applies to Heitler's statistics. His estimate of 4.7 per cent. was obtained not as the result of specially examining all bodies placed on the *post-mortem* table in the Pathological Institute of Vienna in reference to the presence or absence of signs of obsolescent tubercle. The number was arrived at by an analysis of the *post-mortem* records, which were not all made by the same individual, and many of which were probably made without the lung apices being specially carefully examined and their condition in all cases recorded.

It will be seen, therefore, that the differences in the above given

⁹ Ueber die Spontanheilung der Lungenschwindsucht. *Anzeiger der Gesellschaft der Wiener Aerzte*, 1880, No. 31.

² *Traité d'Anatomie pathologique*, vol. iv, p. 615-616.

³ Essai sur la Curabilité de la Phthisie pulmonaire, etc., *Archives Génér. de Méd.*, 3 Série, vol. v, 1839.

⁴ Recherches des Bacilles dans la Tuberculose calcifiée et caséo-calcifiée, *Revue de Méd.*, vol. iv., p. 921, 1884.

⁵ *Géuérison de la Phthisie pulmonaire*, 9 édit., p. 13, 1870.

⁶ *Deutsches Archiv*, vol. 1, p. 140, 1869.

⁷ Ueber Lungenspitzencirrhose, *Inaug. Dissert.* München, 1884.

⁸ *Deutsches Archiv*, vol. xi, p. 446, 1873.

statistics can be, in part, at all events, explained. In future observations on the involution of tubercle we require not simply the analysis of *post-mortem* records, but a series of observations specially directed to the point requiring elucidation. We require also a record of the ages of all the bodies examined, together with a description of what the observer does and does not regard as involuted tubercle.

A number of the specimens of healed phthisis were submitted to microscopic examination with very interesting results. The foci consisted of old fibrous tissue, and smaller or larger patches of caseous material. The fibrous tissue usually formed a capsule round the caseous spots, and not infrequently extended in among the separate foci of caseation, separating one caseous spot from the other. Several of the specimens which were examined, and which were apparently to the naked eye perfectly quiescent, were found to show signs of activity. In some cases all the elements of tubercle could be recognised, even typical giant cells. In one instance the alveoli at the periphery of the patch contained a considerable amount of fibrinous exudation, and the periphery of the patch itself presented a considerable cellular infiltration, in which were typical giant cells. Such patches cannot, of course, be regarded as obsolete tubercle; they were cases which were still active, but where the tubercular process was progressing with a chronic course.

How many of the fifty-four cases, which to the naked eye were regarded as specimens of involuted tubercle, should be reckoned in this class, where microscopic indications of activity of a tubercular nature could be detected, I cannot say, since all the cases were not reserved for microscopic examination. Such cases would, I have no doubt, reduce the number of instances of involuted tubercle very considerably. I am certain that there would be a considerable difference in the percentage of cases of healed phthisis in a table made, as my own has been, simply from the evidence of the naked eye, and one which was made as the result of a microscopic examination of all the cases. A considerable number of the preparations which to the naked eye appear quiescent, and would be placed among the cases of healed phthisis, would, on microscopic examination, show some signs of activity, and be excluded from the class of involuted tubercle. At the same time it would be found that in nearly all the cases, which to the naked eye appeared to be quiescent, there were very evident signs, from the presence of much fibrous tissue and old caseous material, of a tendency to heal. As has been repeatedly pointed out by pathologists, the formation of fibrous tissue in connection with tubercular disease is to be regarded as a conservative change, and one showing the tendency of the process to become quiescent.

Microscopic examination, however, revealed another change in connection with these old tubercular foci, which was present in nearly all those which were examined, and which, I think, indicates the tendency of foci which are quiescent to again become active. Around old spots of caseation, just at their periphery, were to be found small groups of round cells about the size of leucocytes, which in all respects they resembled. These small groups, of which there were usually several in each section round all the old foci, were composed of closely aggregated cells, in the centre of which groups frequently no duct or channel of any description could be detected. In some, however, a small channel, which in some cases was an alveolus, in others a minute bronchus the interior of which was lined with distinct epithelial cells, could be detected. Round this channel the small cell accumulation had apparently taken place. The channel was, I think, usually a minute bronchus, and not a lymphatic duct. The cells composing these groups stained very readily, and were, evidently, of comparatively recent formation. They contrasted markedly with the surrounding old fibrous tissue.

In some cases, where several small old caseous spots were grouped together, the remains of lung alveoli could be recognised between the caseous spots, and there also the small groups of cells existed as well as at the periphery of the focus. No giant cells were ever discovered among these cell groups, and although such structures are not necessarily present in tubercles, I do not think that the groups of cells were to be regarded as minute miliary tubercles. The impression which they conveyed was that they were usually due to a peribronchitis arising from some irritation, the exact nature of which irritation, however, could not be determined. As I have stated, they were very frequently found in connection with foci which otherwise appeared to be perfectly quiescent, and free from any signs of active tubercular change.

A number of sections from different foci of obsolete tubercle were examined for tubercle bacilli, but in the majority of cases with negative results. I do not wish, however, to lay any stress on the failure to find tubercle bacilli in these old caseous spots. In the first place, negative results in such cases are of comparatively little value. Tubercle bacilli may have been present, and yet have been overlooked. I think many pathologists will admit that our present methods of staining and examining tubercle bacilli in sections of tissues are far from satisfactory. For my own part I admit that I have frequently failed to detect tubercle bacilli in sections of undoubtedly tubercular foci which were still in a state of activity. I was not at all surprised, therefore, to frequently fail in detecting those organisms in quiescent tubercular products which could be expected to contain but comparatively few bacilli. My only surprise in connection with this subject has been to find how frequently other observers, as, for instance, Déjerine¹⁰ and Kurlow¹¹, have detected them. Déjerine examined seventeen cases bacterioscopically. In ten cases of completely calcified nodules he found no bacilli except in one instance in which he found a few bacilli around the calcareous centre. In seven cases, where the centre of the focus alone was calcified, he found bacilli in the peripheric caseous part, but none in the calcified centre. Kurlow examined twenty cases of caseo-calcareous nodules, and states that in five instances only were they certainly absent, in one case doubtful, and in fourteen cases present. One cause of my own failure to detect bacilli in many of the preparations may have been because in the majority of cases the tissue had been kept for a long time in spirit before sections were prepared. Bacilli do not stain so readily in sections made from preparations which have lain for a long time in spirit. In one case of a caseous focus in the lung apex, where death had ensued from acute miliary tuberculosis, the old caseous patch presented myriads of tubercle bacilli. Kurlow also mentions a similar case where the bacilli were very numerous, whilst he admits that usually only a few can be found. It is probable, however, that many cases of obsolete tubercle do not contain tubercle bacilli, although they may contain the spores of these organisms and through them still retain their infective properties. There can be little doubt that these foci of old tubercular disease are a decided source of danger to the individual in whose body they exist. We have already seen their tendency to take on activity, and probably in a considerable number of cases of phthisis we have an arrest of the disease for a time and a subsequent starting of the quiescent tubercle into activity. Certainly the careful consideration of the histories which we obtain from our phthisical patients often lends great support to such a view. It is no uncommon thing to obtain a history in phthisical cases of the occurrence of some previous illness before the illness for which they are consulting us came on. Not infrequently such previous illness has been an obscure one, or one which has been incorrectly diagnosed. In some such cases, however, careful inquiry as to the symptoms will leave little doubt in the mind of the physician that the previous illness was really a phthisical attack, and that the disease had passed for a time into a quiescent condition. Another danger which is present in these cases of healed phthisis is the risk of acute miliary tuberculosis ensuing in consequence of absorption from the old tuberculous focus.

The more complete the fibrous change and the calcareous deposit in these cases of involuted tubercle, the less must be the risk to the patient of a local or general development of tuberculosis. Déjerine's observations, above cited, as to the absence of tubercle bacilli in completely calcified foci, are much to the point when we are considering the danger to the organism of the presence of involuted tubercle in the lungs. Kurlow,¹² as the result not only of bacterioscopic observations, but also of numerous inoculation experiments on guinea pigs, shows that very many of what would be regarded merely from naked eye observation as specimens of involuted tubercle are decidedly dangerous, on account of the risk, which their presence involves, of infection. He considers, and I think with perfect justice, that the only indications of perfectly healed phthisis are those foci where there remains simply fibrous tissue, or perfectly calcified caseous foci; and that the caseous masses, which are not at all or only imperfectly calcified, possess all the properties of tubercle, which is capable of infecting the organism, and are, therefore, neither to be regarded as com-

¹⁰ Recherches des Bacilles dans la Tuberculose calcifiée et caséo-calciée, *Ibid.*

¹¹ Ueber die Heilbarkeit der Lungentuberculose, *Deutsches Archiv für klin. Med.*, vol. xl, page 437, 1889.

¹² *Ibid.*

pletely healed cases of phthisis, nor as harmless to the person in whose lungs they occur.

In my own cases the cause of death was exceedingly various in the different cases. In seven cases of the fifty-four in which involuted tubercle was found, active tuberculosis, either of the lungs or other organs, took part in producing death. There was one disease which was a very common cause of death in the cases in which quiescent tubercular lesions were found. That was malignant disease, in some cases in the form of sarcomata, in others of carcinomata. The explanation of this association is not at all easy. We have already seen that the quiescent tubercular lesions were found most frequently in the bodies of persons between 40 and 50 years of age, exactly at that period of life when malignant disease is common. Hence it might be supposed that the malignant disease would be found to be a common cause of death in cases where obsolete tubercular changes were discovered. A little consideration, however, will suffice to show that this explanation cannot be accepted.

Thirteen cases of malignant disease occurred and produced death in the fifty-four cases where involuted tubercle was found, whilst only seven cases of malignant disease occurred among the eighty-five cases where no healed phthisis was present. In other words, of twenty cases of malignant disease thirteen occurred and produced death among the fifty-four cases where "healed phthisis" was discovered, whilst only seven cases of malignant disease occurred in the eighty-five instances where no such involuted tubercle was found. Some observers still consider that there is an antagonism between tubercle and carcinoma, and I am afraid that such will not consider the fact of the frequent association of malignant disease with obsolescent tubercle as any argument against their opinion. They will probably maintain that the association of malignant disease with obsolete tubercle rather supports the view as to the antagonism between tubercle and carcinoma. They will argue that from the presence of *involved* tubercle, we may infer that there has been some tendency in existence in the body which was antagonistic to active tuberculosis, and that it is quite possible that the condition of body which favoured the development of the malignant disease was that antagonistic tendency. If that is so, why did tubercle ever develop in the body which was afterwards killed by a malignant growth?

In conclusion, I think our clinical and pathological experience warrants us in recognising three groups of cases which bear upon the question of the curability of phthisis.

1. Cases where the only remains of tuberculosis is fibrous tissue or completely calcified caseous foci. These are the only cases which can be regarded as perfectly healed.

2. Cases where there remains a caseous mass, which is not at all, or only partially, calcified. Such cases are probably not uncommonly regarded by the physician as cases of healed phthisis, but by the pathologist they cannot be so considered.¹³ They are cases which may give rise to local or general tuberculosis. Probably many cases of phthisis, at one period of their history, come under this class, such cases being characterised by a history of a previous illness, due to a tubercular lesion in the lung, from which the patient has recovered and remained free from signs of disease for a longer or shorter period.

3. Cases which are characterised, pathologically, by the formation of much fibrous tissue, but where, microscopically, all the elements of tubercle are to be found at the periphery of the lesion. Clinically, these cases present the usual features of a very chronic phthisis, but in some instances the lung change is so limited and so very slow in its progress, that the general health is very little affected, and the physical signs may be very indefinite and not at all conclusive as to the existence of phthisis. Not uncommonly the physical signs are considered to indicate that the tubercular process is quiescent, which is not the case. It is probable that the majority of cases of phthisis which have at one time presented distinct symptoms and physical signs, and at a later period have become apparently quiescent, really belong to this class. They are cases which are very misleading to the physician, since they cannot be regarded as perfectly cured, but only as quiescent for a period. If we had an opportunity of examining such lesions microscopically, at a time when, from clinical observation, we

should infer they were quiescent, we should find that there were signs of activity at the periphery of the focus.

PATHOLOGICAL MEMORANDA.

THE LEPROSY BACILLUS.

I SEE from the JOURNAL that the subject of leprosy is creating considerable interest. I have recently made some interesting experiments on the persistence and growth of the bacillus. In October, 1886, I removed some tumours from a leprosy patient. Sections show the usual lepra cells and bacilli. Portions of this tumour were placed in various fluids. The test tubes were loosely closed to keep out dust. No precautions were taken to sterilise the fluids or tubes. The tubes were kept in my consulting room. They all underwent a process of decomposition. The usual bacteria of decomposition were abundantly present, and in some there was a growth of aspergillus. The contents of these tubes have been examined many hundreds of times. In most of them the morsels of tumour have rotted down to a little indestructible connective tissue, and until now the bacilli of leprosy may be demonstrated by the fuchsin stains. These are formed in every stage of growth. The lepra cells at first break up into colonies of cocci; these then grow in length, and in the end quite long threads of bacilli lepræ may be seen. I have numerous slides where the culture is absolutely pure. These occurred in cold water, and are found as a light cloud in close proximity to the morsel of flesh.

Recently Dr. Prince Morrow, of New York, passed through on his way from Honolulu. He was so much interested as to request a series of slides, which he proposed to exhibit at the Paris Convention. He has already shown them in New York, and I also did so at the meeting of the State Medical Society here. In 1883 I visited the islands, and I believe sent you copies of letters which I wrote to the Hawaiian Government. But I am satisfied:—

1. That leprosy is feebly contagious.
2. Probably less so than phthisis.
3. That the spread in the Sandwich Islands affords absolute proof of contagion.
4. That its increase was due to new conditions of native life, brought about by the association with the white population.

I believe it doubtful if Keanu is a leper. The tubercle developed at the point of inoculation, in which bacilli were found at the end of a year, has disappeared without the manifestation of any new symptoms of leprosy. Dr. P. Morrow is my authority for this statement. I suggest an inquiry into the hygienic conditions of populations in Europe still subject to leprosy. I believe it can be arrested and surely prevented by abundant food and a perfect state of health. I have pretty good proof of both these statements.

J. H. STALLARD, M.B.

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SURGICAL MEMORANDA.

TREATMENT BY SEA WATER.

IN Surgeon O'Brien's communication on the treatment of gonorrhoea by means of sea water injections in the JOURNAL of November 30th, there is a suggestion that sea water might be useful in the treatment of other mucous membranes besides that of the urethra. I expect that many men practising in seaside towns have used it in certain cases of leucorrhoea, and also in cases of excoriation of the os uteri; my experience in the above cases is such as to recommend it. I have also tried sea-water gargles with benefit in certain forms of relaxed sore throat. Ordinary table salt and water as an outward application is an old remedy for open cancers, and was thought at one time curative. In a case of cancer of the male breast that was under my care some years ago, I tried it for a few weeks, and found it a very cleansing application, and it also seemed to check somewhat the growth of epithelium. I am afraid, however, that the paragraph from a paper by Dr. FitzGerald, read before the Folkestone Natural History Society in 1887, "Why the Sea is Salt," which closes this note, is only too true for sea-water applications ever to be widely used, although the paragraph below refers only to the internal administration of salt water; after quoting the various ingredients of sea water, the author goes on to say: "Our seas thus contain

¹³ Probably a few cases are met with of old caseous foci, which, although they are not completely calcified, may be regarded as perfectly healed cases, and without risk to the body in which they occur. Déjerine also states that in some cases the tubercle bacilli disappear from caseous foci before lime salts are deposited.