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THE EARLY DIAGNOSIS OF
PULMONARY
TUBERCULOSIS.¹

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WE all, medical profession and laity alike, hope for the stamping out of pulmonary tuberculosis, as typhoid fever may be said to have been stamped out. Its mortality-rate shows a substantial fall during recent

years, but the case incidence seems to be much as it was. Perhaps a fifth of the deaths from all causes are due to tuberculosis. One hopeful plan for the end we have in mind is surely to cure the disease focus in its early stage, if it may be, before it becomes itself infectious.

Nature, in the form of bodily resistance, will cure much of it, but bodily resistance is a variable factor which under stress may break down. How then are we to help in its cure?

Sir William Osler said that "one half of the diagnosis of tuberculosis was to know when to suspect it."

Practically all of us have been at some time infected with tubercle and most of us with tubercle of the lung. It is obviously of the first importance that it should be recognized after that it is suspected and to be satisfied in our provisional diagnosis

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without the brutal proof of finding tubercle bacilli in the sputum.

"Closed" tubercle one may say without doubt is one of the more curable of the serious diseases. "Open" tubercle, when a way has been ulcerated through from the tuberculous focus to the air passages, is well-nigh life-long. For, given this communication of the focus with the external air, while tubercle bacilli are gaining access to the surface of the body pus-forming organisms are gaining entry from the outside air, then a mixed infection results with all the destruction of lung tissue that implies. "Open" tubercle, as we all know only too well, is a source of infection of other parts of the body, to wit, the larynx and bowel, and of other persons through the surrounding air. All that is trite, but let it suffice by way of suggesting the reality of the need for early diagnosis.

What are the means by which this early diagnosis may be achieved? Shortly, as you well know, there are three main lines of approach, from the point of view of actual medical practice, all of which may start from Osler's standpoint of "suspicion." They are symptoms, signs and X-ray examination of the lungs.

By the fashion of the day the tendency appears to be to prefer the last—the X-ray method—but this surely follows, in medical practice, the idea of "suspicion" which is primarily based on symptoms.

Some, in the absence of available X-ray opportunities or perhaps independently of them, pin their faith to a combination of physical signs although admitting their liability to fallacy. In any case let us remind ourselves that this method although easily applicable in a routine way is yet usually based, more or less, on a "suspicion" arising out of symptoms.

Yet others, and I imagine the majority, believe that the main indication, the main arouser of suspicion (apart from such environmental factors as known exposure to infection) are the symptoms, including both

the complaints of the suspects and the apprehensions of their friends based on obvious ill-health, persistent cough and the like.

So for our present purpose let us consider the means of early diagnosis in that order—symptoms, signs, and X-ray examination.

May I, however, at this point recommend to your attention two weighty contributions to the subject that have recently appeared in the medical press. One of these is the Mitchell Lecture delivered by Dr. L. S. T. Burrell before the Royal College of Physicians in November last, and the other, a paper by Dr. F. McPhedran, from the University of Pennsylvania, on "The Prevention of Tuberculosis in Children" which is printed in the current issue of the *British Medical Journal*.

If I may I will further refer to both of these and at this point quote from Dr. Burrell. He says "Of the signs and symptoms no one is sufficient for a diagnosis to be made, but in combination they may lead to suspicion so strong that a positive diagnosis is justified. For example, a patient develops a cough which persists for a few months, he also feels easily tired and slack, and is found to have a slight rise of evening temperature, and this rise is exaggerated by exercise. Even if the X-rays show what appears to be normal lungs and there are no physical signs such a patient should be . . . treated as a case of early but active tuberculosis."

These words express my own view, only more succinctly than I could, and I would merely add that I think it possible that in some of these cases to which he refers "signs" might be found on still more delicate search. The radiologists, no doubt, might hint at the same plea, but that I must leave with them.

Throughout the remarks I have to make when I speak of the early diagnosis of pulmonary tuberculosis, I wish to be considered to refer to "closed" tuberculosis and to that alone.

I would suggest, moreover, that even all "closed" tubercle of the lungs, until it is practically proved to be healed, should be regarded as "clinical" tuberculosis needing medical supervision and almost certainly the adjustment of the conditions of life of the subject.

One good reason for holding this view seems to me to be that the disease-focus being in the lungs cannot have, under ordinary conditions, what is most desirable for cure, namely, rest. For the lungs, as everybody knows, are constantly moving with respiration, inflating and deflating, and that under the influence of the negative pressure inside the chest cavity. Hence the need for your care, to seek quiescence and eventually the obsolescence of fibrosis of the disease; to avoid the "flare-up" of the disease we hear so much about and, almost above all, to prevent the "closed" tubercle from becoming "open" tubercle.

"Open" tubercle, as already suggested, is well-nigh incurable, although life may be prolonged in a patched-up way for many years. Even if rather outside actual medical practice we might further say with McPhedran, "It is the large group of cases which even under normal conditions develop into demonstrable latent infiltration which is the chief object of the search and attack in tuberculosis control."

First as to those earliest suspicion-arousing changes in the hardly yet a patient which we call the symptoms. The picture is something like this: the patient, we may be told by his relatives, is "off colour," he has perhaps had a long-lasting dry cough, he is listless as compared with what he used to be, somewhat pale possibly but liable to flush in the evening. He may have been noticed to be a little thinner than ordinary for him but his appetite and digestion, it is said, have not been up to the mark for quite a time. He may have had some little pain in his chest of late and he may have complained of feeling uncomfortably warm in the early evening and of feeling "shivery" at other

times. There may have been some night sweating, but possibly, thus early, not more than anyone might have who was from any cause weakly. Later, as we may learn, he may have had a little expectoration of glairy mucus. Then he is very likely to have had some definite chest pain and still later there may have been hæmoptysis, something more than mere streaks in the sputum. It may be said that his sputum has been examined in this later time but that no tubercle bacilli have been found.

Now, having our patient before us, a not inconsiderable achievement, we may proceed to question him. He admits that he has felt "shivery" at times, also that he has often, towards evening, thought he was "feverish," and he may even know that once at least his temperature has been actually found at night to be raised. If his illness is rather late, for a really early case, he may tell us that he has sometimes had drenching sweats at night, or real pain in the chest, or slight hoarseness, and that he has been conscious at times of rapid beating of his heart.

Now comes the actual examination and my own plan of procedure (which I may say was the effect of considerable experience in examining suspects in the out-patient departments of general and special hospitals, followed up in many of the cases by seeing them later at short and regular intervals at a sanatorium), has been something like the following. On inspection of his chest there may be a slight flattening of the upper part of one side or both, perhaps the chest does not expand well in its upper part with inspiration; he may be dripping with perspiration from his axillæ and he may look ill and even toxic and thin. Proceeding to touch him I notice that his heart-rate is raised, even in the absence of pyrexia and allowing for emotional stress, say to 100 per minute or more. Placing my hand on his chest I may feel that the skin is not soft and supple but harsh, and I may say that I have again and again noticed in the same patient, after a

short spell of sanatorium treatment, it has become satiny again. On flicking his chest wall there may be a degree of myoidema of one sort or another. You will allow me to repeat I am trying to describe to you the method I fell into in the course of time and one that has helped me. Of course there are many different roads to Rome and it may be each one of you will have beaten out, or will beat out, a trusted path for himself. Next I very lightly, with one finger playing as delicately as possible from the wrist, lightly percuss one clavicle and compare the result with a similar stroke on the corresponding part of the other. In the first instance it is an extremely light flicking stroke that I give. Remembering that a slightly more hollow sound is normally given (to my finding) from the right clavicle I try to assess a shade of abnormal impairment on one or other side and, what is even more valuable, a slight increase in the sense of resistance imparted to the finger on that side. The strength of the stroke may now be increased and the results noted. Given these abnormal signs my suspicions are thoroughly aroused and I auscultate the apices expecting to find slight prolongation of expiration on the suspected side, but keeping in mind that the pitch of breathing on the right side is normally slightly higher on the right side—due, as I suppose, to the presence of the extra bronchus in the right upper lobe. Then I proceed with the usual steps of what has latterly been called the classical physical examination, expecting to find, if all the signs are consistent (as they must be unless from some explicable cause as deformity of the chest wall from lateral spinal curvature, and the rest), that there is a slight defect in movement on the suspected side, slight increase in vocal fremitus (which rules out, so far as it goes, a mere thickening of the pleura that, if present, is very likely tuberculous), and a similar slight increase in vocal resonance (which would not be expected with the pleura thickened and that alone).

On further auscultation I expect to find

either that the breath sounds are weak (at some well-known points, apical or posterior apex usually), or that the breath sounds are intensified and that expiration is as long or longer than inspiration—of the bronchial type in fact.

At this early stage I do not expect to hear crepitations, but rather later they may be heard—localized, persistent râles, not altered by coughing or deep breathing. These, when found, are of course very strong confirmation indeed, but as I have said I do not myself look for them among the earliest signs in the really incipient case.

After this I think of X-ray examination to which I shall presently refer.

Before doing so I should like to allude to a few of the possible pitfalls or exceptional difficulties.

Thus, if both apices are affected what becomes of our standard? Well, we must do the best we can. Each one gains in time. I venture to believe, an idea of what the standard should be in a given type of chest. There is also healthy lung lower down for comparison with which may help. In any case I find the sense of resistance a great assistance, even more perhaps than the slight dullness.

Supposing the suspected area is the right supraspinous fossa, what are we to think of the harsh bronchial breathing knowing that there is an extra small bronchus just there? Two of the ideas that one may recall which may be helpful are that for consistency there should be some slight dullness at that spot if the bronchial breathing is to be considered more than normal; another is whether the bronchial breathing at a corresponding level in front of the chest is more than it should be.

The question of thickened pleura I have already mentioned. Differential tests that help are that the vocal resonance and fremitus will be increased if the dullness is due to infiltration and diminished if due to pleural thickening.

If there be signs of general bronchitis and

a suspected tuberculous focus in addition, one way is to get rid of the bronchitis by treatment, if you can, and examine as to tubercle later on. Of course X-ray examination may greatly help in such a case.

Questions that may be called crucial now arise. Do the signs (and we are well aware of the risks of fallacy in interpreting signs) indicate tuberculous disease or not? We have the history, the symptoms, and obvious morbid appearances which strongly move in strengthening our suspicion, also the temperature phenomena, the effect of exercise on temperature and so forth. But perhaps a chief help in the location of the supposed tuberculous focus is in remembering the well known seats of election, e.g., the postero-external portion of the upper lobe, the posterior apex in the inter-scapular region opposite the fifth dorsal spine and other less frequent "lines of march" as they have been called.

Another question, and this is indeed crucial and difficult, is whether the suspected tuberculous focus is recent and active or older and quiescent, or even, it may be, obsolescent to the point of fibrosis. The history helps, the symptoms help, the difference in signs of infiltration and fibrosis, if at all extensive, are known, e.g., a more wooden dullness in fibrosis and more resistance, but it seems to me that serial X-ray examination as regards progression and during regression may play a chief part in the future on this point.

As regards radiology in chest disease I may say that during the earlier years of my general and special hospital work my attitude towards X-ray examination in suspected early pulmonary tuberculosis was that if the findings confirmed my suspicions, founded on symptoms and physical signs, I was pleased and fortified, if they did not I disregarded the lack of that support. I may say I have changed slightly my view but I still feel that while the positive evidence of X-rays is very strong the

negative evidence is nothing like so strong. Even yet, however, I have had so many negative reports where the clinical evidence was so overpoweringly strong (sometimes to an even grotesque degree) that I do not allow myself to be influenced thereby. Indeed, I have for long held and taught that in any early case evidence from symptoms and signs might be sooner forthcoming to a sufficient degree for a provisional diagnosis than positive X-ray evidence. Thus I support Dr. Burrell's opinion which I have already quoted that a positive provisional diagnosis was allowable, and indeed called for, in the absence of X-ray findings where symptoms were convincing.

With others I feel the great value of X-rays—especially, perhaps, screening so as to show a mere haze over the suspected area of lung with deficient lighting up on inspiration as compared with the opposite side. It is to be believed that there is a great future before radiology in this field. How often have clinicians found at necropsies that the spread of the disease was much more extensive than clinical examination suggested. This, of course, applies to the less early cases, but the X-rays give precision in any case, where positive, to that idea of extent. Similarly I believe that X-rays may show a wider revelation of disease (particularly in the matter of root foci) and I look for much help from that method in estimating the progression or regression of even quite early foci. I anticipate also great help in judging from X-ray pictures whether the disease is active or not (apart from a serial group), as from definition of the outline, density of shadow and other things.

Dr. McPhedran believes that X-ray pictures will show "foci" which should be treated seriously in the absence not only of signs but of symptoms. This seems to me at the present time to be going rather too far for us as practitioners of medicine.

I must leave many points of interest untouched such as the value or wisdom of employing the focal tuberculin reaction, for

which I am not an enthusiast; the question of notification as to when, if at all, it is called for in the absence of infectivity; the question as to when a focus may be said to be healed, that is soundly healed or reasonably free, if ever, from all question of relapse, recrudescence, lighting up or flaring up; when medical supervision can, if ever, be relaxed, and to what extent, and a good many other questions, including the problem of notification.

I will content myself, in conclusion, by saying that I agree with the view that in a suspected early case, whether physical signs be detected or not, and in the absence of positive X-ray findings, I would on the symptoms alone make a positive provisional diagnosis and *act* as if the matter were absolutely, one might even say, mathematically certain, but this, I need hardly add, would not imply in my judgment a need for immediate or speedy "notification."

TINNITUS.

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HISTORICAL.

The word "tinnitus" is derived from the Latin "tinnitus" and corresponds with the French "tinnire."

The word "tinnitus" means "a sensation of ringing in the ears."

Medical writers in 1693 recognized tinnitus as a definite symptom of disease.

Classification.—Tinnitus may be divided into (I) Subjective tinnitus; (II) Objective (Entotic) tinnitus.

(I) SUBJECTIVE TINNITUS.

Significance.—This always denotes a lesion in some portion or portions of the auditory nerve.

Frequency.—Politzer states that nearly two-thirds of all persons suffering with aural lesions are victims of tinnitus. Children rarely complain of tinnitus.

Pathological Classification.—(i) due to primarily diseased aural states, in which the disease originates in the ear itself; (ii) due to secondarily diseased aural states in which the disease originates in some organ belonging to another system in the body.

GENERAL ÆTIOLOGY.

Shambaugh's Theory as to the Origin of Tinnitus.

He states that the character of tinnitus is generally that of an "indefinite" sound, composed of a great complexity of tones, and with no definite pitch.

One well-known cause of tinnitus is pressure applied to the conducting apparatus.

This pushes the foot-plate of the stapes into the foramen ovale, and so there results an increase in the intra-labyrinthine pressure, which alteration in tension causes disturbance of the membrana tectoria.

This latter structure appears to have the same specific gravity as the endolymph under normal circumstances, and it has been shown to be so constituted anatomically that it is capable of responding to the most delicate impulses passing through the endolymph.

Now the hairs of the hair-cells normally penetrate into the lower surface of the membrana tectoria and therefore, any disturbance of this latter will alter the physiological relationships between the hairs and the membrana. Shambaugh considers that such an alteration may result in stimulation of these hair-cells; thus all instead of only certain of these cells, would become stimulated, and so bring about this "indefinite" tinnitus.

When, by severe hæmorrhage, administration of drugs, &c., a sudden increase or decrease in blood-pressure results in tinnitus.