THE DIAGNOSIS OF EARLY CLINICAL TUBERCULOSIS BY THE GENERAL PRACTITIONER

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While great progress has been made in the reduction of the mortality from tuberculosis in the past quarter of a century, yet it still ranks as one of the greatest agencies for destroying human life and so demands the earnest attention of all practitioners of medicine.

The very fact that the mortality has been reduced nearly sixty per cent. in the past twenty-five years calls for still greater interest on the part of the profession than has ever yet been manifested. For now we can truthfully say that it is a preventable and curable disease. But regardless of the progress made, advanced tuberculosis still remains a menace to the individual who has it and through him to the race.

Early tuberculosis can nearly always be healed with restoration of the patient to an efficiency little if any short of normal. Even if one is suffering from extensive advanced lesions, he still may overcome the disease; but he maintains his health thereafter only by living carefully and always bearing in mind that he has had a serious infection which may again be stirred to activity through indiscretion or stress.

WHEN SUSPECT TUBERCULOSIS

The ravages of tuberculosis can best be stayed by eliciting the earnest cooperation of general medical men. Specialists may make the diagnosis with greater accuracy because of their attention being constantly held to this one subject, but specialists do not see the cases first. The man who sees the disease earliest is the family physician, so upon him rests the burden of early diagnosis. From the progress that has been made in diagnosing tuberculosis in the first quarter of this century we must say that he has accepted the responsibility and is acquitting himself well. Not that he cannot do better. He can and he will. But for encouragement he already has to his credit thousands of lives which, without his interest and aid, would have gone the same way that thousands of others have gone yearly throughout the ages.

The most important thing for the physician to know is when to suspect the presence of active tuberculosis. He can get his mind in the most advantageous mood for aiding in the fight against tuberculosis, first, by keeping the disease always in mind and being thoroughly imbued with its hopefulness if diagnosed and treated early, and its seriousness if neglected; then by realizing that any one may have it, that no one is too old or too young, too fat or too thin, too strong or too weak, to have tuberculosis; and, finally, by keeping in mind the danger signs that indicate its presence in the early stage of activity. The disease comes on in many different ways, but usually slowly at first, and more rapidly after infection has been well established. It may best be suspected from the symptoms of which the patient complains and may often be diagnosed by a careful analysis of these alone.

For those who are not accustomed to making frequent chest examinations, it should be known that a fairly accurate opinion may be formed in most cases of active tuberculosis by other methods of studying the patient. Of these the most important is the clinical history. By carefully analyzing the clinical history alone a very large majority of frank cases of early active tuberculosis may be diagnosed.

WHAT WILL CLINICAL HISTORY TELL?

The clinical history tells what the patient wants the physician to know and what the physician wants to know; that is, it tells the various ways in which the patient finds himself departing from normal health. It is through eliciting these facts and analyzing them that the physician must decide whether he is to suspect a lung lesion or one of the heart or kidney, some nerve or brain disease, or a metabolic disorder. The clinical history, then, is the foundation on which the diagnostic edifice is to be built. Needless to say it should be adequate for its purpose; so too much care cannot be taken in obtaining it.

Symptoms and signs of disease consist of many different entities which on a casual glance, if we consider them individually, may seem to be unrelated; but group them together according to some well chosen plan and they become simple and appear in definite relationship to each other.

If we were able to enumerate all the symptoms that could be produced by tuberculosis of the lung they would make a very long list; for while pulmonary tuberculosis has its chief seat of disease in the lung, the entire organism

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is ill. Every organ—yes, every cell of the body—receives harmful stimuli during the course of the disease which have a tendency to disturb its function; but there are certain major disturbances of function which make up the chief complaints.

If one will stop to analyze these complaints or symptoms he will see that they naturally fall into few groups; in fact, I have suggested that all of the commonly elicited symptoms of pulmonary tuberculosis are produced in one of three ways. They are general, being due either to toxins or to the effects of the disease upon the body expressed through the nerves, endocrines or cells themselves; or due to reflex stimulation of organs and tissues through impulses which arise in the lung and are carried centralward over the sympathetic and vagus nerves to be transmitted to other neurons which connect with them in the central nervous system; or, they are local effects produced by the disease process itself in the lung or overlying pleura.

Thus, from an etiologic standpoint, one may place all the important symptoms of pulmonary tuberculosis in the following groups:

of active pulmonary tuberculosis are those of Group I, those due to toxemia or general nerve, endocrine and cellular imbalance. The reason these have so little diagnostic value is because the same symptoms appear no matter what the toxemia, or no matter what the nerve or endocrine imbalance. When taken in conjunction with other symptoms belonging to Groups II or III, however, they begin to assume real diagnostic importance; and when one has fastened the disease from which the patient is suffering upon the lung, then the general symptoms become very important.

The diagnostic importance of the symptoms belonging to Group II rests upon the fact that the tissues or organs which are disturbed in their function are closely associated with the lung through nerve connection. There is more individuality in the symptoms of this Group than in those of Group I; in fact, from the standpoint of vegetative neurology it will readily be seen that most of the symptoms of this group assume localizing importance.

The diagnostic prominence given to symptoms of Group III is based on the fact that they are produced locally by the tuberculous

Table I. Etiological Classification of symptoms of Pulmonary Tuberculosis

GROUP I	GROUP II	GROUP III
Symptoms Due to Toxemia and Other Causes Acting Generally	*Symptoms Due to Reflex Cause*	*Symptoms Due to the Tuberculous Process Per Se*
Malaise	Hoarseness	Frequent and protracted colds (tuberculous bronchitis)
Lack of endurance	Tickling in larynx	Spitting of blood
Loss of strength	Cough	Pleurisy (tuberculosis of pleura)
Nerve instability	Digestive disturbances (hypermotility and hypersecretion) which may result in loss of weight	Sputum
Digestive disturbances (hypomotility and hyposecretion)	Circulatory disturbances	
Metabolic disturbances resulting in loss of weight	Chest and shoulder pains	
Increased pulse rate	Flushing of face	
Night sweats	Spasm of muscles of shoulder girdle.	
Temperature	Diminished motion of affected side.	
Blood changes		

The important thing about this grouping is that by showing the cause of symptoms and tracing their relationship to each other, the diagnosis at once begins to localize upon the lung. The classification and analysis of symptoms according to this grouping will make the diagnosis evident in nearly every frank case of pulmonary tuberculosis. Only in the vague borderline cases will there still be doubt.

It readily can be seen that the symptoms which have the least bearing upon the diagnosis process itself. They become especially significant in diagnosis, however, when they are accompanied by symptoms belonging to Groups I and II, as will appear later in this discussion.

EVALUATION OF SYMPTOMS

It is impossible to place a definite value on individual symptoms, because different individuals vary so much in their reaction toward disease, and infections vary so much quantitatively and qualitatively. Neither is it possible to demand that any definite group of

symptoms be present before making a diagnosis. Patients differ, the disease process differs, and the examiners differ in their interpretation. Symptoms in one patient are not present in another; yet if active tuberculosis is present there will nearly always be a combination of symptoms belonging to at least two of the groups above mentioned, which when taken together will direct the examiner's attention to pulmonary tuberculosis and make the diagnosis fairly certain. For example: fatigue and loss of weight with cough and expectoration; fatigue and loss of strength with hemoptysis; expectoration with cough and toxic symptoms; or pleurisy with cough and temperature.

There are certain symptoms which require special discussion in their relation to the diagnosis of early active tuberculosis, because of their particular import.

Among the symptoms of Group I, *malaise, loss of weight,* and *temperature* are extremely important and require some elaboration.

Malaise. One of the very important symptoms of active tuberculosis is a gradually developing tiredness—one that seems not to be accounted for by anything the patient is doing, and further may at times seem out of proportion to other signs of disease that may be present. One must not forget, however, that this symptom at times may not be noticed. Some individuals seem to feel the effects of toxins very little.

The difficulty in interpreting malaise correctly is due to the fact that tuberculosis often becomes active during or following periods of stress. The patient may have been working unusually hard; or may have had business or domestic worries, or financial loss; or may have previously suffered from some debilitating disease; or the tuberculosis may affect one who, when at best, possesses an unstable nerve, psychical or endocrine balance. Easy tiring is almost a constant symptom in all these conditions, and there is no way to differentiate the malaise caused by the tuberculosis from that produced by the other causes.

While malaise alone has no special significance, when taken in connection with the loss of a few pounds in weight, a slight elevation of temperature or a cough combined with any of the symptoms in Group III it points strongly to an active tuberculosis.

Loss of weight. During health a fairly regular weight is maintained by most people, with variations of only a pound or two in the course of weeks. If there be a loss of from five to ten pounds within a few weeks' time, it should be considered as having some serious nutritional change as a basis, such as is so frequently produced by the toxins of tuberculosis. If malaise, temperature and cough, or any of the symptoms of Group III, accompany it, tuberculosis should be most strongly suspected.

Temperature. A rise in temperature of a few tenths of a degree for which no other cause could be found was formerly considered as being a sufficient basis for diagnosing tuberculosis. It is known today, however, that other infections, psychical instability, increased metabolism caused by increased nerve stimulation or increased hormone action, or such nerve action as interferes with vasodilatation of the skin capillaries and the throwing off of heat, will all cause elevations of a few tenths of a degree in the registered temperature. The nervous element should be evident to any one who studies the effect of a visit to the doctor's office on the temperature or blood pressure of a nervous or psychical patient.

It is important to know that individuals may have elevations of from 99 to 99.5 without having a toxemia as the cause. Women, without infection, frequently run a temperature of 99.5 in connection with the menstrual period. It usually appears before the period as long as fourteen days. It may appear during the flow; and, in a few, following it. This knowledge is of great importance in estimating the significance of a patient's temperature curve.

Slight elevation of temperature of itself is not significant, but with malaise or loss of weight or cough or in connection with the symptoms of Group III, it becomes of great importance.

In Group II the only subjective symptoms of diagnostic import are laryngeal irritation as shown in hoarseness and a tendency to cough, cough itself, and flushing of the face. The objective symptoms in this group, however, particularly the localized reflex atrophies and muscle spasms, and the limitation of motion caused by the increased muscle tension, when once appreciated will assume very important diagnostic worth, because of the fact that the nerve connection between the tissues involved and the lung is definite and the reflex symptoms follow well established physiologic laws.

Hoarseness and throat irritation. If one inquires carefully into the history, the patient will quite often complain of slight hoarseness and throat irritation. The reflex relationship between the pulmonary branches of the vagus and the laryngeal branches of the same nerve is quite close. So, inflammation in the lung readily sends impulses to the larynx over the motor nerves which interfere with its normal action, and over the sensory nerve which cause irritation.

Cough is a part of the same reflex; or we might better say that hoarseness and laryngeal irritation are a part of the cough reflex. Cough itself, however, is produced by a widespread

muscular effort, in which practically all the ordinary respiratory muscles are brought into play.

Hoarseness and cough may be caused by impulses arising in other parts of the respiratory tract, such as the nose, tonsils, sinuses, larynx itself, and by inflammation of the bronchi. They have little diagnostic value except as they are associated with symptoms of Groups I and III. Cough with loss of weight and undue fatigue is very suggestive; so is it when accompanied by hemoptysis or pleurisy.

Flushing of the face. Flusing of the face is a reflex through the vagus and 5th cranial nerve. It rarely manifests itself, however, unless the infiltration in the lung is fairly extensive and the disease active. This symptom in a minor degree is at times caused by disturbances in the gastrointestinal canal; but as a rule the impulse which causes it has its origin in the lung; and malaise, cough and expectoration at least are nearly always present when it manifests itself.

The symptoms in Group III are individually the most important of all the symptoms of active tuberculosis; yet each of these symptoms needs to be discussed separately so that its true significance in the diagnosis of tuberculosis may appear.

Hemoptysis. We formerly stated that spitting blood, unless it could be shown to be due to a heart lesion or bleeding gums, could be quite safely ascribed to a tuberculous process in the lung. Now we are compelled to modify this opinion in many instances. Since the pandemic of influenza in 1918 we have had many infections of the respiratory tract which hang on and pass through a subacute and even chronic stage that now and then cause hemoptyses in no wise different from the hemoptyses of tuberculous origin. Blood-spitting may also appear in the course of new growths in the lung, in bronchiectasis and lung abscess. Even quite large hemorrhages may appear every now and then in the course of these nontuberculous infections.

So we are now forced to revise our ideas. Tuberculosis is the cause of by far the great majority, probably about ninety per cent., of instances of blood-spitting, yet it is important to remember the possibility of other causes and require the presence of other symptoms before making the diagnosis. Any hemoptysis of one-half to a dram of bright blood should be considered as being of a tuberculous origin unless some other cause is definitely found.

Blood-spitting may show as streaks or specks which nearly always can be disregarded; or as pinkish saliva or sputum, which is rarely from the lung in early tuberculous lesions; or as a small quantity—a half dram or more—of bright blood, or several mouthfuls of it, which is the usual form of hemoptysis in early tuberculosis.

Temperature would have no diagnostic significance in the group of nontuberculous cases; neither would cough. Malaise and loss of weight might or might not be of value. In some cases of hemoptysis one will be unable to settle definitely on the underlying pathology without using all the diagnostic methods that we are able to command.

Sputum. Sputum is of the greatest importance in diagnosis. If bacilli are found that alone is sufficient. This is the only single symptom on which alone a diagnosis can positively be made. Negative sputum, however, has no definite diagnostic significance, yet a small amount of sputum coming on when a patient is below par or persisting for a time after an acute bronchitis should always be carefully considered as possibly being due to a tuberculosis. Tuberculosis may be present for a long period without bacilli appearing in the sputum; or bacilli may appear so seldom and in such small numbers that they may be overlooked in the routine method of examination.

Sputum accompanying early tuberculosis may be due to irritation of the mucous glands in the bronchi, under which circumstances it must not be expected to show bacilli; or, it may be due to a necrosed tuberculous focus which usually sheds bacilli.

There is much to be said about the examination of sputum. In the first place one must not rely on the statement of the patient, "that he raises nothing." I always give the patient a bottle and tell him to bring for examination everything he raises for twenty-four or forty-eight hours, no matter where he thinks it comes from. If the sputum is of small amount, for accuracy, it should always be subjected to concentration methods of examination. It is surprising how often bacilli will be found with these methods when they fail to be found by the ordinary smear method.

Small amounts of sputum accompanied by toxic symptoms and cough are very suspicious of tuberculosis. So are small amounts of sputum accompanied by cough and loss of weight; or loss of weight and elevation of temperature; or malaise and loss of weight.

Pleurisy. Pleurisy, whether dry or accompanied by effusion, is most often due to a tuberculous process. Pleurisy with effusion, without another known cause, has long been considered as being due to tuberculosis. The same diagnostic value should be attached to definite dry pleurisy. Pleurisy at the base with a distinct rub, unattended by pneumonia or influenza, is nearly always of tuberculous origin.

Such cases usually give considerable pain and are easily recognized. Pleurisies, however, are very commonly found covering the apices of the lung, accompanying tuberculous processes in the underlying pulmonary tissue. Such pleurisies do not produce a recognizable rub because of the limited apical motion. Neither do they produce the sharp pain of pleurisy at the base. So they are overlooked. They produce an uncomfortable distress rather than pain.

Pleurisy may or may not be associated with an elevation of temperature, but when effusion is taking place temperature is commonly present. There is nearly always some of the toxic or reflex group of symptoms accompanying severe dry pleurisy or pleurisy with effusion, and when all are put together they leave little doubt as to the diagnosis.

Patients are prone to call many different pains pleurisy. They may be right in many of them as to origin, but they often err in considering them as signs of an active inflammation. When pain has once been established in a chronic inflammatory process, such as pleuritis, the nerve path through which the pain is expressed attains a state of decreased inhibition in which sensations that would not be felt under ordinary conditions are transmitted to the higher brain centers, resulting in pain under many circumstances: such as on tiring; if the patient worries or is depressed and discouraged; at the menstrual time; and with changes in weather. It is difficult at times to assign the proper significance to these complaints.

Frequent and protracted colds. Tuberculosis at times in its early stages, takes the form of repeated attacks of bronchitis. The patient usually considers that each attack is a cold. The symptoms in such cases are caused by a metastatic extension of the disease usually caused by comparatively small numbers of bacilli yet sufficient to produce quite an allergic reaction.

Inasmuch as these are real definite reactions following the inoculation of bacilli in tissues which have been sensitized by previous infections, symptoms belonging to each of the three etiological groups usually manifest themselves. The patient usually has a slight elevation of temperature of four or five days' duration, is toxic, has headache, suffers from malaise, loses appetite and some weight. He often thinks he is bilious. He usually coughs and may or may not expectorate. The toxic symptoms with temperature may clear up within four or five days, or may hang on for several weeks. Even if the toxic symptoms subside after a few days, cough and expectoration, if present, usually continue for several days or weeks longer. The sputum during and immediately following these attacks may show the presence of bacilli, even though they disappear later. An X-ray at this time may show a flakiness about the metastatic focus which will pass away in a few days or weeks. Auscultation may reveal rales which may also disappear as soon as the acuteness of the allergic reaction has passed away.

IF SYMPTOMS ARE SUSPICIOUS WHAT OTHER SIMPLE MEASURES WILL LEAD TO A DEFINITE DIAGNOSIS?

It will be seen from this discussion of the symptoms of active tuberculosis that if physicians who are not specialists in diseases of the chest will learn to think of symptoms from the standpoint of their etiology and learn to put an interpretation upon them as they appear in combination, they can nearly always arrive at a probable diagnosis. If in doubt, or if they wish to make the diagnosis more certain, there are other measures at their command which will aid.

The physical examination is of great or little value according to one's experience in its use. I wish to emphasize strongly that one who is not in the habit of frequently examining chests should never turn down a probable diagnosis based on a carefully taken and analyzed clinical history because he fails to find signs on auscultation. He had better stick to the "probable diagnosis" based on the history until he can have it proved or disproved by employing other methods himself, or by consultation.

I would especially urge the necessity of examining patients with bare chest and without restriction of the waist line. Every examiner should learn to look at chests understandingly. They tell much. If any asymmetry in the skin or subcutaneous tissue or muscle mass is present, it may be important and have diagnostic bearing. Diagnoses of underlying pathology, and whether the process is active or not, may be determined by correctly reading the motor and trophic reflexes which are expressed in the tissues covering the chest. However, regardless of their value, until these are taught to students the same as auscultation and percussion are taught, they will remain a closed book to most examiners; yet some of them are so simple that any one with a little practice can use them.

At this time I desire to call attention to two reflexes which I believe any one may learn to detect, the *atrophy of the soft tissues* caused by trophic reflexes from the lung, and *diminished motion* of the chest wall resulting from

a motor reflex from the lung, analogous to the motor reflex in the abdominal muscles in cases of appendicitis, cholecystitis and ulcer of the stomach. The diagnostic value of these depends on the fact that they always affect the same tissues, and when once learned immediately suggested that the impulse causing them arises in the lung.

Atrophy of soft tissues over chest. Often, on the first glance at a chest, one sees a lessening of tissue above the second rib anteriorly and the spine of the scapula posteriorly. Sometimes this is considered and spoken of as contraction of the apex. But careful inspection with or even without palpation will reveal that there is a lessening in the subcutaneous tissue. It is thinner than below the second rib, or if it is confined to one side it is thinner than on the other side. Palpation either by feeling with the tips of the fingers or by picking up the tissues between the thumb and fingers will aid the eye very much in detecting this atrophy. This is an atrophy produced reflexly by some chronic inflammation in the lung, usually a tuberculosis.

Sometimes the atrophy extends down below the second rib and spine of the scapula. This is evidence of not only a chronic pulmonary involvement but also of an involvement of the underlying pleura as well.

Here then we have very valuable information stamped on the patient's chest, if only we see it. Now, when we recognize that much of our adult tuberculosis is caused by metastases from former foci, and find the metastases most often in the same lung that was formerly the seat of infection; and further recognize that the larger the previous infection the greater the danger of future metastases; these reflex atrophies, particularly if they are well marked, give us an immediate clue in diagnosis if the individual being examined complains of symptoms suggestive of a pulmonary tuberculosis.

Diminished motion of the side. Diminished activity of an inflamed organ or part has long been recognized as a part of nature's protecting mechanism. This defensive reflex shows itself very early in cases of tuberculosis of the lung. When tuberculous infection takes place in pulmonary tissue it at once irritates the nerve endings in the diseased area. Impulses are carried to the cord and transmitted to motor neurons that supply certain muscles whose contraction limits chest movement. If the lesion is confined to one side, as it often is at first, then this defensive reflex has great diagnostic significance and is comparatively easy of detection; if both sides are involved, it is more difficult to determine.

The muscles which are particularly involved in this reflex action are the muscles which take their innervation from the cervical segments of the cord. These are particularly the muscles of the shoulder girdle and the crura and central tendon of the diaphragm. By shortening the muscles of the shoulder group the upper portion of the thorax is fixed, and by shortening the crura of the diaphragm the lower portion is fixed. Together, they limit the motion of the side involved, or disturb the normal respiratory rhythm when both sides are involved. The increased tension of the neck and shoulder muscles may be felt by palpation which, together with the limited motion, furnishes most dependable evidence of active inflammation in the lung.

The importance of this muscle reflex in diminishing the movement of the thorax can be understood by realizing that the muscles particularly responsible for this limiting of motion are the scaleni above, running from the cervical vertebra to the first and second ribs, and the crura and central tendon of the diaphragm below. The movement of the diaphragm is, under normal conditions, the most important agency in respiratory movement; and the effect of a steady contraction of the large crural muscle below, especially when the upper portion of the same side of the chest is fixed by the apical muscles, particularly the scaleni, is self-evident.

There are other things besides a motor reflex from the lung that will cause lessened motion, such as pleural adhesions and fibrosis in the lung, which must be considered; but one of the commonest causes in early clinical tuberculosis is the pulmonary inflammation.

Limited motion may be detected by inspection, but I prefer to seat myself before the patient and, placing my hands lightly over the lower portion of the chest wall in the axillary region, observe and palpate at the same time; then repeat the same over the upper surfaces of the chest both front and back.

The diagnosis of a pulmonary tuberculosis is strengthened very much by finding diminished motion present along with suspicious symptoms of other groups.

When both sides are the seat of active tuberculosis the diminution of motion is found on both sides, but usually predominating on one side. This causes some confusion and requires more skill in assigning to it its proper value.

Rales. Rales heard on coughing or on inspiration following cough are valuable as indicating that inflammation is or has been present in the underlying lung, or pleura, or both.

It requires considerable experience to properly interpret them and distinguish those in the lung from those in the pleura. Their presence, however, no matter what their origin, gives evidence that the underlying structures are or have been the seat of inflammation. It is necessary to be on the lookout for rales in the tissues surrounding the hilum and toward the base as well as apex, for we find a great deal of tuberculosis starting in these areas of the lung.

X-ray. The X-ray is assuming a very important role in the diagnosis of chest diseases today. Many errors are being committed because of placing too much confidence in a film regardless of its quality. I see many films which are overshot and underdeveloped, or overshot alone, in which the rays pass through without causing shadows even though sufficient disease to cause shadows be present. The best plate is a moderately soft one, developed carefully to bring out detail. Such a plate will aid greatly in diagnosis. A poor plate shows no more than a poor physical examination and the value of the two are on a par. Soft flaky shadows are most significant of active tuberculosis. They may be in any part of the lung but are most common above the third rib, not necessarily at the apex. They are often found near the hilum running out toward either the apex or base. Flakiness is present only when an area of softening or an allergic reaction is present. When this has passed away, as it will after a few weeks following a metastasis or reinoculation of mild degree, the X-ray may fail to show the disease.

SUMMARY

1. By carefully taking the clinical history, and classifying the symptoms according to their etiology, and assigning to those present their combined value, one can make a probable diagnosis in nearly all frank cases of early clinical tuberculosis.

2. The sputum should always be examined, no matter where the patient thinks it comes from. A twenty-four or forty-eight hour specimen should be examined in all cases where the amount raised is small. Examining by one of the methods which concentrate the bacilli will show their presence in many instances where they are not found by the smear method.

3. Areas of atrophy of the soft tissues over the thorax should be looked for because they tell of previous inflammation in the underlying lung and pleura. Atrophy of skin and subcutaneous tissues above the second rib anteriorly and the spine of the scapula posteriorly suggests previous or chronic inflammation in the underlying lung; atrophy below these limits suggests previous or chronic inflammation of the underlying pleura.

4. Diminished motion of the chest wall on one side is present in all cases of unilateral active clinical tuberculosis. Other common causes of diminished motion are pleural adhesions and fibrosis in the underlying lung. Where both lungs are involved, interference with motion is found on both sides but is more difficult to interpret. Diminished motion in addition to suspicious symptoms increases the probability of active disease within the lung.

5. The X-ray is a great aid to diagnosis. Many plates on which an opinion is given are so poor that they are not only valueless but harmful. A moderately soft plate, carefully developed, is most dependable. A negative film does not imply the absence of disease.

6. Rales may indicate the presence of active disease in the underlying lung or pleura, or of a chronic or obsolete process. They must be interpreted in conjunction with other symptoms. Those who examine chests for early tuberculosis infrequently should disregard all rales except those which are of a definitely moist nature.

Pottenger Sanatorium.