Home Sanatorium to consolidate the cure. Arrangements should therefore be made accordingly in good time.

The "short and early" Alpine cure is the best of all courses for safety and also for real economy. Too often patients are sent to the altitude as a last resource. If, as this implies, there is a curative power in it greater than that of home climates and to which an ultimate appeal has to be made, the patient would have been better off for its earlier help. In fatal cases life itself might perhaps have been saved. In the others there might have been much saving of time and of earning power to outweigh the additional expense of travel. For, although both forms of sanatorium treatment yield their best results at the earliest stage, the advantage arising from earliness, particularly as regards rapid results, is immeasurably greater in the Alps than in our own climate. Safety and economy strongly urge that the *Alpine Sanatorium should be visited not second, but first.*

4. The rationale for this order of march rests upon:

(a) The greater "altitude invigoration" which can be derived by constitutions as yet less debilitated by disease, and upon the greater "altitude expansion" of lungs as yet less extensively damaged; and also

(b) Upon the greatly enhanced subsequent efficiency of the Home sanatorium treatment when the early cases have just had the benefit of that initial invigoration and of that thoracic expansion which no Home climate can confer.

5. The Selection of Cases is simplified by the fact that, at that earliest stage, practically speaking all ordinary apyrexial cases are suitable for a temporary stay in the altitude.

6. The Selection of Seasons is simplified by the fact that for these earliest cases all seasons are suitable for treatment under sanatorium rule. As a fact, the individual merits of the several seasons are a minor consideration as compared with the inherent virtues of the "mountain breathing-cure," and these are always equally at our service at all times of the year.

7. As no other treatment is superior to this, no points can possibly be lost through its immediate adoption. But many points might be quickly lost through its delay. For safety, our first climatic prescription should be in all "possible" cases, "Sanatorium treatment in the Alps at once, and Home Sanatorium treatment to follow."

8. For those threatened only—and particularly for Children—this is the treatment *par excellence*; and for them Alpine preventoria must eventually be provided. The risk of bacillary infection, which has sometimes been alleged as a deterrent, is probably smaller at Davos than anywhere else; and as a merely sentimental objection it should not be allowed to stand in the way of an untold boon.

9. The later cases, including those which have not been cured by prolonged treatment at our Home Sanatoriums, are not to-day under our consideration. For them the best opportunity has clearly been missed. Nevertheless they may still find in the altitude a measure of improvement greater than they could obtain elsewhere, provided they can invest considerable time in their treatment. These are not the cases in which admission to the Queen Alexandra Sanatorium could lead to the best and to the most rapid results, nor to the greatest advantage for the greatest number. They are not therefore specially the cases which you will be invited to recommend when the Sanatorium, at no distant period as it is hoped, shall at last open its gates.

THE German Society of Tropical Hygiene will hold its second meeting in Berlin at Eastertide this year.

ACCORDING to the *Medizinalkalender für Oesterreich*, the number of medical practitioners in Austria, including Bosnia and Herzegovina, at the end of 1908 was 12,278, as against 12,041 in the previous year. Of these, 2,946 reside in Vienna, 269 at Graz, 112 at Innsbruck, 499 at Prague, and 334 at Lemberg.

THE eighth International Congress of Hydrology, Climatology, Geology, and Physiotherapy will be held this year at Algiers, April 4th to 10th, under the patronage of M. Jounart, Governor-General of Algeria. There will be an exhibition in connexion with the Congress, and a number of interesting excursions have been arranged. Communications relative to the Congress should be addressed to the General Secretary, Dr. L. Raynaud, 7, Place de la République, Algiers.

THE SELECTION OF SANATORIUM CASES FOR TREATMENT WITH TUBERCULIN.

By H. HYSLOP THOMSON, M.D.,

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THE scientific and comprehensive basis upon which the sanatorium treatment of tuberculosis has now been placed is chiefly due to the exhaustive work of Wright on the problem of the infections and their treatment by opsonotherapy. The recognition of autoinoculation as a specific factor in the treatment of disease took origin in the observations of Freeman. The possibilities of autoinoculation in the treatment of pulmonary tuberculosis were first recognized by Meakin and Wheeler,¹ who in 1905 were led to the conclusion that the beneficial effect of graduated walking exercise in the sanatorium treatment of consumption was due to autoinoculation with small doses of tuberculin, which raises the level of the opsonic index. In one patient, who had a small, almost healed focus, walking exercise failed to elicit any rise in the opsonic index, and the indications in this case pointed to a total absence of autoinoculation.

Recently Paterson and Inman,² from an investigation of the effect of carefully systematized manual labour on the physical condition of consumptive patients and their progress towards recovery, as gauged by the range of temperature and the level of the opsonic index, concluded that graduated manual labour is directly beneficial to the able-bodied consumptive by reason of the repeated autoinoculations it induces, which find expression in a higher opsonic range. In 95 per cent. of the patients doing heavy manual work, Inman found the opsonic index to be above normal. A rise of temperature to 99° F. as a result of work is regarded as indicating a condition of hyperinoculation, calling for absolute rest. Obviously, manual labour will lead to autoinoculation when walking exercise fails to do so by reason of the more active respiratory and muscular movements to which it gives rise.

Walking exercise and graduated labour, therefore, are important and essential elements of the sanatorium régime, inasmuch as they represent an autoinoculation with tuberculin, the doses of which depends in susceptible cases on the amount of exercise and degree of labour. But autoinoculation as a specific measure has distinct limitations. It is not possible to exercise complete control over the dosage in all cases; moreover, patients treated in this way are inoculated, after a certain phase has been reached, with gradually decreasing doses of tuberculin, and indeed in quiescent cases autoinoculation may cease altogether. The clinical history of many of these cases indicates that this fails to elicit an efficient and lasting immunizing response, and if a high level is to be maintained it becomes necessary to supplement the failing autoinoculation by the introduction of tuberculin from without. The occurrence of relapse in patients who have derived material benefit from autoinoculation may frequently be traced to the failure of the organism to protect itself against a sudden hyperinoculation induced by physical strain, exhaustion, etc. Further, it is the experience of most sanatorium physicians that, other things being equal, patients treated with Koch's tuberculin are less liable to relapse than those in whom no such specific treatment has been employed. In a word, the employment of tuberculin in suitable cases in known and gradually increasing doses produces a marked and efficient tolerance which ensures a greater freedom from relapse. It is therefore suggested that in all cases in which the clinical evidence points to the absence of hyperinoculation and the possibility of a diminishing or absent beneficial autoinoculation, gradually increasing doses of Koch's tuberculin should be administered.

PHASES OF AUTOINOCULATION IN RELATION TO TREATMENT.

The degree of autoinoculation in pulmonary tuberculosis varies within wide limits. In quiescent and almost cured cases it may be entirely absent. In benign cases it is slight, and when the dosage is proportionate to the physiological needs of the organism it is directly beneficial by increasing the agglutinins and opsonins of the blood serum. Apart from the clinical phenomena due to acute disease or a coexisting septic infection we have two distinct types of

pulmonary tuberculosis. In the one, to which the great majority of sanatorium patients conform, a hyperinoculation induced by walking exercise or manual labour is expressed by a rise in temperature; whereas in the other, which embraces a small minority, the temperature under like conditions tends to a subnormal range. It has also been observed in consequence of treatment that certain patients of the reactive type merge through an afebrile phase into the subnormal type.

The following facts have been noted with regard to this subnormal type: Improvement in the local condition as indicated by the character and number of crepitations is more rapid. The effect of graduated labour and walking exercise, which is to reduce the temperature below normal, invariably coincides with a marked improvement in the general and local condition. Lastly, such patients rapidly develop considerable tolerance to Koch's tuberculin. Another suggestive fact, first observed by Latham,³ is that in certain febrile cases tuberculin administered by the mouth in small doses induces a fall in temperature. In several cases which I have under observation a very decided subnormal range followed the administration of tuberculin. Curiously enough, however, in other cases the same dose produced a rise in temperature. The effect seems to depend largely on idiosyncrasy and suitable dosage, although the possible influence of an associated pyogenic infection must be kept in view.

In studying the degree and extent of hyperinoculation in tuberculous patients, we find certain phases of inoculation which are dependent for the most part on the character and extent of muscular effort. In acute cases there may be a continued hyperinoculation during rest, the temperature reaching 99° F. or above it notwithstanding absolute rest in bed. This hyperinoculation may continue indefinitely, or yield to the influence of rest and appropriate treatment. The second phase is characterized by the absence of hyperinoculation during rest and its development as a result of muscular effort. The amount of exercise varies from a few steps to several miles a day, and its effect upon the temperature becomes a useful guide in estimating the patient's susceptibility to hyperinoculation, and likewise to the activity of the disease. The frequency and degree of hyperinoculation induced in this way varies in different cases, and also according to the length and gradient of the walk. As the patient's condition improves, a well-marked immunizing response is gradually evoked, and it becomes more difficult, and at last impossible, to induce hyperinoculation by walking exercise. Finally, in some cases a mean subnormal temperature is attained.

Manual labour may induce hyperinoculation when walking exercise has failed to do so, this being due to the more active muscular and respiratory movements it entails. The majority of patients, however, who are able to take the maximum amount of walking exercise along roads of varying gradient will be found capable of undertaking the heavier grades of manual labour without any injurious reaction. Occasionally a somewhat severe autoinoculation is induced, which, however, yields rapidly to rest and treatment. The absence or presence of susceptibility to hyperinoculation induced by manual labour is of some value in forecasting the ultimate results of treatment. The fact that a specified amount of manual labour under the ideal conditions of sanatorium life gives rise to hyperinoculation is of somewhat unfavourable prognostic significance, especially if it occurs in the case of the wage-earner who is compelled after a course of treatment to follow some arduous occupation. Conversely, the absence of hyperinoculation under like conditions is to be regarded as distinctly favourable.

In patients who are responding well to treatment a stage is reached when even an occasional hyperinoculation fails to occur. This is probably due to a relatively high immunizing response and a diminished tuberculin output. In such patients the temperature at 6 and 8 p.m. is normal or subnormal. Very occasionally it may reach 98.8° F. A temperature of 98.6° F. following walking exercise or manual labour should be regarded as the maximum compatible with beneficial autoinoculation. Even a somewhat frequent rise to 98.6° F. should be viewed with some misgiving. The most favourable indication in this stage is a tendency towards a mean subnormal temperature. In the majority of cases the

complete absence of hyperinoculation under all conditions is only attained after much patience and by gentle gradations.

Although it cannot be accepted as conclusively proved that every rise of temperature to 99° F. and above it in a patient suffering from pulmonary tuberculosis is due to a hyperinoculation with his own tuberculin, it is a wise and safe rule to assume that such is the case. The light which recent investigation has shed on the value of walking exercise and manual labour in the treatment of pulmonary tuberculosis has largely increased the importance of stringent medical supervision and widened the responsibility of the sanatorium physician. The daily routine as regards rest, walking exercise, and manual labour must be carefully mapped out for each patient, and the question of recreation calls for like careful consideration. This was specially emphasized by Latham some years ago. It is somewhat remarkable that certain patients are able to undertake heavy manual labour without any rise of temperature, and yet a game of cards, bowls, croquet, or chess is followed by a rise of one or even two degrees; in the majority of such cases the rise of temperature is probably of nervous origin, as it speedily falls to normal. Occasionally the rise persists, and is obviously due to a hyperinoculation from quickened pulse-rate. Such cases are not suitable for tuberculin treatment.

THE ROUTINE OF TREATMENT.

The following are the general principles underlying the treatment at present carried out in the Liverpool Sanatorium. In febrile cases (temperature 99° F. or above) the aim of treatment at first is to cut short the period of hyperinoculation, so as to hasten the relatively quiescent phase, when the amount of autoinoculation suffices to evoke an immunizing response and becomes directly beneficial to the patient. When hyperinoculation has entirely ceased under all conditions an effort is made to induce tolerance to relatively large doses of tuberculin by supplementing the beneficial autoinoculation which may be present with gradually increasing doses of Koch's tuberculin. The importance of avoiding a hyperinoculation is always kept in view.

Febrile cases are treated by absolute rest in bed and the administration of calcium lactate or calcium chloride with or without some antipyretic drug. In patients with a superadded septic infection some antiseptic form of treatment is employed. The diet is suited to the digestive requirements of each individual, large quantities of milk and in some cases gelatine moulds being given.

Patients with slight degrees of fever which have not yielded to the ordinary therapeutic measures (chiefly absolute rest) are, after a time, allowed to have walking exercise or are prescribed tuberculin in small doses by the mouth. It is a curious yet significant fact that in certain patients with slight pyrexia the autoinoculation induced by walking exercise or the administration of tuberculin in small doses by the mouth gives rise to a lower range of temperature, while in other patients under like conditions a higher range is produced. Unfortunately it is not possible to foresee what the result may be in any given case. The tuberculin may be given in very small doses thrice daily or in larger doses twice or three times weekly. In some cases it is prescribed in mixture along with calcium chloride. When tuberculin administered by the mouth has had a beneficial effect upon the temperature it usually produces a subnormal temperature, but not infrequently the chart shows an absolutely normal temperature, between 98° and 98.4° F., the well-marked amplitude which was previously present owing to a low morning remission having disappeared.

Walking exercise ordered with the view of reducing fever in patients with slight hyperinoculation must be very carefully employed. It is only in a few patients of a certain type that it proves beneficial. If the temperature rises it is doing harm and should at once give place to absolute rest.

When the absence of hyperinoculation during rest has been secured, graduated walking exercise is commenced as the next step in treatment. The walks are at first short but are increased by easy stages. Great care is taken not to prescribe too long a distance for the first few walks, as patients who have been some considerable time at rest are during the first few days very susceptible to hyperinoculation.

tion. I cannot too strongly emphasize the importance of systematized and graduated walking exercise, more especially during the transitional stage between hyperinoculation during rest or that induced by movement, and the beneficial autoinoculation which subsequently results from exercise. When in consequence of walking the distance prescribed a rise of temperature to 98.8° or 99° F. results, the distance is shortened or the patient is ordered to rest. Perhaps the greatest difficulty is disobedience on the part of patients to instructions given. To meet this possible difficulty a few lectures are delivered to the patients from time to time on the general principles of treatment, and the importance and true value of walking exercise and graduated labour.

After a period varying from a few days to several weeks, according to the susceptibility of the patient, a stage is reached when the maximum amount of walking exercise is daily undertaken without any resulting hyperinoculation. Patients in whom this stage has remained unimpaired for a week or ten days are prescribed manual labour. The work is ordered not only as a means of inducing a further beneficial autoinoculation, but as a definite test. Broadly, it consists of two grades, medium and heavy, and includes weeding, trimming, mowing, joiner work, digging, shovel work, barrow and pick work, etc. Experience has shown that the majority of patients who have been able to take the maximum amount of walking exercise without any rise of temperature or other evidence of hyperinoculation may safely be put to medium or heavy grades of work. From 9 a.m. to noon the patients work, and in the afternoon they are sent a long walk, as many when at work assume a stooping attitude. If the temperature rises in consequence of manual work the patient is ordered to rest for a day or two, after which he is put back to walking exercise until he qualifies again for manual labour.

The final stage in the treatment of male patients is the employment of inoculations with Koch's tuberculin in gradually increasing doses. This is begun when they have passed the test of a week or ten days' heavy manual labour without any resulting hyperinoculation, as indicated by a rise of temperature to 99° F., or an amplitude which exceeds one and a half degrees. The initial dose of tuberculin is $\frac{1}{1000}$ mg., according to the old dosage. Following the initial dose, an inoculation is given every week, the dose being gradually increased during the course of treatment; the maximum dose reached depending in each individual case upon the duration of the patient's residence in the sanatorium. The time for inoculation is the early afternoon, after which the patients rest for the remainder of the day. Patients rest or follow their usual routine, according to instructions, the day after. The injection is given alternately in the right and left interscapular regions under aseptic precautions. Every male patient who has passed the heavy labour test is inoculated in this way, and the experience of this method so far points very definitely to the fact that not only may tuberculin be given in increasing doses with absolute safety, but that in many cases it is followed by a lower range of temperature (that is, a mean subnormal temperature) and improvement in the local condition.

The female patients are treated by a somewhat different method. For obvious reasons, it is not possible to test them so thoroughly, nor is it desirable, as female patients are more susceptible to autoinoculation, and react more strongly to tuberculin than male patients. Further, with few exceptions, they shrink from the needle. The method adopted, therefore, is to test them for a week or ten days with long walks, some of considerable gradient, and if during that time no hyperinoculation has taken place tuberculin is given by the mouth in gradually increasing doses, the initial dose being $\frac{1}{1000}$ mg. Each patient must, of course, graduate for the long distance test by successfully passing through the intermediate grades of walking exercise.

Both male and female patients are carefully watched and tested regarding any increase of susceptibility to hyperinoculation in consequence of the administration of tuberculin either by inoculation or *per oram*. As might have been expected, a slightly increased susceptibility has occurred in one or two cases. It was observed when the patient was tested by a long walk or some heavy manual labour on the day following the administration of tuber-

culin. In order to obviate as far as possible any increased tendency to hyperinoculation patients, on the day following the first administration of tuberculin, are allowed to rest or are prescribed a short walk or some light manual work. If this initial test be successfully passed, the same dose is given the next week, and the following day the patient is prescribed a long walk or some heavy manual work. If the temperature remain unchanged an increased dose is given the following week. Those cases in which hyperinoculation takes place are either treated with a smaller dose, followed by rest, or the administration of tuberculin is stopped altogether, and the patients are treated by autoinoculation alone for a further period of time. It is very necessary to avoid any constitutional disturbance, and therefore the rule is strictly adhered to not to increase the dose of tuberculin until the amount already given, *plus* the extent of autoinoculation induced by heavy manual labour in the case of males and distant walking exercise in the case of females, fail to produce a hyperinoculation.

During the past eight months 47 patients have been treated with tuberculin—31 males and 16 females; 28 male patients received 180 inoculations, the minimum dose being $\frac{1}{1000}$ mg., and the maximum $\frac{1}{100}$ mg. In all these cases the patients were first of all tested with walking exercise and heavy manual labour. The 3 remaining cases were treated with tuberculin by the mouth— $\frac{1}{1000}$ mg., divided into twelve doses, one dose thrice daily. It was given with the view of reducing slight persistent fever, and was continued for several weeks. In 2 of the patients the result was very striking; in the third case the patient left before any beneficial effect was observable.

Of the 28 male patients inoculated, 23 have left the sanatorium, all of them able to work. In only 2 were tubercle bacilli found in the sputum before leaving; 5 are still under treatment. Of the 23 discharged, tubercle bacilli were found on admission in the sputum of 16. The effect of the whole course of treatment upon the physical wellbeing and pulmonary condition in the case of these patients was very marked. An effort is being made to keep in close touch with all patients who have been under treatment, so that definite information may be obtained regarding the true value and ultimate results of this method of treatment compared with treatment by autoinoculation alone.

Of the 16 females, 2 were treated by inoculation, the remaining 14 having tuberculin administered by the mouth. In 7 of these cases there was slight persistent fever, and tuberculin was given in the hope that it would favourably influence the pyrexia. In five of the cases the effect upon the temperature was marked. Thus, in one case, during forty days prior to the administration of tuberculin by the mouth, the temperature had registered 99° F. or higher on seventeen occasions; whereas during a like period subsequent to the commencement of tuberculin treatment, it reached as high as 99° F. only on two occasions. In the case of a child, aged 11, who had been under treatment for several months suffering from a discharging sinus connected with hip disease and a swinging temperature, the effect of tuberculin by the mouth was to bring about the expulsion of two small sequestra, with complete healing of the sinus and an absolutely normal temperature. In two cases no beneficial result was obtained. In one of these the tuberculin was stopped as it induced an increased amplitude, with a somewhat higher range; the other patient left the sanatorium before any effect was observed. In the case of the seven remaining female patients tuberculin was administered in increasing doses after they had been thoroughly tested as to the absence of hyperinoculation. The initial dose was $\frac{1}{1000}$ mg.; all these patients are doing well.

As has already been stated, two methods of administering tuberculin by the mouth are employed. In the case of female patients in whom hyperinoculation is no longer induced by walking exercise it is administered weekly in gradually increased doses, usually beginning with $\frac{1}{1000}$ mg. and followed by $\frac{1}{1000}$ mg., $\frac{1}{1000}$ mg., and so on. When it is given with a view to control hyperinoculation and reduce slight grades of fever, $\frac{1}{1000}$ mg. is diluted with glycerine and sterile water and divided into twelve doses, one dose being taken three times in the day; occasionally $\frac{1}{1000}$ mg. is given in single dose every third day. Experience has shown that this method of dividing the doses is more effective in reducing slight degrees of fever.

With the exception of one patient who was treated with bovine tuberculin, Koch's new tuberculin was used in all the cases. In future tuberculin of bovine origin will be given a trial in a certain proportion of cases. This method of selection for treatment by tuberculin in cases of pulmonary tuberculosis has been found useful and practical. It is safe and easily applied in the ordinary routine of sanatorium work.

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¹ BRITISH MEDICAL JOURNAL, November 25th, 1905. ² *Lancet*, January 25th, 1908. ³ Paper read before the Medical Section of the Royal Society of Medicine, May 26th, 1908.

CONTUSION OF THE LUNG WITHOUT EXTERNAL INJURIES.

By ED. MARTEN PAYNE, M.B., C.M.ABERD.,
BLACKBURN.

As it appears to be incredible to some that contusion of the lung may result from an accident without visible signs of injury to the chest wall, I think it well, before describing a case which recently came under my observation, and which resulted in an action under the Employers' Liability Act, to cite some of the authorities upon which I based the opinions which I expressed, and defended in the witness box, in respect to it. That the condition is recognized by the Registrar-General as a cause of death is shown by the fact that the phrase "Contusion of heart or lung without wound" is included in *The Nomenclature of Diseases*.

W. J. Walsham, in his *Surgery*, says:

Contusions of the lung without an external wound may be produced by a severe crush or blow upon the chest. The visceral layer of the pleura may or may not be lacerated. . . . Pneumonia or abscess or gangrene of the lung occasionally ensue" (pp. 398-399, ed. 1890).

Erichsen in his *Surgery* (vol. i, p. 829, ed. 1884) says:

Contusion of the lung without injury to the pleura covering it may happen from severe blows on the chest, as from falls from horseback or kicks on the side. It may be complicated with fracture of one or more ribs; but this is not necessarily a concomitant of the injury.

Stonham in his *Surgery* (vol. ii, p. 324, ed. 1899) says:

Contusion and rupture of the lung may result from simple concussion of the chest.

And further (p. 327):

Slight localized pneumonia may result from simple injury to the lung with or without wound of the chest wall. In such cases the inflammation is very limited in extent, produces few physical signs and but little constitutional disturbance. It may, however, be very dangerous in the aged or enfeebled.

Holmes in his *Surgery* (p. 204) says:

In severe contusions of the chest . . . the lung is sometimes lacerated without the chest wall sustaining any visible injury.

Osler in his *Principles of Medicine* (p. 109, ed. 1901) says:

"Contusion-pneumonia." Pneumonia may follow directly upon injury, particularly of the chest, without necessarily any lesion of the lung. Litten gives 4.4 per cent., Stern 2.8 per cent.

Taylor, *Medical Jurisprudence* (ed. 1844, p. 292), says:

The lung may sustain serious injury from a blow or fall, and yet there may be no external marks of violence or symptoms indicative of damage for some hours.

Hoffman, *Atlas of Legal Medicine* (Plate 13), says:

A direct contusion of the lung occurs, especially in cases of fracture of the ribs, but is usually accompanied by laceration of the pleura, and even extensive laceration of the pulmonary parenchyma, but may take place without such associated lesions.

If, then, we can place any reliance upon classical authors, it appears that:

1. There is such a thing as "contusion of the lung."
2. The lung may be contused without being lacerated.
3. Contusion or laceration of the lung may occur without there being any visible injury to the chest wall.
4. The lung may sustain dangerous injuries, and yet no alarming symptoms may show themselves for some hours.
5. Contusion of the lung may give rise to a dangerous form of pneumonia.

I will now proceed to describe my case.

History of Accident and Illness.

On September 11th, 1908, I was requested by my assistant, Dr. Allan, to see, in consultation with him, a man named P. McV. I saw him at about 12.30 p.m. He was quite conscious, and gave me his own account of what had happened.

He told me that on September 8th he felt quite well, and went to his work at about 7 a.m. He came home to dinner at noon, and returned to his work still feeling quite well. The accident occurred at 3.30 p.m. He was working on a roof and fell over a spar or beam of some sort on his right side. Not feeling very seriously hurt at the time, he continued his work until about 5.30 p.m., when he went home. By this time the pain in his side was so bad that he went straight to bed. Fomentations and such home remedies were applied, and the man remained in bed, gradually getting worse in his breathing until the morning of September 11th, when, his friends getting seriously alarmed, at last sent for my assistant. Dr. Allan informed me that when he first saw the patient he was lying on his left side in bed. His breathing was shallow and quick, and he complained of great pain in his right side, towards the base of the lung. The temperature was 103°, respirations 33, and the pulse 120, small and irregular. The heart sounds were audible but distant; there was no bruit. There was dullness at the right base. The tongue was dry and foul.

When I saw the man, a few hours later, Dr. Allan remarked that his condition seemed to have slightly improved. The decubitus was exactly as above described, and the patient still had the pain in the right side, but he said it was not quite so acute. The temperature was 101°, and the pulse about 100, but it was small and difficult to count. The heart sounds were scarcely audible, and there was marked dyspnoea. I could find no signs of external injury to the chest, except redness and tenderness on pressure over a region towards the base of the right lung, where the patient complained of the internal pain. There was marked dullness on percussion in this region, and râles could be heard on both sides of the chest, especially towards the upper lobes. The tongue was furred, and the eyes were bloodshot and somewhat jaundiced. The general impression was, a man in the second stage of pneumonia; the immediate anxiety was cardiac failure. The patient died at 2.30 p.m. the same day, exactly seventy-one hours after the accident.

In view of the recent accident I refused to give a certificate, and, by order of the coroner, the body was removed to the mortuary.

Necropsy.

An autopsy was conducted by my friend Dr. Bannister, in the presence of Dr. Allan and myself. There were no signs of injury to the thoracic walls, no ribs were fractured, there was no laceration of the soft tissues. The heart was flabby and light coloured.

Both lungs were more or less generally congested, and at the apices were a few very small scars, indicative of old headed tuberculous lesions. Extending inwards, from the surface of the lower lobe of the right lung, was a patch of red hepatization, about the size of the palm of the hand, and about one to one and a half inches thick. It was judged that this patch *in situ* would just correspond with the spot indicated externally by the patient as being the place where the pain was so acute and continual, and where he had received the blow in falling. The liver, kidneys, and spleen were somewhat congested, and the coats of the stomach reddened.

Taking all the circumstances into consideration, I arrived at the conclusion that the man died of pneumonia, secondary to contusion of the lung, contracted by the accident. This also was the verdict at the inquest, on which occasion Dr. Bannister was the only medical witness called.

An action for damages against an insurance company followed. The case was tried on November 16th, 1908, at Blackburn County Court by Judge Hamilton, assisted by Dr. R. Hunt as medical referee. The contention was that the man died from pneumonia following contusion of the lung caused by the accident. I was the first medical witness called, and maintained this opinion, in which I was supported by Drs. Bannister and Allan.

The defence was that the pneumonia was due to natural causes, and was a mere coincidence, that it could not have been due to the accident as there were no visible signs of external injury. This view was supported by Drs. R. A. Gray and Walter Rigby, the only medical witnesses called by the defence. The judgement of the Court was that there had been an accident, that the man died of pneumonia, and that the accident had nothing to do with it.

I will now capitulate the grounds on which I formed the opinion that the pneumonia was the result of the accident.

1. The man goes to his work in the early morning feeling perfectly well, comes home to dinner, and returns to his work feeling perfectly well. He falls and hurts his side, not very badly, as he thinks, and manages to finish his job, which is not a very heavy one; but by the time he arrives home, after about two hours, the pain is so bad he