is of slow growth, we may presume that it is more likely to obtain a footing when it is left undisturbed in parts where the air is more or less stagnant."

Wherefore we may take it that in the apical portions we have the parts of the lungs which are the most inaccessible to the purifying influences of the tidal air, for which reason, the germs of tubercle being once implanted thereon, there is nothing to disturb the progress of their growth, or to prevent the elaboration of their baneful influences.

When pleurisy affects the chest it leaves traces in the form either of thickened serous membrane or of inflammatory adhesions, or almost universally of both, which must have an influence on the expansile power of at least one part of the lung; grant this diminution in the power of expansion of a so affected area, and you admit the existence of a patch of lung tissue, analogous in functional characteristics to the apices, and therefore predisposed to invasion and attack by the germs of consumption.

This is most probably the manner in which the case under review has been attacked by the disease. It is possible, of course, that tubercle may have developed as a sequel to a traumatic hæmorrhage from contusion of the lung at the seat of injury, which would thus furnish a suitable soil for the growth of the invading bacilli, but the fact that there was no cough and no hæmoptysis for some considerable time after the infliction of the injury leads me to the idea that the tuberculous infection was in reality superimposed upon a deflated area of lung tissue consequent upon traumatic pleurisy.

In the treatment of the case there are several points of interest; the patient during the entire course of treatment was in a state of semi-starvation; in receipt of only 6s. 11d. per week as benefit from his friendly society, he contrived by means of cod-liver oil and pulmonary antiseptics reinforced by breathing exercises, not only to place something to the credit of his body weight, but to free himself, as far as physical and microscopical examinations could ascertain, from an attack of pulmonary tuberculosis.

It seems to me, as the outcome of observation, that if there is one thing in the treatment of this scourge above another to which due attention has not been given, it is the question of pulmonary physical culture. This seems to me to be the one method whereby this anchoring and consequent devitalizing of the pulmonary tissues by pleuritic adhesions may be rendered comparatively impotent.

I have for some time past taken the opportunities which have been afforded me of measuring the range of chest expansion in cases of pulmonary phthisis, and I find that it practically never approaches the normal or average of the healthy chest, which may be put at from $2\frac{1}{2}$ in. to 3 in. Anything between 1 in. and 2 in. is a very common range in cases of chest disease—which being the case, the question arises, of what use is all the fresh air in the universe to a man who, suffering from phthisis, is unable so to expand his chest as to permit the purifying influence of the air to reach the most ultimate alveoli of the lungs? In pulmonary physical culture, I believe, we have the means whereby this is to be effected.

I have had several cases in which treatment by this method combined with the exhibition of pulmonary antiseptics has proved remarkably beneficial. The case under consideration is one of these, but I should like to read short notes of a case which was treated by pulmonary gymnastics alone, and that too in a tainted atmosphere, with excellent results, inasmuch as it serves, more distinctly than those in which the treatment has been combined with drugs, to demonstrate the value of the purely physical treatment.

The patient, an overgrown lad of 18 years, had been troubled with a cough for only a few weeks; the expectoration accompanying the cough was scanty, but contained tubercle bacilli in abundance. It is unnecessary to detail the physical signs found on examination; suffice it to say that they were not exactly typical of a fully inflated apex solidified by tuberculous deposit, and led me to suspect that the left apex was in a condition most probably of apneumatosis, with a tuberculous infection superimposed upon the collapsed area. The range of chest expansion taken at the nipples was $1\frac{1}{2}$ in. Pulmonary antiseptics were prescribed, with cod-liver oil, but all were rejected from the beginning. Treated entirely by physical culture, in about three months' time his range of expansion had increased to 3 in., his cough gradually disappeared, and all trace of abnormality in the lung vanished. It is only fair to state that this treatment was carried out to the end in the very heart of our city. The lad is now—four years later—still in perfect health.

Breathing as a curative agent—that is, forced or dynamic breathing, by which is intended that mode of respiring in which inflation and deflation of the lungs, instead of being an

unconscious and involuntary act, is subjected to the dictates of the will and as far as possible brought under voluntary control—is no new method of treatment, for as a writer in one of our leading journals, writing on Full Breathing as a Therapeutic Agent, Restorative and Curative, says: "Frequently has attention being called in these pages to the great value of cultivating the habit and practice of filling the lungs to the utmost capacity as a curative measure in all scrofulous and other constitutional conditions.....In constitutional disease depending on malnutrition, and associated with impaired assimilation of the kind that is belonging to the deeper tissue renovation and repair, this practice of breathing in oxygen to the fullest extent is of remarkable curative powers."

There can be no doubt that deep and forcible rhythmic breathing, by means of which the lungs, which ordinarily only take in 20 or 30 cubic inches of air at each inspiration, may be made by practice to accommodate as much as six times the quantity, generates a large quantity of vital energy, and indeed forms of itself a superb physical culture; and quite apart from the physiologically vitalizing influence, its power as a scavenger of the uttermost interstices of the respiratory apparatus must alone commend it as a therapeutic agent in pulmonary tuberculosis.

Numerous as are the various points in the systems of dynamic breathing at present in vogue, all the exercises are perfectly simple and most of them have strong points in favour of their acceptance by exponents of the healing art.

Taken generally, respiratory gymnastics as recommended by professional physical culturists, are valuable exercises, and all have very much in common as regards the ultimate result.

With a general knowledge of these systems, any one who is familiar with the muscular mechanism of ordinary and extraordinary respiration may, with little trouble, evolve an excellent system of breathing exercises, or, in the presence of disease of the lungs, invent a scientific system of respiratory movements suitable to the special condition of the patient and the site of the disease.

As a side issue in connexion with the question of chest expansion, its bearing upon life insurance is of considerable importance. It has been a matter of surprise to me that all life offices do not make specific reference to this point in the catechism of their medical forms. Some ask definitely for a note of the chest measurements on expiration and on inspiration, but these offices would seem to be in a minority.

I would commend to the notice of "life" companies the advisability of demanding a fairly good chest expansion as an additional safeguard against pulmonary disease, especially in considering the lives of young adults, and would suggest as a passable minimum range of expansion a difference of $2\frac{1}{2}$ in. from forced expiration to forced inspiration.

On the side of the applicant for life insurance there is also something to be said. It is well known how great the stress is that is laid upon a tuberculous family history. It seems to me that this may in very great measure be discounted when the applicant himself is of good physique, of healthy appearance, and where the chest expansion is fully up to the normal.

THE SO-CALLED ANTHRACOSIS AND PHTHISIS IN COAL MINERS.

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In former years these conditions were stated to be prevalent in miners of coal; in fact, they were said to be so prevalent that they were classified by many statisticians in "occupational diseases" of this class of workmen.

Probably largely owing to the great improvements in mine-ventilation in this country, these conditions are very uncommon now; it is probable also that, as regards anthracosis at any rate, a considerable amount of misapprehension has led to the symptom "black spit" being taken as diagnostic of anthracosis when the diseased condition of the lung may have been due to something altogether different from coal dust.

Though all coal miners would show a blackening of the lungs due to the inhalation of coal dust, smoke from powder and other explosives, and soot from their lamps and candles, in the *post-mortem* room, this blackening or anthracosis is by no means necessarily due to a diseased condition of the lungs,

nor does it seem to be a factor in the causation of a diseased condition of the lungs. Phthisis, either fibrous or tuberculous, as a disease among coal miners due to their occupation is very uncommon indeed; in fact, as a disease phthisis is probably more uncommon in coal miners than in any other class of workmen in the country.

I very much question whether the presence of coal dust and soot in the lungs of miners has any influence whatever in the production of phthisis, and I venture to express the opinion that anthracosis as a disease *per se* does not exist, but is really an epiphenomenon in diseases of the lungs in which this blackening is found.

In a tuberculous phthisis the diseased condition is due to the presence and work of the tubercle bacillus on a fertile ground; in a fibrous phthisis the fibrosis is due, not to the presence of coal dust and soot and their irritating peculiarities, but to the presence of and irritation produced by the dust particles from the post or sandstone strata and by the dust from the shale and seggar clay.

I wish particularly to draw the attention of pathological observers to this point, and to the fact that these other dust particles are probably not as a rule observed, on account of the only too evident presence of the coal dust and soot particles which obscure them macroscopically and microscopically. I would suggest to these observers the application of simple chemical tests, the use of the polariscope, and also a comparison with the lung tissues of dead ganister workers.

I am inclined to believe that the comparative rarity of phthisis among coal miners is probably largely due to the protective influence of coal dust and soot. I am aware that this is disputed, but I am not aware that it has been disputed in regard to the relative protecting and irritating influence of coal dust and soot, etc., and the post, shale, and seggar clay dusts.

I do not think that this point has been touched upon, far less argued out, by other observers. This protective influence of coal dust and soot appears to be due partly to a filtering action, partly to a mechanical action, in clinging to and covering the sharper angles of the post, shale, and seggar clay dusts, which latter are thus screened as a rule from observation, and to a lesser degree to an antiseptic and deodorant action.

That there must be some protective influence in the coal dust and other carbon particles inhaled by the coal miner seems evident, for many of the other factors which favour the development of phthisis are present and actively at work in his daily life, such as (in this district at least) living in damp houses under conditions of overcrowding and bad ventilation, working in an atmosphere often impure from the presence of noxious and irritating gases, and where the percentage of oxygen is often below the normal, and possibly also sometimes contaminated with dried tuberculous sputum, and spending the greater part of his time indoors and in the mine. In fact, one may say that the average coal miner often works in the mine under more healthy conditions than those in which he lives at home.

A point which corroborates this is the fact, which is well known to all men familiar with mine work, that the horses and ponies down the mine improve in condition there, and though they do not get very much nor very efficient grooming their coats are generally sleek and glossy. The average life of a horse or pony in a pit, notwithstanding the hard nature of its work, is quite up to the outside standard. I know of several ponies down the pit upwards of 20 years of age still working well. These have been in the mine all their working lives. The statements as to the prevalence of coal miners' phthisis in former years do not correspond with the actual facts observed now. Phthisis among colliers is the same as phthisis among other people, and arises from the same causes with the exception above mentioned. Facts worth noting, too, in this connexion are:

1. Coal dust may remain embedded under the skin for years without producing any irritation whatever.
2. The death returns from phthisis in a colliery district show a greater proportion of deaths among females than among males.
3. Colliery surgeons almost invariably state that phthisis is not so common in mining as in other districts where they have been in practice.
4. In the majority of phthisis cases which do occur there is a strong family history of phthisis on one or both sides.
5. Phthisis often seems to attack successive families in particular houses.

THE "PHYSIOLOGICAL" DIFFERENCE BETWEEN THE TWO SIDES OF THE CHEST

IN THE PHYSICAL SIGNS OBTAINED OVER THE UPPER PART
OF THE LUNG.

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It has long been recognized and taught that the physical signs obtained in examination of the chest by palpation, percussion, and auscultation are not identical on the two sides. That there are such differences may be generally recognized by teachers, though the fact is certainly not universally emphasized in their textbooks and writings. The extent of these differences is, however, certainly not always fully appreciated by practitioners, and an exaggerated idea of what may be considered as physiological differences in the signs elicited over the two lungs leads sometimes to failure in recognizing a very important pathological condition when such recognition is of vital consequence to the patient.

That tuberculosis of the lungs is curable if treatment is commenced whilst the disease is in its earlier stages is now abundantly proved; the small expectation of cure when the disease has become more advanced is unfortunately common experience.

In the detection of the disease physical examination of the chest is an important factor, and in the earlier stages the deviations from the normal are often but slight. There is practically no standard which we can apply to all cases; the physical signs which are normal in one individual would be abnormal in another person of different build or age. We are therefore obliged to supplement our sense of whether or not the signs elicited over a portion of a lung in any given case approximate to our views of the supposed normal, by comparison with the corresponding part of the opposite side of the chest. The exact amount of difference between the two sides which may be considered "physiological" as opposed to "pathological," becomes then a matter of supreme importance.

In the Medical Report for 1902 of the Mount Vernon Hospital for Consumption and Diseases of the Chest, out of 68 early cases of tuberculosis of the lung in which signs of disease were found in one upper lobe only, 46 had the right lung affected, or 67.35 per cent. In commenting upon this the report says that the preponderance of the right side over left-side cases affords evidence "that the greatest care should be taken before assigning any slight abnormality of the physical signs at the right apex to the generally-accepted physiological difference between the right and left apices." It is on these grounds, and in view of cases in which the physical signs of early tuberculosis of the lung have been passed over as representing the physiological difference between the two sides of the chest, that I have noted carefully when examining healthy chests what differences can be detected over the upper part of the chest between the two sides. The cases include healthy persons presenting themselves for life assurance, healthy young women joining the staff of the hospital as nurses, probationers, or servants, and a few patients suffering from slight complaints unconnected with the lungs.

THE PHYSICAL SIGNS OVER THE PULMONARY APICES ON EXAMINATION OF THE CHEST IN HEALTH.

It cannot be too much insisted upon that by physical examination we can only learn the physical condition of the parts, so that physical examination alone will not lead us to a diagnosis. But, on the other hand, the general condition of the patient and his various symptoms, though these may give reason to suspect tuberculosis, are by themselves insufficient foundation for an opinion on the nature of his complaint. Examination of the sputa cannot be relied upon for the very obvious reason that there may be no expectoration to examine. Many cases of pulmonary tuberculosis run their course to arrest or cure without any expectoration and even without any marked cough. Of those cases where cough with expectoration is present from the commencement, in comparatively few will tubercle bacilli be found in the sputa until the disease has advanced so far that the physical signs in the chest give clear indications of the presence of disease; examination of the sputa may then be useful to demonstrate its nature.

The right lung is primarily affected in pulmonary tuberculosis more frequently than the left, and it is in the